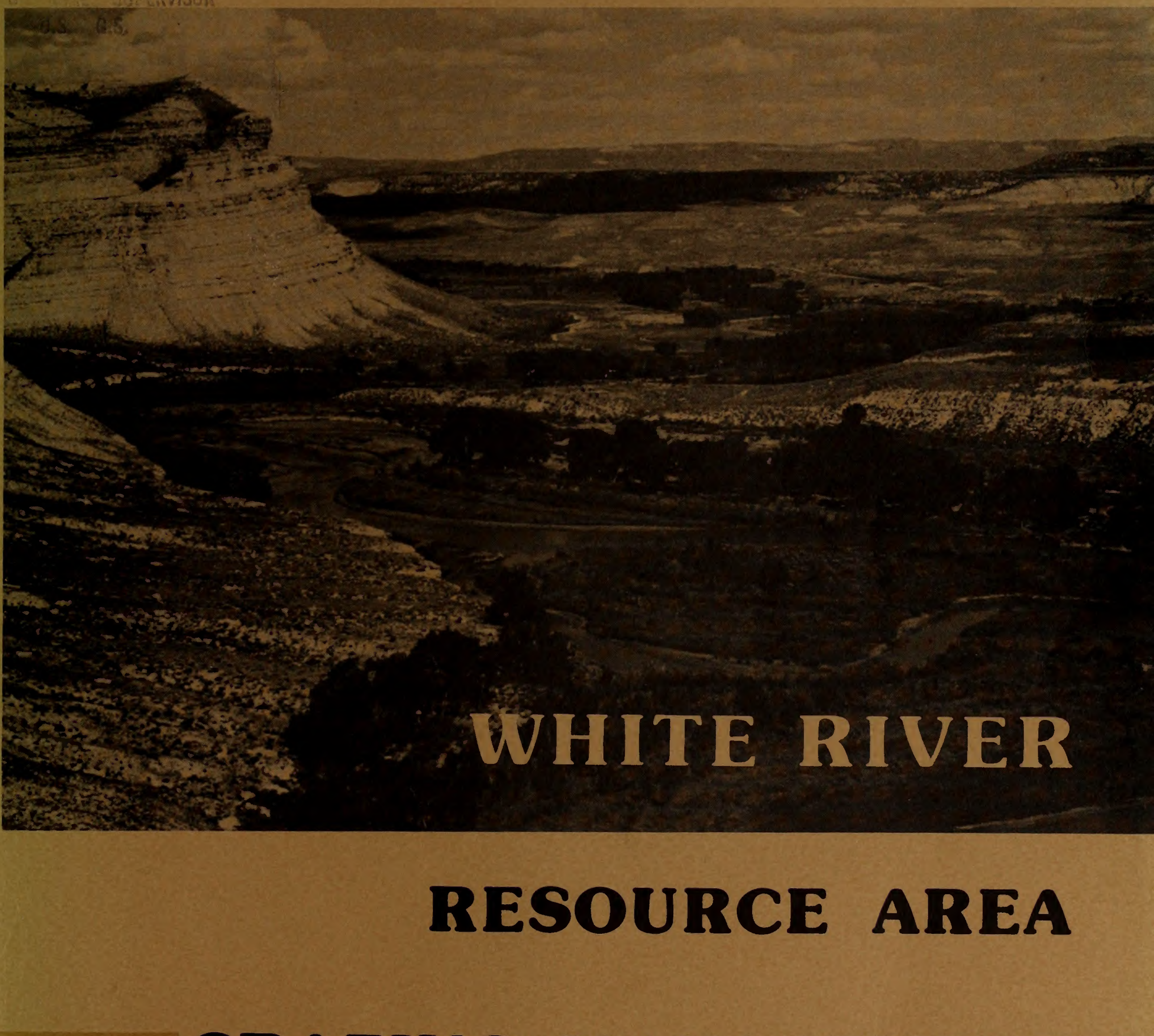
DRAFT ENVIRONMENTAL IMPACT STATEMENT



RESOURCE AREA

GRAZING MANAGEMENT

PROPOSED GRAZING MANAGEMENT PROGRAM FOR THE WHITE RIVER RESOURCE AREA

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Prepared by

BUREAU OF LAND MANAGEMENT

U.S. DEPARTMENT OF THE INTERIOR

State Director

Colorado State Office

PROPOSED GRAZING MANAGEMENT PROGRAM FOR THE WHITE RIVER RESOURCE AREA

(X) Draft ( ) Final Environmental Impact Statement

U.S. Department of the Interior, Bureau of Land Management

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

2. *Abstract*: The Bureau of Land Management proposes to implement a well balanced rangeland management program for the White River Resource Area (approximately 1,521,806 acres of public lands) in the Craig District, located in Garfield, Moffat, and Rio Blanco Counties of northwestern Colorado. The overall objective of the proposal (Action Proposal) is to provide an improved rangeland condition capable of supplying 182,888 animal unit months (AUMs) of forage in the short term and 229,758 AUMs by the year 2000 for use by big game wildlife, wild horses, and livestock on a sustained yield basis. The proposal would continue intensive grazing management on 156,471 acres, implement intensive grazing management on 1,290,554 acres, and implement less intensive grazing management on 61,941 acres. Range improvements required to implement intensive management include approximately 186,000 acres of vegetation manipulations, 700 watering facilities, and 212 miles of fence.

Implementation of the proposal would result in rangeland vegetation conditions improving on 581,000 acres and remaining stable on the remainder. Erosion and runoff would decrease as a result of improved watershed conditions. Wildlife forage and habitat conditions would improve and lead to increased populations of deer (11 percent), elk (8 percent), and antelope (2 percent), which would result in an increase of approximately $2.7 million in hunter/recreation income for Colorado. The proposal would provide an improved habitat capable of supporting 140 wild horses in the long term. However, the present wild horse range would be reduced by by 72 percent to 107,000 acres with an 86 percent reduction in wild horses from the present 625 head to 90 head. The initial reduction in livestock grazing use from the present 136,028 AUMs to 109,003 AUMs (20 percent) would decrease local incomes by $260,398. Long term livestock grazing use would increase to 156,058 AUMs (13 percent above present use) with favorable increases in local incomes of $326,874.

3. *Alternatives Considered*:

A. Action Proposal

B. No Action

C. Elimination of Livestock Grazing from Public Lands

D. Optimize Livestock Grazing

E. Emphasis on Other Resource Uses

F. Optimize Wild Horses

4. *Request for Comments*: See the list on the following page.

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6. *Date Draft Statement Made Available to EPA and to the Public*: *April 23, 1980. Close of comment, June 18, 1980.*

COORDINATION IN REVIEW OF DRAFT ENVIRONMENTAL STATEMENT

FEDERAL AGENCIES

Advisory Council on Historic Preservation
Department of Agriculture
- Forest Service
- Soil Conservation Service

Department of Defense
- U.S. Army Corps of Engineers
- U.S. Navy (Naval Oil Shale Reserve)

Department of Energy
Department of Interior
- Fish and Wildlife Service
- Geological Survey
- National Park Service
- Water and Power Resource Service

Environmental Protection Agency

COLORADO STATE AGENCIES

Office of the Governor
Colorado Division of Planning - State Clearing House (distributes to State agencies)
Colorado Historical Society

LOCAL GOVERNMENT

Rio Blanco, Moffat, and Garfield County Commissioners, Planning Commission, and local city governments.

OTHER ORGANIZATIONS AND INDIVIDUALS

Numerous organizations and individuals expressing interest in and/or affected by the proposal have been sent copies of this statement and have been invited to comment.

SUMMARY

INTRODUCTION

The Bureau of Land Management (BLM), Craig District, proposes to develop a well balanced rangeland management program on 1.5 million acres of public land within the White River Resource Area. Six separate proposals for implementing a management program are considered in this Environmental Impact Statement (EIS). After analysis of each proposal, one is identified as the preferred grazing management program (the preferred alternative).

ALTERNATIVES CONSIDERED

The six alternatives considered and analyzed in the EIS are:

1. Alternative A - Action Proposal
2. Alternative B - No Action (Continuation of Present Management)
3. Alternative C - Elimination of Livestock Grazing from Public Land
4. Alternative D - Optimize Livestock Grazing
5. Alternative E - Emphasis on Other Resource Uses
6. Alternative F - Optimize Wild Horses

All alternatives except Alternative C (Elimination of Grazing) were developed from the 1978-79 revision of the land use plan (Management Framework Plan, MFP) for the White River Resource Area. Alternative B was developed from base data (the present situation) collected on three planning units in the Resource Area. Alternatives D, E, and F were developed from recommendations made in the land use planning process (MFP) for optimizing individual resource values and uses, while Alternative A was developed from the multiple use recommendations made for coordinating all resource values and uses identified through the land use planning process.

Alternative A - Action Proposal

The objectives of the Action Proposal are to provide improved rangeland conditions capable of supplying 182,888 animal units months (AUMs) of forage in the short term and 229,758 AUMs in the long term for use by wildlife, wild horses, and livestock on a sustained yield basis. In addition, 6.5 miles of Colorado cutthroat trout habitat and 72 acres of critical sage grouse habitat would be protected by fencing. About 55.5 miles of riparian habitat and 241,000 acres of sage grouse habitat would be designated for improvement through improved livestock grazing management.

The allocation of vegetation is one of the principal issues in the proposal. Fifty percent of the vegetation available was allocated for the combined use of livestock, big game wildlife, or wild horses with the remaining vegetation reserved for plant maintenance, nongame and small game wildlife, and watershed protection.

Initial allocations (short term) would provide 64,521 AUMs of forage for big game wildlife, 1,350 AUMs for wild horses, and 109,003 AUMs for livestock use. The long term (year 2000) allocation would provide increased allocations for big game wildlife (71,599 AUMs), for livestock (156,058 AUMs), and for wild horses (2,101 AUMs).

The initial allocations would require adjustments in the existing use levels of livestock and wild horses. Adjustments in livestock and wild horse use levels would be completed in 3 years and would consist of 27,025 AUMs (20 percent) for livestock and 8,014 AUMs (86 percent) for wild horses.

Allotment management plans (AMPs) would be developed for each allotment in the EIS area. Six allotments on 156,471 acres of public land would continue under intensive management. In addition, intensive management would be developed on 75 allotments (1,290,554 acres). Specific grazing systems and necessary range improvements would be developed during implementation of the Action Proposal. Less intensive management would continue on 58 allotments (61,941 acres).

A minimum rest requirement (a period of no livestock grazing) is proposed for each allotment and would be incorporated into grazing systems during AMP preparation. Progress and effectiveness of the grazing management proposals would be monitored through study programs designed to assess changes in vegetation condition and trend in relation to multiple use management goals.

Implementation of intensive livestock grazing management would require development of 699 water facilities, 212 miles of fence, and 186,310 acres of vegetation manipulation. Range improvements would be developed within 8 years.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE A

Rangeland conditions would improve on 581,000 acres of public land which would allow for improvement in soil and watershed conditions. Soil displacement would decrease by 1.6 tons/acre/year, while a decrease in runoff (0.43 inches/acre during high intensity storms) would result in a 5 percent decrease in sediment yield to 2.28 tons/acre/year. Improvements in forage production on wildlife use areas would permit population increases for deer, elk, and antelope to 51,526 (11 percent), 1,926 (8 percent), and 224 (2 percent), respectively. This would create an increase of 18,684 hunter recreation days with a resulting increase of $2,742,213 to the state economy. Habitat conditions for sage grouse would also improve. Riparian vegetation conditions would improve on 89 acres and decline on 7 acres, resulting in fish habitat improvement along 45 stream miles and deterioration along 3 stream miles. The present wild horse range would be reduced by 72 percent to 107,000 acres capable of supporting 140 wild horses in the long term. Present livestock use levels would be reduced to 109,003 AUMs (20 percent) in the short term, which would create significant decreases of $99,731 in ranch incomes and $160,667 in incomes to other EIS area economy sectors. By the year 2000, livestock use would increase to 156,058 AUMs (13 percent above present actual use) resulting in favorable increases of $125,188 to ranch incomes and $201,686 to incomes of other EIS area economy sectors.

Alternative B - No Action

The No Action alternative would not change the existing grazing management or the present grazing use levels of vegetation. The present grazing use levels are based on the average active licensed use for livestock (136,028 AUMs), the forage requirements for the 1978 big game wildlife population (64,521 AUMs), and the forage requirements for the current wild horse population (9,364 AUMs).

Intensive management would continue on the six allotments (156,471 acres) presently under intensive management with less intensive management continuing on the remaining 133 allotments (1,352,495 acres). No scheduled rest periods would occur during the present authorized period of use on the less intensive management allotments, with the present period of use being maintained.

The current wild horse population (625 horses) would continue to utilize the present 443,979 acre wild horse range. The wild horse population would be controlled to maintain a maximum of 625 horses.

No new range improvements would be developed, however, existing range improvements would be maintained in serviceable condition.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE B

Continuation of the present grazing levels for livestock, wild horses, and big game wildlife (especially deer) would result in long term declines in rangeland and habitat conditions. Poor condition rangeland would increase by 89,476 acres while good and fair condition rangeland would decline by 89,280 and 8,804 acres respectively. Declines in vegetation conditions would lead to a long term increase of 0.8 tons/acre/ year in soil displacement, and a 4 percent increase in sediment yields to 2.39 tons/acre/year as a result of increased runoff (0.46 inches/acre during high intensity storms). Declining vegetation conditions would result in a long term decrease of 13,300 AUMs (7 percent) in available forage production, creating a decline in present mule deer populations to 37,769 (12 percent). This would lead to a reduction of 15,826 hunter recreation days with a resulting decrease of $1,560,659 to the state economy. Riparian vegetation conditions would decline on 75 acres and improve on 5 acres, resulting in fish habitat deterioration along 21 stream miles and improvement along 6 miles. Wild horse populations would have to be controlled in order to maintain the present population. Livestock grazing levels would continue at present levels (136,028 AUMs) through the long term, however, at some point during the long term (before the year 2000), livestock levels may require downward adjustments in response to declining rangeland conditions and forage production.

Alternative C - Elimination of Livestock Grazing from Public Lands

Under this alternative, wildlife and wild horse populations would be allowed to reach a balance with the vegetation resource without the influence of livestock grazing. Existing livestock grazing use on public lands (except livestock trailing on established trails) would be eliminated on all public lands within the White River Resource Area.

All available forage production (182,888 AUMs short term and 192,032 AUMs long term) would be allocated for wildlife and wild horse use and for enhancement of other resources. Existing big game wildlife use of 64,521 AUMs would be allowed to increase to 78,440 AUMs in the long term. Existing wild horse use of 9,364 AUMs would be allowed to increase to 11,250 AUMs in the long term for a maximum of 750 wild horses.

No development of new range improvements or maintenance of existing range improvements would occur except for the benefit of resource values other than livestock grazing. Extensive fencing (approximately 1,200 miles) may be required, at the option of adjacent land owners, if livestock grazing is to continue on private and state lands adjacent to public lands. Implementation of this alternative, if selected, would be accomplished within 3 years.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE C

Eliminating livestock grazing use would enhance most other uses which occur on public lands. Improvements in vegetation conditions would occur in a relatively short period of time, providing the maximum soil protection in the long term. Rangeland condition would improve on 1,225,000 acres of public land. Rangeland in good condition would increase by 327,000 acres. Soil displacement would decrease by 3.6 tons/acre/year, while a decrease in runoff (0.41 inches/acre during high intensity storms) would result in an 11 percent decrease in sediment yield to 2.12 tons/acre/year. Riparian vegetation conditions would improve on 251 acres, resulting in fish habitat inprovements along 71 stream miles. Big game populations would increase to 53,340 deer (15 percent), 1,926 elk (8 percent), and 224 antelope (2 percent). This would create an increase of 21,251 hunter recreation days, resulting in an increase of $2,996,355 to the state economy. Deer populations could decrease at some point in time, beyond the long term (year 2000), as a result of declines in preferred winter forage (browse). The elimination of livestock grazing from public lands would result in the nonutilization of 98,592 AUMs of available forage which would not be used to the benefit of other resources. Adverse economic impacts would occur to the EIS area economy and livestock industry, especially to the ranching operations dependent upon public land grazing. Ranch incomes would decline by $432,412, while incomes to other EIS area economy sectors would decrease by $696,616.

Alternative D - Optimize Livestock Grazing

Under this alternative, livestock grazing would be optimized to the level of sustained annual yield of available forage production on public lands suitable for livestock grazing. Big game wildlife and wild horses would be allocated forage not utilized by livestock (noncompetitive) on areas suitable for livestock, and all forage available to wildlife and wild horses on areas unsuitable for livestock.

Short term allocations would be 133,075 AUMs for livestock, 42,948 AUMs for big game wildlife, and 760 AUMs for wild horses. Long term allocations would be 180,114 AUMs for livestock, 48,482 for big game wildlife, and 797 AUMs for wild horses.

Wild horses would be managed on 107,000 acres as under the Action Proposal but would be reduced to 52 head.

The livestock grazing management proposals (intensive and less intensive management, utilization levels, minimum rest periods, etc.) would be, under this alternative, the same as under the Action Proposal. Range improvements proposed under this alternative would be the same as those under the Action Proposal with an additional 14 miles of fence proposed within the wild horse range. Implementation, as in the Action Proposal, would be an 8 year period after approval of the final EIS with adjustments in livestock, wild horse, and big game wildlife use being made by the third year.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE D

Optimization of livestock grazing would provide for the multiple use objectives of most major resource uses except those dealing with wildlife and wild horses. Rangeland conditions would improve on 581,000 acres which would contribute to improved soil and watershed conditions. Soil displacement would decrease by 1.4 tons/acre/year, while a decrease in runoff (0.43 inches/acre during high intensity storms) would result in a 4 percent decrease in sediment yield to 2.30 tons/acre/year. In the long term, the forage allocation for big game wildlife would be reduced to 48,482 AUMs (25 percent below present use). Consequently, population numbers for deer, elk, and antelope would be 36,579 (19 percent), 798 (55 percent), and 103 (53 percent), respectively. This would create a decrease of 20,992 hunter recreation days, with a resulting decrease of $2,721,214 to the state economy. Riparian vegetation conditions would improve on 89 acres and decline on 19 acres, resulting in fish habitat improvement along 45 stream miles and deterioration along 3 stream miles. The substantial reduction (92 percent) in wild horses numbers that would be required could result in a nonviable wild horse population (52 head). Management of a nonviable population would be in nonconformance with the Wild and Free-Roaming Horses and Burros Act and would require actions by BLM to assure continuation of a viable population. Short term livestock grazing use would decrease to 133,075 AUMs (2 percent below present actual use), however, increases of $43,825 to ranch incomes and $70,602 to incomes of other EIS area economy sectors would occur. Long term livestock use would increase to 180,114 AUMs (25 percent above present use), resulting in increases of $240,507 to ranch incomes and $387,457 to incomes of other EIS area sectors.

Alternative E - Emphasis on Other Resource Uses

Under this alternative, livestock grazing would be managed to optimize or emphasize other resource values such as riparian habitat, sage grouse habitat, watershed and soil protection, wild horses, and big game wildlife.

A larger quantity of forage would be allocated to increased big game wildlife and wild horse populations in the long term than under the Action Proposal. Short term allocations would be 64,742 AUMs for livestock, 64,521 AUMs for big game wildlife, and 4,200 AUMs for wild horses. Long term allocations would be 88,845 AUMs for livestock, 96,815 AUMs for big game wildlife, and 6,750 AUMs for wild horses.

Wild horses would be managed on 107,000 acres with a maximum population of 450 horses.

Existing intensive management would continue on six allotments (156,471 acres of public land) with intensive management proposed on an additional eight allotments (437,226 acres) to improve conditions on critical deer winter range. Less intensive management would continue on 125 allotments (915,269 acres).

Minimum rest requirements proposed under the Action Proposal would be applied every year on each allotment under this alternative. A fall minimum rest requirement would also be imposed on 11 allotments to increase available forage to deer on critical winter ranges. Kind of livestock, period of use, and utilization levels of key species would be the same as under the Action Proposal.

Range improvements would be limited to those that would enhance deer, elk, antelope, and sage grouse habitat conditions. Range improvements would include 160 water developments, 172 miles of fence, and 83,890 acres of vegetation manipulations.

Adjustments in grazing use would occur over a 3 year period with implementation of AMPs and range improvements occurring within 8 years.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE E

By optimizing resource uses other than livestock grazing, long term rangeland conditions would improve on 910,000 acres, with good condition range increasing four times the present amount to 324,246 acres. Consequently, soil displacement would decrease by 2.7 tons/acre/year, while a decrease in runoff (0.42 inches/acre during high intensity storms) would result in an 8 percent decrease in sediment yield to 2.19 tons/acre/ year. Improved vegetation conditions would allow deer, elk, and antelope populations to increase to 55,835 (23 percent above 1978 populations), 1,926 (8 percent) and 224 (2 percent), respectively. This would create an increase of 27,749 hunter recreation days with a resulting increase of $3,639,834 to the state economy. Sage grouse habitat conditions would also improve. Riparian vegetation conditions would improve on 211 acres, resulting in improvements in fish habitat along 53 stream miles. The size of the wild horse range would be reduced by 72 percent to 107,000 acres, with a 28 percent reduction in wild horse numbers to 450 head. Present livestock grazing levels would be reduced to 64,742 AUMs (48 percent) in the short term, which would create significant decreases in income of $375,146 for ranching operations and $605,146 for other EIS area economy sectors. By the year 2000, livestock use would increase to 88,845 AUMs but still remain 35 percent below present actual use. This would result in decreases in incomes below the present levels of $272,682 for ranching operations and $439,291 for other EIS area sectors.

Alternative F - Optimize Wild Horses

This alternative would propose optimum levels of management for wild horses. Short term allocations of forage would be 103,752 AUMs for livestock, 64,521 AUMs for big game wildlife, and 9,364 AUMs for wild horses. Long term allocations would be 141,780 AUMs for livestock, 71,599 AUMs for big game wildlife, and 16,865 AUMs for wild horses.

Wild horses would continue to be managed on the present wild horse range (443,979 acres) with population levels managed at a minimum of 700 and a maximum of 1,125 head. The wild horse range would be divided into four units with horses in excess of the minimum number set for each unit being removed every 5 years.

Intensive grazing management would continue on six allotments (156,471 acres), one of which is within the wild horse range. Intensive management is proposed for 62 allotments (804,168 acres public land) and less intensive management is proposed for 71 allotments (548,327 acres), thirteen of which would occur in the wild horse range.

The range improvements proposed for allotments without wild horses in the Action Proposal are also proposed under this alternative. Range improvements on these allotments would include 521 water developments, 119 miles of fence, and 120,128 acres of vegetation manipulations. Range improvements proposed on wild horse allotments for enhancement of the wild horse habitat include 82 water developments, 19 miles of fence (none within the interior of the wild horse range), and 46,780 acres of vegetation manipulations.

Implementation of this alternative would occur over an 8 year period with livestock use adjustments occurring the first 3 years.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE F

Optimizing wild horses would benefit most other resource uses. Long term rangeland conditions would improve on 417,000 acres with good condition range increasing three times the present amount to 243,238 acres. Consequently, soil displacement would decrease by 1.4 tons/acre/ year, while a decrease in runoff (0.43 inches/acre during high intensity storms) would result in a 4 percent decrease in sediment yield to 2.30 tons/acre/year. Improved vegetation conditions would allow deer, elk, and antelope populations to increase to 51,526 (11 percent), 1,926 (8 percent), and 224 (2 percent), respectively. This would create an increase of 18,684 hunter recreation days with a resulting increase of $2,743,213 to the state economy. Sage grouse habitat would also improve. Riparian vegetation conditions would improve on 89 acres and decline on 7 acres, resulting in improvements in fish habitat along 45 stream miles and deterioration along 3 stream miles. By allowing increased forage for wild horses, population numbers would increase to 1,125 head (80 percent above the present population) on the present wild horse range (443,979 acres). Livestock use would be reduced on the wild horse range to provide for the additional wild horse forage. Present livestock grazing levels would be reduced to 103,752 AUMs (24 percent) in the short term, which would create significant decreases of $123,198 to ranch incomes and $198,472 to incomes of other EIS area economy sectors. By the year 2000, livestock use would increase to 141,780 AUMs (4 percent above present actual use), resulting in favorable increases of $75,956 to ranch incomes and $122,333 to incomes of other EIS area economy sectors.

THE PREFERRED ALTERNATIVE

The Action Proposal (Alternative A) would provide improvement in, and enhancement of, major resource values and competing land uses while, at the same time, providing for the least economic disruption. Rangeland conditions would be improved thus, providing increased soil and watershed protection and increased forage production. Improvements in aquatic and riparian habitats would occur. The Action Proposal would continue to provide space and forage for a viable wild horse herd and provide increased forage supplies for big game wildlife species. Short term economic losses resulting from reduced livestock grazing levels would occur, however, long term increases in livestock grazing use would create economic gains above the present levels. Based upon the analysis of the alternatives, the Action Proposal would be the preferred alternative.

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Section 1

PURPOSE AND NEED FOR THE ACTION

SECTION 1

PURPOSE AND NEED FOR THE ACTION

The White River Resource Area (the EIS area) is located in northwestern Colorado and is comprised of Rio Blanco county along with portions of northern Garfield County and southern Moffat County (Map 1-1). The entire Resource Area encompasses approximately 3,808 square miles containing 2,125,675 acres, of which 71 percent is public land managed by BLM, 26 percent is private land, 2 percent is State land managed by the Colorade Board of Land Commissioners, and 1 percent is State land managed by the Colorado Division of Wildlife.

Domestic livestock grazing first occurred within the White River Resource Area during the late 1880's. Livestock grazing use on public land has decreased since that time to where present livestock use is at the lowest levels since the turn of the century. At present, public lands provide at least 21 percent of the total forage requirements for the range livestock industry within the EIS area. An even greater dependency for seasonal forage requirements occurs during the spring growing season.

Considerable grazing use by big game wildlife species occurs within the EIS area. The area has the largest wintering mule deer herd in North America, and consequently, large winter kills occur during severe winters. Most livestock grazing capacity inventories (range surveys) within the EIS area did not make direct allocations or allowances for wildlife grazing use.

In addition to wildlife use, a relatively small wild horse herd (in 1970) has rapidly increased in numbers to the present population of 625 horses. As with wildlife, livestock forage inventories did not make direct allocations for wild horse grazing use.

Besides conflicting grazing uses, anticipated energy development within the EIS area would have an effect on future uses of the vegetation resource. Within the EIS area, the largest oil shale deposit in the United States occurs in the Piceance Basin, one of the largest oil and gas fields in the state occurs near Rangely, and coal deposits underlie most areas north of the White River.

As a result of court actions, the Federal Land Policy and Management Act of 1976, and the diverse uses and influences on the vegetation resource, the land use plan was revised in 1978-1979. From the revision, coordinated land use allocations were made for all resource uses.

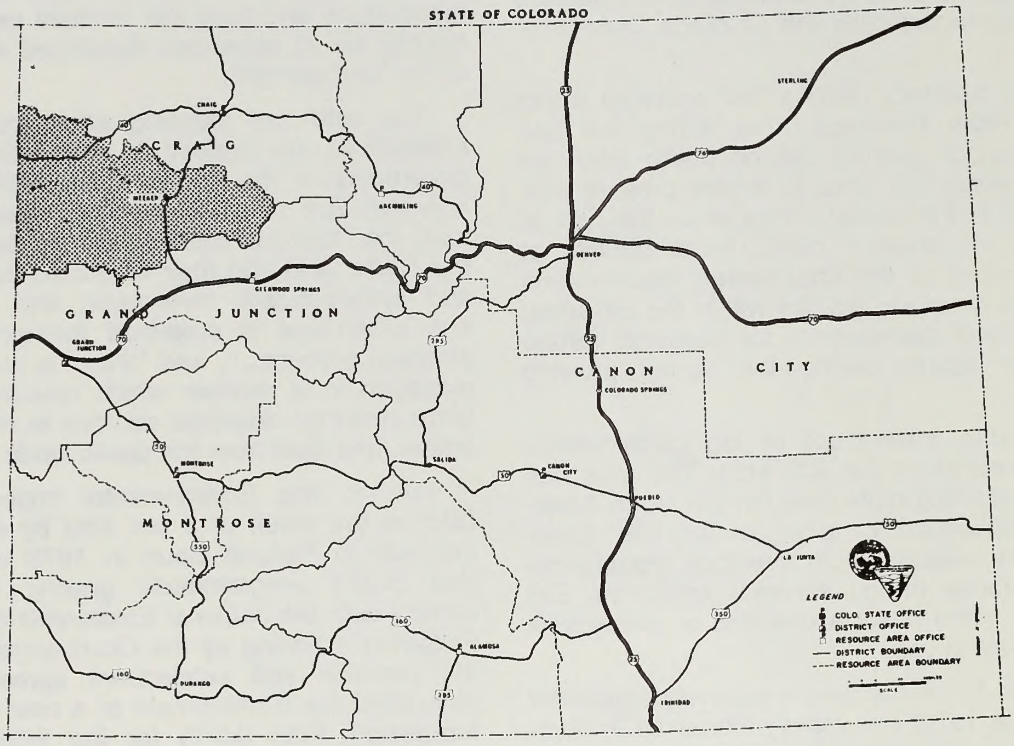
The multiple use objectives of the land use plan are to enhance the vegetation resource, improve range conditions, provide quality habitat for wildlife and wild horses, provide a continuous supply of livestock forage, reduce soil erosion and sedimentation damage, improve water quality, improve the recreation and visual resources, and protect archeological and historical sites.

Alternative proposals for allocating vegetation and managing livestock grazing were developed from the individual resource optimization recommendations and from the multiple use recommendations for all resources developed during revision of the land use plan.

The land use planning effort from which the alternatives are derived is responsive to the requirements of the Federal Land Policy and Management Act of 1976 including the policy goals that, the "national interest will be best realized if the public land and their resources are periodically and systematically inventoried and their present and future use is projected through a land use planning process...", and "that the public lands be managed in a manner which recognizes the Nation's need for domestic sources of minerals, food, timber, and fiber from the public lands...".

Further, this Environmental Impact Statement (EIS) is the result of a suit filed by environmental interests in Federal Court in 1973 which alleged that BLM's programmatic grazing EIS did not comply with the National Environmental Policy Act. Following a finding by the Court largely in favor of the plaintiffs and subsequent agreements, BLM scheduled the development of a new Management Framework Plan (MFP) for the White River Resource Area.

This statement was prepared under the new Council on Environmental Quality (CEQ) regulations for environmental assessments. This has resulted in a new format for EISs with the impacts of all alternatives discussed in the Environmental Consequences section (Section 4) and description and comparison of each alternative in Section 2. The Affected Environment section (Section 3) discusses only those elements of the environment or those resources that would be affected by the proposals within each alternative.



Map 1-1. Location Map

Section 2

DESCRIPTION OF THE ALTERNATIVES

SECTION 2

DESCRIPTION OF THE ALTERNATIVES

This section describes the alternative courses of action considered in the Environmental Impact Statement (EIS). Following the description of the alternatives, the significant impacts of each alternative identified in the Environmental Consequences section (Section 4) are described. This section concludes with a comparative analysis of each alternative and identifies the preferred alternative.

SELECTION OF ALTERNATIVES

Development of the alternative grazing management programs was guided by the Bureau's mandates to manage the public lands for multiple use and sustained yield based on the integration of physical, biological, economic, and other applicable factors. The primary Bureau multiple use mandate is the Federal Land Policy and Management Act of 1976. The principles of multiple use and sustained yield are applied to management of the public lands through a system of land use planning. The planning process begins with the multidisciplinary resource inventory contained in the Unit Resource Analysis (URA), socioeconomic data analyzed in the Planning Area Analysis (PAA), and management decisions developed in the Management Framework Plan (MFP).

The URA is a detailed compilation of inventory data for various resources including, but not limited to, minerals, range, timber, watershed, wildlife, recreation, and realty management. The URAs outline the resources present, the current status of each resource, and the capabilities and opportunities for management to beneficially affect those resources. A URA is prepared on an identified geographic area called a planning unit. The EIS area encompasses three planning units on which URAs have been completed: Meeker, Rangely, and Piceance Basin. Updates (incorporation of newly acquired data) of these URAs were completed in 1978.

The Management Framework Plan (MFP) establishes coordinated land use allocations for all resources and establishes objectives and constraints for each resource. Each resource specialist identifies the full potential of the resource in his field. The overlaps and conflicts are reconciled through extensive study and discussions, including public input. The major recommendations contained in the MFP which would affect development of the grazing program in the EIS area are summarized in Table 2-1. The MFP for the White River Resource Area contains more site specific resource recommendations and trade-offs based on particular resource conditions existing in the respective planning units. Table 2-1 indicates the multiple use parameters generally common throughout the EIS area. The update of the MFP was completed in early 1979. Public input was sought on the updated MFP through public meetings held in 1978 and early 1979.

Six alternatives are considered in this EIS, five of which were developed from information contained in the land use planning documents. The action proposal (Alternative A) addresses the vegetation allocation and rangeland management recommendations made in MFP Step II of the planning system. Alternatives to the proposal and the phase of the planning system from which they were developed are as follows:

(1) No Action (Alternative B) was developed from the present situation (current status) for each resource in URA Steps II and III.

(2) Elimination of Livestock Grazing from Public Lands (Alternative C) was not contained in the planning documents but is considered as one of the alternatives.

(3) Optimize Livestock Grazing (Alternative D) was developed from the livestock grazing optimization recommendations in MFP Step I.

(4) Emphasis on Other Resource Uses (Alternative E) was developed from the resource optimization recommendations in MFP Step I for wildlife, watershed, recreation, and wild horses.

(5) Optimize Wild Horses (Alternative F) was developed from the wild horse optimization recommendations in MFP Step I.

ALTERNATIVE A - ACTION PROPOSAL

The action proposal, as developed from the multiple use recommendations, was designed to manage the use of the public rangelands for the protection, maintenance, and improved conditions of the basic vegetation and soil resources. The objectives of the action proposal are to provide an improved rangeland condition capable of supplying 182,888 animal unit months (AUMs) of forage in the short term and 229,758 AUMs in the long term (20 years) for use by wildlife, wild horses, and livestock on a sustained yield basis (Table 2-2). In addition,

TABLE 2-1

EVOLUTION OF THE ALTERNATIVES THROUGH THE LAND USE PLANNING PROCESS

Livestock MFP I Recommendations	Other Resource MFP I Recommendations That Conflicted with Livestock Recommendations	MFP I Conflicts	MFP II Multiple use Recommendations	Rationale For MFP II Recommendations	Trade-Offs
1. Supply 133,075 AUMs in the short term and 159,734 AUMs in the long term for livestock grazing.	**Wild Horses** Reserve 5,400 AUMs of forage to maintain 200 to 450 wild horses.	Would require additional reductions in livestock use in the short term.	e) Supply 109,003 AUMs in the short term and 156,058 AUMs in the long term for livestock grazing.	Would adjust livestock grazing use to the estimated forage production level for livestock.	Reduction of present active qualifications by 50,731 AUMs short term and 3,676 AUMs long term.
		Would require additional reductions in livestock use.	b) Reserve 2,101 AUMs of forage for 95 to 140 wild horses.	Provide forage for wild horses within their most natural habitat.	Reduction of 530 wild horses.
	Wildlife Provide Wildlife forage for the following wildlife populations: *Mule Deer* 18,306 AUMs (May to Oct) 54,849 AUMs (Nov to Apr) *Elk* 1,454 AUMs (May to Oct) 3,665 AUMs (Nov to Apr) *Antelope* 84 AUMs (May to Oct) 120 AUMs (Nov to Apr)		c) Maintain 1978 wildlife populations by providing required forage as follows: Mule Deer 14,984 AUMs (May to Oct) 44,593 AUMs (Nov to Apr) Elk 1,387 AUMs (May to Oct) 3,358 AUMs (Nov to Apr) Antelope 82 AUMs (May to Oct) 117 AUMs (Nov to Apr)	Would allow for maintenance of present big game herds. Current deer winter habitat is estimated to be in suboptimal condition requiring improvement before increasing forage allocations to wildlife.	Would limit big game population increases in the short term. Mule Deer 3,322 AUMs (May to Oct) 10,256 AUMs (Nov to Apr) Elk 67 AUMs (May to Oct) 307 AUMs (Nov to Apr) Antelope 2 AUMs (May to Oct) 3 AUMs (Nov to Apr)
2. Conduct field analysis of range suitability guidelines in conjunction with forage surveys prior to adjusting livestock use in excess of 20 percent of active qualifications.	**Wild Horses** Provide 5,400 AUMs of forage for wild horses. **Wildlife** Provide 78,478 AUMs of forage for big game species of wildlife.	Continued competition of grazing ungulates until necessary livestock adjustments are made.	Reduction to be spread over a 3-year period after approval of final EIS. All reductions to be fully implemented by the end of the third year. During this 3-year period, conduct necessary studies to verify allotment forage production.	Would help lessen the economic impact to livestock operators, plus this is Bureau policy. The studies will help fill data gaps that exist from inadequate baseline data.	Possible continued wildlife-livestock forage competition during the 3-year period.
3. Allocate future forage increases to livestock until present active livestock qualifications of 159,734 AUMs are fulfilled.	**Wild Horses** Provide 5,400 AUMs of forage for wild horses. **Wildlife** Provide 78,478 AUMs of forage for big game species of wildlife.	Allocations to livestock would restrict desired increases in wildlife and wild horses. Allocations to wildlife or wild horses would restrict desired increases in livestock grazing use.	e) Provide 156,058 AUMs for livestock by the year 2000. b) Provide 2,101 AUMs for wild horses by the year 2000. c) Provide 66,388 AUMs for deer, 5,004 AUMs for elk, and 207 AUMs for antelope by the year 2000.	The allocation by the year 2000 would provide the desired forage levels for elk and antelope; provide forage to the capacity of noncompetitive forage for deer; provide forage for livestock to meet increasing demands for red meat production.	
4. Initiate AMPs for intensive management on 75 allotments and continue intensive management on six allotments.	Specific conflicts will occur with implementation of AMPs and are shown with livestock recommendations A through G below.	None.	Accept MFP I livestock recommendation.	All resources should benefit from improved livestock grazing management.	
A. Develop grazing systems that will satisfy minimum rest requirements for key forage species.	**Wild Horses** Restrict spring grazing by livestock within the wild horse range.	Would eliminate livestock grazing during spring on horse use areas.	Accept MFP I livestock recommendation.	Minimum rest requirements would provide for the physiological needs of forage plants, protect soil, and reduce competition of grazing ungulates during critical green-up periods. The rest requirements would improve range conditions and watershed protection.	Loss of 20,425 livestock AUMs during the spring grazing period.
	Watershed Restrict livestock grazing during the critical period of spring green-up and wet soil conditions.	Would eliminate livestock grazing on most allotments from 3/1 to 6/1.	Accept MFP I livestock recommendation.		
B. Develop 700 livestock watering facilities.	**Wild Horses** Develop only 46 new watering areas within the wild horse range.	Without new water facilities, livestock distribution would not be improved. With new water, wild horse/livestock forage competition would increase.	Accept MFP I livestock recommendation.	Improved livestock distribution would improve range conditions which will benefit other resource values.	None.
	Wildlife Develop 65 wildlife waters to improve wildlife distribution.	Development of livestock water in these areas will increase wildlife/livestock forage competition.	Accept MFP I livestock and MFP I wildlife recommendations.	Improved livestock distribution would generally benefit wildlife. Wildlife waters can be developed in areas unsuitable to livestock.	None.
	Consider wildlife needs and requirements in all water developments.	No conflict, except for added cost of development.	Accept MFP I livestock recommendation with stipulations of:		
			a) Fence the source of all spring developments and pipe water.	Provide protection to source and development of small riparian zone.	None.
			b) Where practical, fence reservoirs and pipe water to trough.	Provide shoreline vegetation, enhancing wildlife habitat, i.e., possible waterfowl nesting, etc.	Additional development costs.
			c) Provide wildlife escape ramps in all water troughs.	Provide wildlife access to and from water in the water troughs.	None.
	Recreation Manage Wilderness Study Areas (WSAs) in accordance with Interim Management Policy.	Would limit types of water facilities that could be developed.	Stipulations that water developments comply with Interim Management Policy in WSAs.	Bureau policy to insure integrity of WSAs. No projects would be developed that would impair WSAs' Wilderness potential.	Water developments in WSAs that would impair wilderness potential, i.e., large earthen reservoirs. Additional development costs.
	Manage VRM Class II lands so that changes are not evident.		Stipulations that water developments comply with VRM II Classification.	Assure that facilities will not contrast with VRM II scenery quality.	Additional development costs to conceal facilities.
	Cultural Values Cultural values examination of all developments.	Possible damage to cultural sites.	Stipulations that facilities receive cultural clearance prior to construction.	Assure that no cultural site will be damaged.	Relocation or redesign of development.
C. Allow livestock use of natural and developed water sources.	**Wildlife** a) Fence riparian habitat to exclude livestock.	Could prevent livestock access to water and reduce livestock forage for any riparian area that is fenced.	e) Water gaps will be installed in any riparian or reservoir fencing project.	This will allow livestock and wild horses access to water.	None.
	b) Fence riparian habitat on Soldier Creek and Lake Creek to protect the Colorado Cutthroat Trout.	Could limit types of water facilities that could be developed.	b) Fence the riparian habitat on Soldier and Lake Creeks.	This will protect habitat for the Colorado Cutthroat Trout.	Loss of 10 AUMs of livestock forage.
	c) Fence 72 acres of riparian habitat to protect critical sage grouse habitat on Roan Plateau.		c) Fence 72 acres of riparian habitat and allow moderate livestock use inside to maintain grouse habitat.	Will protect sage grouse habitat. Moderate livestock use will maintain the most desirable grouse habitat.	Possible loss of livestock forage in the short term.
	d) Fence riparian habitat on 63 miles of streams in the Resource Area.		d) Modify wildlife recommendation by: On a case by case basis, fence the riparian zone if improved livestock management is not meeting the objectives of improving the riparian zone.	This will assure all resource values are considered prior to fencing the riparian zone.	Possible continued degradation of riparian zone during evaluation period.
D. Construct stock trails to improve livestock distribution.	**Wild Horses & Wildlife** Provide forage for wild horses and wildlife.	Trails would allow livestock use of areas traditionally used only by wild horses or wildlife.	Accept MFP I livestock recommendation.	Will allow use of range suitable to livestock but presently unavailable. Livestock distribution would improve.	Wild horses and wildlife should benefit from improved range conditions.
	Watershed No surface disturbance on highly erosive soils.	Livestock access to potentially suitable range could be limited.	No trail construction on highly erosive soils. Trails constructed must have waterbars and be reseeded. Trails to be closed to vehicular traffic.	Will allow trail construction with restrictions for soil protection.	Potential suitable range surrounded by highly erosive soils.

	Recreation Wilderness Study Areas and VRM Class II areas.	Would restrict method of trail construction. Trails could impair wilderness potential of WSAs.	Trails to be designed and located so as not to impair wilderness potential. In VRM II areas, trails comply with VRM II Classification.	No projects will be developed that would impair a WSAs' wilderness potential or that would create an adverse visual impact.	Additional construction cost to conceal trails.
E. Construct 227 miles of interior and allotment boundary fences.	**Wild Horses** Remove all fences from interior of the wild horse range.	Removal of existing allotment boundary and interior fences and prevents construction of any new fences. Would decrease livestock control.	Accept MFP I livestock recommendation except on Cathedral Bluffs and Yellow Creek allotments. Construct 16 miles boundary fence and eliminate 15 miles of proposed interior fences. Fence waters in these allotments for livestock control.	Boundary fences will keep livestock and horses within the allotments and not interfere with wild horse movements. Controlled access to water will improve livestock control.	15 miles of proposed fence.
	Wildlife Fence construction in wildlife migration routes to comply with Bureau Manual 1737.	Fences could impede wildlife movements and cause wildlife losses.	Accept wildlife recommendation.	Properly designed fences would minimize wildlife losses yet allow for controlled livestock use.	None.
	Watershed & Recreation No mechanical fence line clearing.	Mechanical clearing would increase soil erosion and create a visual intrusion.	Accept watershed and recreation recommendation.	Insure protection of other resource values.	Additional construction and maintenance costs.
	Recreation Wilderness Study Areas (WSAs).	Improper fence construction could impair wilderness potential of WSAs.	Fences constructed in WSAs be in accordance with Interim Management Policy.	Bureau policy to insure integrity of WSAs.	Additional construction and maintenance costs of fences in WSAs.
	Cultural Values Cultural examination of all projects.	Possible damage to cultural sites.	Cultural clearance prior to construction.	Assure no cultural sites will be damaged.	Relocation of fence if cultural site is found.
F. Install cattle guards on roads subject to vehicular traffic.	**Wild Horses** Design cattle guards to prevent harm to wild horses.	If not properly designed, horses hooves can slip through the cattle guard.	Cattle guards placed within the wild horse range will be designed to protect wild horses.	Proper design will prevent harm to wild horses.	None.
G. Complete proposed land treatments on areas suitable for increased forage production as follows: Pinyon-Juniper - 173,000 acres. Sagebrush-Mtn. Browse - 257,000 acres. Greasewood Bottoms - 19,470 acres. Existing P/J Chainings - 16,860 acres.	**Wild Horses** Complete proposed land treatments on 3,410 acres of sagebrush and 25,000 acres of pinyon-juniper. **Wildlife** Complete proposed land treatments on 29,790 acres of sagebrush-mountain browse and 39,150 acres of pinyon-juniper.	Generally, recommendations support each other, however, conflicts could arise depending upon the size of the treated areas.	Accept livestock recommendation subject to the needs of other resource uses. (Needs are discussed below.)	Livestock, wildlife, and wild horse recommendations indicate a need for increased forage production that can be accomplished through land treatment.	
	Wild Horses - Wildlife 1. Maintain protective cover for horses and wildlife in treated areas.	Could reduce cover needs for wild horses and wildlife.	No point in the treated area should be 200 yds. from suitable cover.	Assures suitable cover for wild horses and wildlife.	Reduction of about 44,000 acres of P/J woodland proposed for treatment.
	2. No sagebrush treatment within 2-mile radius of sage grouse strutting ground.	Possible reduction or loss of sage grouse habitat.	Sagebrush treatments will be accomplished after site specific impacts are identified and necessary mitigating measures are applied. Generally, no sagebrush treatments would occur on areas with less than 40 percent cover of sagebrush.	Will allow protection of the sage grouse and its habitat.	Reduction of about 38,000 acres of sagebrush rangeland proposed for treatment.
	3. No disturbance within 1/4 mile of a known active raptor nest.	Could alter habitat around nesting site and destroy snags and trees used for nesting or perching.	No land treatment within 1/4 mile of active raptor nests that would permanently alter or adversely impact habitat. Preserve all snags within 1/2 mile of nesting site.	Will assure protection of raptor habitat.	Reduction of about 12,000 acres of P/J proposed for treatment.
	Watershed 1. No surface disturbance on highly erosive soils. Allow no activity that would decrease present water quality of perennial streams.	Treatments could increase soil erosion and decrease water quality.	No treatment on highly erosive soils and no mechanical treatment on slopes in excess of 20 percent.	Would prevent heavy erosion and sedimentation that could occur on highly erosive soils and slopes in excess of 20 percent.	Short term increase in soil erosion with possible decrease in water quality. Possible reduction of about 50,000 to 100,000 acres of rangeland proposed for treatment.
	Forest Products Intensively manage pinyon-juniper stands on slopes less than 25 percent for wood products.	Would eliminate all P/J areas proposed for treatment.	Reject forestry MFP I recommendation pending increased commercial demand for wood products. Use wood product sales as another method of manipulating P/J.	Present demand for wood products is not large enough to warrant intensive forest management.	Some wood products on treatment areas of P/J.
	Protect ecologically unique forested areas.	Loss of scientific information if unique areas were destroyed.	No treatment or conversion of unique forested areas.	Will protect the value of these unique areas.	4,000 acres of proposed P/J treatment.
	Recreation Manage WSAs according to Interim Management Policy.	Would restrict types of land treatments.	Burning will be the only method used in vegetation conversions in WSAs.	Will allow some treatment and still preserve wilderness values of WSAs.	31,000 acres suitable for treatment.
	Manage VRM Class II Lands under VRM II Classification.	Treatments could detract from scenic quality.	Treatments to comply with VRM II Classification.	Will allow treatments in VRM II areas that do not detract from scenic quality.	Decrease in some areas suitable for treatment. Increased costs in design, layout, and treatment.
	Cultural Values Cultural examination prior to treatment.	Possible damage to cultural sites.	Treatments to receive cultural clearance and necessary mitigating measures prior to treatment.	Assure that no cultural site will be damaged.	Relocation or possible reduction in proposed treatment areas.
	Minerals Leases for oil and gas, oil shale and coal.	Treatments could be lost if treated areas were developed for minerals.	No land treatments in areas of intensive mineral development (present and potential).	Would prevent loss of treatment costs.	Reduction of 45,000 acres proposed for treatment.
5. Eliminate spring grazing on 14,000 acres in three allotments.	None.	None.	Accept MFP I livestock recommendation with modification that spring grazing be allowed after range conditions have improved.	Allotments are in unsatisfactory condition. Nonuse during the spring critical growth period should improve range condition in the short term.	1,000 AUMs of spring livestock grazing lost during the short term.
6. Continue less intensive management on 58 allotments.	None.	None.	Accept MFP I livestock recommendation.	Allotments consist of small unmanageable tracts of public land. In most cases, the public lands make up less than 10 percent of the total allotment acreage.	None.
A. Initiate minimum rest requirements during critical spring growing period.	None.	None.	Accept MFP I livestock recommendation.	Minimum rest requirements will provide for the biological needs of forage plants, reduce grazing ungulate competition during critical green-up periods, and protect soil during spring thaw periods.	
7. Do not re-issue grazing leases on 1,960 acres of public lands in the Oak Ridge State Wildlife Area.	None.	None.	Accept MFP I livestock recommendation with the addition of: Reserve these lands for wildlife use.	Public lands are unfenced and surrounded by patented lands owned by the State of Colorado.	None.
8. Maintain existing livestock driveways.	None.	None.	Accept MFP I livestock recommendation.		None.

TABLE 2-2
PROPOSED VEGETATION ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE A - ACTION PROPOSAL

Kind of Livestock & Period of Use 1/	No. of Allotments	Acres Public Land	Acres Other Owner-ship	Present Authorized Livestock Use (AUMs)	Livestock Actual Use (AUMs) 2/	Initial Allocation (AUMs) Livestock	Initial Allocation (AUMs) Wildlife	Initial Allocation (AUMs) Wild Horses	Initial Allocation (AUMs) Total	Projected (20th yr) Allocation (AUMs) Livestock	Projected (20th yr) Allocation (AUMs) Wildlife	Projected (20th yr) Allocation (AUMs) Wild Horses	Projected (20th yr) Allocation (AUMs) Total
EXISTING INTENSIVE MANAGEMENT													
Cattle Sp/Su/F	2	23,359	2,806	3,879	2,923	2,750	1,470	0	4,220	3,675	1,649	0	5,324
Cattle Sp/Su/F/W	4	133,112	23,883	10,241	10,023	11,221	7,166	375	18,762	14,824	9,876	483	25,183
Total	6	156,471	26,689	14,120	12,946	13,971	8,636	375	22,982	18,499	11,525	483	30,507
PROPOSED INTENSIVE MANAGEMENT													
Cattle Sp	4	46,142	6,770	2,996	1,856	2,378	2,341	0	4,719	3,701	2,676	0	6,377
Cattle Sp/Su	2	9,036	1,122	1,163	980	365	580	0	945	430	651	0	1,081
Cattle Sp/Su/F	14	202,810	41,681	17,848	16,875	11,814	10,114	525	22,453	19,436	10,860	809	31,105
Cattle Sp/Su/F/W	13	656,350	156,442	62,726	56,087	41,225	25,851	450	67,526	61,799	27,937	809	90,545
Cattle Sp/F/W	7	55,866	20,168	4,887	4,255	3,028	3,573	0	6,601	4,964	3,661	0	8,625
Cattle Su/F	8	20,823	8,811	3,766	3,168	2,012	1,226	0	3,238	2,953	1,475	0	4,428
Cattle F/W	2	12,420	1,760	1,117	1,117	882	661	0	1,543	1,262	662	0	1,924
Sheep Sp	1	9,070	720	758	451	507	19	0	526	784	22	0	806
Sheep Sp/F/W	7	46,818	11,356	5,588	4,184	3,982	1,763	0	5,745	6,006	1,911	0	7,917
Sheep Sp/W	10	157,662	22,730	21,107	12,715	9,005	853	0	9,858	13,958	989	0	14,947
Sheep W	5	42,313	2,425	3,985	3,446	2,880	611	0	3,491	4,116	705	0	4,821
Cattle & Sheep Sp/Su/F	1	17,144	10,994	2,083	1,647	1,633	861	0	2,494	2,068	906	0	2,974
Cattle & Sheep Sp/Su/F/W	1	14,100	456	1,622	1,541	1,306	1,198	0	2,504	2,003	1,198	0	3,201
Total	75	1,290,554	285,435	129,646	108,322	81,017	49,651	975	131,643	123,480	53,653	1,618	178,751
PROPOSED LESS INTENSIVE MANAGEMENT													
Cattle Sp	1	1,229	3,460	60	60	67	99	0	166	72	101	0	173
Cattle Su	1	1,040	3,216	21	21	60	69	0	129	60	84	0	144
Cattle Sp/Su	4	2,831	12,870	486	486	441	257	0	698	444	269	0	713
Cattle Sp/Su/F	19	14,308	50,221	3,188	2,972	2,863	1,497	0	4,360	2,883	1,538	0	4,421
Cattle Sp/Su/F/W	1	680	800	248	248	248	69	0	317	248	69	0	317
Cattle Su/F	4	9,749	5,964	1,945	1,229	798	564	0	1,362	804	638	0	1,442
Cattle F/W	1	860	106	45	45	50	86	0	136	50	88	0	138
Sheep Sp/Su	2	1,152	2,560	298	298	298	99	0	397	298	99	0	397
Sheep Sp/Su/F	11	8,301	41,565	2,533	2,450	2,425	1,145	0	3,570	2,425	1,176	0	3,601
Sheep Sp/Su/F/W	4	5,742	18,726	1,557	1,558	1,554	965	0	2,519	1,554	965	0	2,519
Sheep Su/F	1	450	1,760	113	113	113	26	0	139	113	26	0	139
Sheep Sp/W	4	9,945	8,392	886	735	521	54	0	575	551	59	0	610
Sheep W	2	3,065	2,339	150	107	139	22	0	161	139	27	0	166
Cattle & Sheep Sp/Su/F	2	2,440	3,240	663	663	663	192	0	855	663	192	0	855
Horses Sp/Su/F	1	149	160	25	25	25	10	0	35	25	10	0	35
Total	58	61,941	155,379	12,218	11,010	10,265	5,154	0	15,419	10,329	5,341	0	15,670
Unallotted	--	3,240	--	0	0	0	1,080	0	1,080	0	1,080	0	1,080
Stock Driveways	--	9,600	--	3,750	3,750	3,750	0	0	3,750	3,750	0	0	3,750
EIS AREA TOTAL	139	1,521,806	467,503	159,734	136,028	109,003	64,521	1,350	174,874	156,058	71,599	2,101	229,758

1/ Sp = Spring, 3/15 to 6/30
Su = Summer, 7/1 to 9/30
F = Fall, 10/1 to 11/15
W = Winter, 11/15 to 3/15

2/ Livestock Actual Use = Average active licensed livestock use

the proposal was designed to protect 6.5 miles of Colorado cutthroat trout habitat along Lake and Soldier Creeks and 72 acres of critical sage grouse habitat on Roan Plateau through protective fencing and to improve 55.5 miles of riparian habitat and 241,000 acres of sage grouse habitat through improved livestock management.

Vegetation Allocation

The principal issue in the proposal is the allocation of vegetation among the predominant consumptive users: cattle, sheep, deer, elk, antelope, and wild horses. The initial (short term) allocation (Table 2-2) would provide the required forage to maintain the existing big game wildlife populations and the required forage to maintain 90 head of wild horses. Livestock would be allocated the remaining available forage.

The proposed allocation of vegetation was based upon ocular reconnaissance livestock forage inventories as well as utilization, actual use, authorized licensed use, and condition and trend data, where available. Estimates were used in some aspects of the allocation where field data was lacking or was not reliable. Total vegetation available to and palatable to livestock was estimated for each allotment. Vegetation unpalatable or unavailable to livestock was excluded in the total livestock grazing capacity (Appendix C).

The amount of competitive vegetation, that amount which can be used by both livestock and big game wildlife or by both livestock and wild horses, was determined based on diet similarities for vegetation available to and palatable to livestock. The amount of noncompetitive vegetation available to wildlife or wild horses was estimated by seasonal use areas on each allotment based upon habitat conditions for big game wildlife and wild horses. Fifty percent of the vegetation available was allocated for the combined use of livestock, big game wildlife or wild horses with the remaining vegetation reserved for plant maintenance, nongame and small game wildlife, and watershed protection.

Appendix C contains more detailed information on how the vegetation allocation was made. The amount of use by livestock, wildlife, and wild horses for each allotment is presented in Appendix B, Table B-1.

Wild Horse Management Area

At present, 625 wild horses utilize 443,979 acres of public land within 14 livestock allotments. The wild horse range would be reduced to 107,000 acres of public land within three livestock allotments (Map 2-1).

A minimum of 90 and a maximum of 140 wild horses would be maintained within the 107,000 acre range. The proposed initial vegetation allocation would provide 1,350 AUMs of forage to maintain 90 horses. This allocation level would require the removal of 276 wild horses from within the proposed 107,000 acre horse range. The long term allocation would provide 2,101 AUMs to maintain 140 horses.

Increased oil and gas production within the recognized wild horse areas (those areas utilized by wild horses at the time of the passage of the Wild and Free-Roaming Horse and Burro Act of 1971) and the increased forage requirements for wild horses has created an expansion of the wild horse range. Complete removal of wild horses would occur in these areas (Map 2-1) with a total of 259 horses being removed.

Wild horses which are gathered and removed would be adopted out to individuals through the BLM's Adopt-A-Wild Horse program.

Grazing Management

Allotment management plans (AMPs) would be developed for each allotment in the White River Resource Area. Two categories of AMPs are proposed: intensive and less intensive. The level of management proposed for each allotment is shown in Appendix B, Table B-1.

EXISTING INTENSIVE MANAGEMENT AREAS

Six allotments containing 156,471 acres of public land are presently under intensive management: Segar Gulch (6008), Reagles (6026), Square S (6027), Cricket (6300), Park Canyon/Bitter Creek (6353), and Black's Gulch (6612). These allotments would continue under intensive management. Segar Gulch is managed under a rest rotation grazing system on two summer pastures and deferred rotation on two spring/fall pastures. Park Canyon/Bitter Creek is managed under deferred rotation spring/summer/fall on Bitter Creek and continuous winter use on Park Canyon. The other allotments are managed under deferred rotation grazing systems during spring, summer, and fall.

PROPOSED INTENSIVE MANAGEMENT AREAS

Intensive management has been proposed for 75 allotments containing 1,290,554 acres of public land. Specific grazing systems have not been proposed for these allotments. Grazing systems and the required range improvements would be developed as the AMPs are developed. Development of AMPs would be with permittee consultation. The AMP with its grazing system and range improvements would be designed to coordinate livestock grazing with other land uses to meet the objectives for other resource uses outlined in the Management Framework Plan (MFP). Appendix B, Table B-1 lists the allotments proposed for intensive management.

PROPOSED LESS INTENSIVE MANAGEMENT AREAS

Less intensive management is proposed for 58 allotments containing 61,941 acres of public land. These allotments involve small acreages of public land (in comparison to total allotment acreage), which, due to low productivity, high fencing costs, and other factors, makes it impractical or uneconomical to administer intensive management programs. Appendix B, Table B-1 lists the allotments proposed for less intensive management.

LIVESTOCK DRIVEWAYS AND STOCK TRAILS

Presently, livestock trailing occurs along the White River (State Highway 64), Dragon Road, Staley Mine Road, and Victory (US Highway 40) Stock Trails, and on the Yellowjacket Pass and Flag Creek Stock Driveways. Trailing use occurs on 9,600 acres of public land with 3,750 AUMs of permitted livestock grazing use. Trailing use along these stock trails and driveways would continue, under this alternative, as in the past. Trailing permits would continue to be issued for use on the trails and driveways. No range improvements have been proposed on any trail or driveway.

UNALLOTTED PUBLIC LAND

The 3,240 acres of unallotted public lands located within the Oak Ridge State Wildlife Area and the Little Hills Experiment Station along the Dry Fork of Piceance Creek would continue in unallotted status (Map 3-14). The estimated grazing capacity for big game wildlife on these unallotted lands is 1,080 AUMs.

GRAZING TREATMENTS

A minimum rest requirement (period of no livestock grazing) would be developed for each allotment (Appendix B). This period of rest is the minimum required to restore plant vigor, improve watershed conditions and improve rangeland conditions. These minimum rest periods would be incorporated into grazing systems during AMP preparation.

A majority of the public land (97 percent) is utilized by livestock during the spring and early summer growing periods. Grazing use normally occurs late enough in the growing season (elevations below 7,000 feet) that forage plants do not regrow prior to their dormancy in early summer. Without regrowth prior to dormancy, the forage plants do not mature to set seed and replenish food reserves.

The minimum rest periods have been developed and proposed for the spring and early summer growing periods in order to provide a period of nonuse for the forage plants so that they can fulfill their basic physiological requirements for maintenance of growth, vigor and adequate reproduction. In addition, the rest period would reduce livestock trampling damage to plants and soil during wet soil conditions after spring thaw. The frequency of the proposed rest periods was based on the present rangeland conditions of each allotment with more frequent spring rests proposed for poor condition rangeland than for fair or good condition.

The rest periods proposed are the minimum period of rest that would be required on each allotment. The rest period has been designed to allow some flexibility in the application of this period. This rest can be provided in an alternate year sequence or on a yearly basis. Minimum rest for a range area may be satisfied in two ways: (1) the entire area would not be grazed by livestock, or (2) the area may be subdivided to permit livestock use on one or more subunits while the remaining unit or units are left unused. For example, a minimum rest period cycle of 2 in 3 years can be applied to: (1) the entire allotment or designated portion of an allotment which would only allow use of the allotment or area once every three years during this period, or (2) it can be applied to two-thirds of the allotment and allow use of one-third of the allotment or area during this period. This flexibility would be allowed after allotment analysis during preparation of AMPs.

PERIOD OF USE AND KIND OF LIVESTOCK

No changes in the kind of livestock that would utilize an allotment has been proposed from the kind of livestock presently utilizing an allotment.

Any change requested by a livestock permittee would be analyzed in an environmental assessment and allowed if the change accomodates the management objectives of the MFP and meets environmental constraints.

Maximum periods of use, by kind and number of livestock, for each allotment are noted in Appendix B, Table B-1. Not all portions of an allotment would receive use during this period, as livestock move or are moved in response to available vegetation and water. Appendix B, Table B-1 categorizes allotments into like kinds based upon the kind of livestock and the seasonal use periods in which they are used; Table 2-2 summarizes the use in the EIS area based upon these categories.

The existing periods of use (Map 3-14) with the minimum rest requirements incorporated would be implemented under the action proposal. These periods of use are based upon historical use which evolved from need, forage availability, forage quality, and water availability.

UTILIZATION LEVELS OF KEY SPECIES

Combined livestock, wildlife and wild horse utilization levels of key species within an allotment would average 50 percent of annual production for the entire allotment. Maximum utilization of key species would not normally exceed an average of 60 percent of annual production in the grazed pasture.

MONITORING AND STUDY PROGRAMS

Forage production and utilization studies (BLM Manual 4413) are proposed during the three year livestock adjustment period (discussed below) to establish the proper livestock grazing capacity for each allotment proposed for intensive management. Existing livestock forage production inventories, used to estimate livestock grazing capacities in this EIS area, were conducted prior to 1965 on approximately 85 percent of the public land acreage in the EIS area. These studies would be conducted in conjunction with livestock use adjustments so that proper livestock grazing capacities can be determined at the end of the 3 year adjustment period.

In addition, an evaluation at the conclusion of the grazing cycle on intensive management units would be conducted by various study procedures that would monitor changes in plant composition and ground cover. Four primary studies are basic to this evaluation: actual grazing use, vegetation utilization, range condition and trend, and climate analysis (BLM Manual 4413). In addition, collection of data on wildlife habitat, riparian vegetation, aquatic habitat utilization and trends, and watershed condition is proposed if pertinent to the resource values of the allotment. Results of these studies would be summarized and evaluated at the end of each grazing system cycle. The data would then be used to assess progress toward achieving AMP objectives and to recommend adjustments in the grazing systems or stocking rates.

If an evaluation determines that additional livestock use can be made on a sustained yield basis, an increase in livestock grazing use that is consistant with MFP objectives would be made. However, if an evaluation determines that the specific objectives established on the allotment are not being achieved, modifications to the proposal would occur. Such modifications (revisions) could include changes in the grazing system, livestock numbers, period of use, additional range developments, or any combination of revisions in order to attain the management objectives.

Range Improvements

To implement intensive grazing management, additional range improvements are usually needed. There are two types of range improvements proposed: support facilities (Table 2-3 and Map 2-2) and vegetation manipulations (Table 2-4 and Map 2-3).

Support facilities include fences and water developments. These facilities would help accomplish the management objectives through improved control and distribution of livestock and improved use of key forage species.

Vegetation manipulation may be needed on 186,000 acres which is 12 percent of the public lands. Vegetation manipulations would include treatment of 11,137 acres of sagebrush and mountain shrub rangelands, 42,723 acres of pinyon-juniper woodlands, 9,110 acres of greasewood bottoms, and 6,580 acres of specialized treatments and retreatment of 16,760 acres of existing pinyon-juniper chainings (Appendix A, Table A-2).

Range improvements proposed for each allotment and description of the types and treatment methods proposed are presented in Appendix A. The range improvements proposed are an estimate of the improvements that may be required to implement intensive livestock management and to meet the MFP objectives.

The exact amount, location, and treatment method would be determined during development of allotment management plans (AMPs). Range improvement needs identified during AMP development would be subject to the standard operating procedures listed below, the design restrictions listed in Appendix A, and a site specific environmental assessment.

STANDARD DESIGN, CONSTRUCTION, AND OPERATION PROCEDURES

The following protective measures would be required as standard design, construction, or operation procedures. These measures would be required to protect resource values and limit adverse impacts associated with the proposed range improvements.

1) A survey of potential habitat for threatened or endangered species would be made prior to taking any action that could affect these species. Should BLM determine that there may be an effect on listed species, formal consultation with the U.S. Fish and Wildlife Service would be initiated.

2) Intensive archeological examinations will be required prior to commencement of any range improvement activities which involve land disturbance. Properties determined eligible for inclusion in the National Register of Historic Places would be identified in consultation with the State Historic Preservation Officer. Range improvement projects would be designed to avoid adverse impacts to cultural sites wherever possible. Where avoidance of properties included in or determined eligible to the National Register is not feasible, mutually agreeable mitigation procedures will be developed in consultation with the State Historic Preservation Officer (Advisory Council 1980).

3) The appropriate federal official would be notified if vertebrate paleontological remains are encountered during construction. Recovery, protection, and preservation measures would then be implemented as necessary to mitigate adverse impacts.

4) Public lands in the EIS area will be evaluated for wilderness characteristics during the BLM wilderness inventory process. The present management and policy guidelines do not allow any new or expanded actions within the six recommended wilderness study areas (WSAs) that would impair their suitability for wilderness designation. All proposed range improvements would be subject to the present management and policy constraints (Interim Management Policy and Guidelines for Lands Under Wilderness Review, BLM 1979).

5) An environmental assessment (EA) would be required prior to construction of proposed range improvements and implementation of allotment management plans. The EA, written to conform with BLM Manual 1791, would be site specific and would supplement the environmental assessment contained in this EIS.

6) Disturbance of soil and vegetation at all project sites would be held to an absolute minimum. Disturbed areas would be reseeded as soon as possible after project completion.

7) All range improvements would conform with visual resource management guidelines.

8) Range improvements would be periodically inspected to insure that they remain in usable condition. Preventive maintenance would be performed as needed. Cooperative agreements with range users would be solicited by BLM for fences and some water developments. Agreements would outline the specific project maintenance responsibilities.

General Implementation Schedule

Adjustments in livestock use would be implemented within a 3 year period following the filing of the final EIS for the White River Resource Area. Detailed livestock grazing plans, or allotment management plans (AMPs), would be prepared by 1985 with associated range developments and vegetation manipulations undertaken within 3 years after AMP completion, subject to manpower and budget limitations. Table 2-5 shows the proposed schedule of implementation for 8 years following filing of the final EIS (See Appendix A for schedule by allotment).

The six existing AMPs would continue under present operation with the addition of the proposed range improvements.

The vegetation, water quality, wildlife, and fishery monitoring systems are ongoing. The wild horse and livestock vegetation (production, condition, and trend) monitoring systems would be implemented in 1980.

COSTS OF IMPLEMENTATION

All allotment management plans and their respective range improvements would be subject to cost-benefit analysis. The estimated cost of implementing the action proposal would be (Tables 2-3 and 2-4):

TABLE 2-3
PROPOSED RANGE IMPROVEMENTS - SUPPORT FACILITIES
ALTERNATIVE A - ACTION PROPOSAL

Range Improvements	Units	Average Unit Cost 1/	Estimated Total Cost 1/	Annual Maintenance Cost 1/
Reservoirs	510	$ 1,740	$ 887,400	$ 44,370
Check Dams	21	1,000	21,000	1,050
Wells	44	13,520	594,880	14,870
Water Catchments	39	10,900	425,100	10,630
Springs	85	1,000	85,000	3,400
Pipelines (Miles)	65	2,260	146,900	2,950
Troughs	219	2/	2/	2/
Storage Tanks	83	2/	2/	2/
Fences (Miles)	212	3,000	636,000	15,900
Total			$2,796,280	$ 93,170

1/ Costs are in 1979 dollars.
2/ Costs of storage tanks and troughs are included in the cost of other developments such as springs, wells, etc.

TABLE 2-4
PROPOSED RANGE DEVELOPMENTS - VEGETATION MANIPULATIONS
ALTERNATIVE A - ACTION PROPOSAL

Range Improvement	Unit (Acres)	Average Unit Cost 1/	Estimated Total Cost 1/	Annual Maintenance Cost 1/
Sagebrush				
Mechanical	6,628	$16	$ 106,048	$ 1,060
Chemical	27,747	15	416,205	4,162
Burning	76,762	7	537,334	5,373
Pinyon-Juniper				
Mechanical	37,619	38	1,429,522	57,180 2/
Burning	5,104	15	76,560	765
Existing P/J Chainings				
Burning	16,760	10	167,600	350
Greasewood	9,110	15	136,650	600
Other Treatments	6,580	12	78,960	230
Total	186,310		$2,948,879	$ 69,720

1/ Costs are in 1979 dollars.
2/ Annual maintenance costs would include costs of follow-up prescribed burning.

TABLE 2-5
GENERAL IMPLEMENTATION SCHEDULE

Year	No. of Allotments Fully Implemented	Acres
1	36	61,498
2	28	75,102
3	19	350,697
4	19	366,968
5	26	356,888
6	6	159,424
7	5	138,389
8	(some range improvement construction)	
Total	139	1,508,966

1) Construction related costs - $5,745,159

2) Annual maintenance costs - $ 162,890

ADDITIONAL MANPOWER REQUIREMENTS

Additional BLM personnel would be required both during and after implementation of the action proposal. It is estimated that an average of about ten additional positions would be required during implementation with only three of these positions required after implementation.

Administration of Grazing Management

The action proposal would be administered and managed through standard BLM operating procedures. Each livestock operator would be issued a grazing permit. The permit would specify allotment, period of use, numbers, and kinds of livestock that would be allowed to use the allotment. Trailing permits would continue to be issued for use of the established stock trails and driveways.

Livestock grazing use would be supervised throughout the year. Any changes in the grazing use authorized by the grazing permit must be requested in writing by the livestock operator prior to the grazing period. Changes in authorized grazing use could exceed the limits of the action proposal, if they were consistent with management objectives. Grazing use outside the limits of the proposal and without prior authorization would be considered unauthorized grazing use. BLM would take action to assure that any unauthorized grazing use is eliminated in accordance with the regulations governing management of the public lands (43 CFR 4150).

BLM would also make adjustments in the range management program during drought or other emergencies. Such adjustments would be designed to accomplish grazing management objectives. Range condition, competition with wildlife or wild horses, amount of available vegetation and water, and the time of year would be considered in any decision to remove livestock from an area in the event of drought or other temporary problems.

ALTERNATIVE B - NO ACTION (CONTINUATION OF PRESENT MANAGEMENT)

This alternative would not change the existing grazing management or present use levels of vegetation within the EIS area.

Vegetation Allocation

Allocation under this alternative is based on present grazing use by livestock, big game species of wildlife, and wild horses. The initial vegetation allocation as shown in Table 2-6 would be 136,028 AUMs for livestock, 64,521 AUMs for big game wildlife, and 9,364 AUMs for wild horses.

Livestock grazing use would be set at 136,028 AUMs, the average of past licensed use, which is 23,706 AUMs below the present authorized use of 159,734 AUMs. The initial allocation for livestock and wild horses would be maintained through the long term.

Since wildlife numbers are not controlled by the BLM, it is expected that they would fluctuate according to population dynamics and habitat condition. The estimated declines in forage production that are expected under this alternative (for analysis of this alternative see Section 4, Environmental Consequences) would reduce forage availability for mule deer in the long term. Thus, the long term allocation for big game wildlife would be 56,971 AUMs, a reduction of 7,550 AUMs below present levels.

Wild Horse Management Area

The present wild horse herd, 625 head, would be managed on the present 443,979 acre wild horse area. Excess numbers of wild horses would be gathered as often as required to maintain an average number of 625 horses. The excess wild horses gathered would be adopted out through the BLM's Adopt-A-Wild Horse program.

Grazing Management

EXISTING INTENSIVE MANAGEMENT

Intensive management would continue on 156,471 acres of public land in six allotments as described in Alternative A (the Action Proposal).

LESS INTENSIVE MANAGEMENT

Less intensive management would continue on 1,352,495 acres of public land in 133 allotments. These allotments are grouped into categories based upon kind of livestock and seasonal use periods (Appendix B, Table B-2). Livestock would be allowed to utilize the entire allotment or a portion as in the case of multi-seasonal allotments,

TABLE 2-6
PROPOSED VEGETATION ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE B - NO ACTION

Kind of Livestock 1/ & Period of Use	No. of Allotments	Acres Public Land	Acres Other Ownership	Present Authorized Livestock Use (AUMs)	Livestock Actual Use 2/	Initial Allocation (AUMs) Livestock	Initial Allocation (AUMs) Wildlife	Initial Allocation (AUMs) Wild Horses	Initial Allocation (AUMs) Total	Projected (20th yr) Allocation (AUMs) Livestock	Projected (20th yr) Allocation (AUMs) Wildlife	Projected (20th yr) Allocation (AUMs) Wild Horses	Projected (20th yr) Allocation (AUMs) Total
EXISTING INTENSIVE MANAGEMENT AREAS													
Cattle Sp/Su/F	2	23,359	2,806	3,879	2,923	2,923	1,470	0	4,393	2,923	1,470	0	4,393
Cattle Sp/Su/F/W	4	133,112	23,883	10,241	10,023	10,023	7,166	2,190	19,379	10,023	6,713	2,190	18,926
Total	6	156,471	26,689	14,120	12,946	12,946	8,636	2,190	23,772	12,946	8,183	2,190	23,319
EXISTING LESS INTENSIVE MANAGEMENT AREAS													
Cattle Sp	6	51,208	10,680	3,413	2,271	2,271	2,449	435	5,155	2,271	2,449	435	5,155
Cattle Sp/Su	10	16,315	23,231	2,149	1,967	1,967	1,054	0	3,021	1,967	1,054	0	3,021
Cattle Sp/Su/F	35	151,798	86,732	19,369	17,868	17,868	7,276	1,401	26,545	17,868	6,810	1,401	26,079
Cattle Sp/Su/F/W	15	729,515	161,422	66,592	59,453	59,453	30,683	5,052	95,188	59,453	25,358	5,052	89,863
Cattle Sp/F/W	7	55,866	20,168	4,887	4,255	4,255	3,573	95	7,923	4,255	2,742	95	7,092
Cattle Su/F	6	19,999	9,742	3,281	2,778	2,778	1,214	0	3,992	2,778	1,176	0	3,954
Cattle F/W	2	9,443	1,416	805	807	807	738	0	1,545	807	662	0	1,469
Sheep Sp	1	9,070	720	758	451	451	19	0	470	451	15	0	466
Sheep Sp/Su	2	1,152	2,560	298	298	298	99	0	397	298	99	0	397
Sheep Sp/Su/F	11	8,301	41,565	2,533	2,450	2,450	1,145	0	3,595	2,450	1,154	0	3,604
Sheep Sp/Su/F/W	4	5,742	18,726	1,557	1,558	1,558	965	0	2,523	1,558	965	0	2,523
Sheep Su/F	1	450	1,760	113	113	113	26	0	139	113	26	0	139
Sheep Sp/F/W	7	46,818	11,356	5,588	4,184	4,184	1,763	116	6,063	4,184	1,582	116	5,882
Sheep Sp/W	17	201,671	33,734	25,111	16,096	16,096	1,272	75	17,443	16,096	1,119	75	17,290
Sheep W	4	11,314	2,152	1,017	907	907	268	0	1,175	907	236	0	1,143
Cattle & Sheep Sp/Su/F	3	19,584	14,234	2,746	2,310	2,310	1,053	0	3,363	2,310	1,053	0	3,363
Cattle & Sheep Sp/Su/F/W	1	14,100	456	1,622	1,541	1,541	1,198	0	2,739	1,541	1,198	0	2,739
Horses Sp/Su/F	1	149	160	25	25	25	10	0	35	25	10	0	35
Total	133	1,352,495	440,814	141,864	119,332	119,332	54,805	7,174	181,311	119,332	47,708	7,174	174,214
Unalloted	--	3,240	--	0	0	0	1,080	0	1,080	0	1,080	0	1,080
Stock Driveways	--	9,600	--	3,750	3,750	3,750	0	0	3,750	3,750	0	0	3,750
EIS AREA TOTAL	139	1,521,806	467,503	159,734	136,028	136,028	64,521	9,364	209,913	136,028	56,971	9,364	202,363

1/ Sp = Spring, 3/15 to 6/30
Su = Summer, 7/1 to 9/30
F = Fall, 10/1 to 11/15
W = Winter, 11/15 to 3/15

2/ Livestock Actual Use = Average active licensed livestock use

during the designated grazing period. The designated grazing period would not be interrupted by a required rest period.

LIVESTOCK DRIVEWAYS AND STOCK TRAILS

Livestock trailing would continue, as described in Alternative A.

UNALLOTTED PUBLIC LAND

No livestock grazing would continue on 3,240 acres of public land within the Oak Ridge State Wildlife Area and the Little Hills Experiment Station area as described in Alternative A.

GRAZING TREATMENTS

Scheduled rest periods would not occur during the normal period of use on the existing less intensive management areas. Scheduled rest periods on the existing intensive management areas would continue as described in Alternative A.

Livestock grazing use would occur as shown in Appendix B, Table B-2 which described existing grazing use in the EIS area. In the table, allotments are presented in groups of allotments which are managed in a common fashion; Table 2-6 summarizes that use.

PERIOD OF USE AND KIND OF LIVESTOCK

The normal periods of use, kind of livestock, and numbers of livestock that have occurred in the past would continue under No Action. The maximum period of use, kind of livestock, and maximum numbers of livestock that would be allowed under this alternative are presented in Appendix B, Table B-2.

The maximum use presented in Table B-2 (numbers of livestock and period of use) would occur only during periods of excess forage, available to livestock, which exceeds the livestock allocation. During periods of average forage production, livestock use would be held to the livestock allocation (Table 2-6).

The maximum period of use shown for each allotment (Appendix B, Table B-2) does not occur on all portions of an allotment, as livestock move or are moved within an allotment in response to available vegetation and water.

UTILIZATION LEVELS OF KEY SPECIES

Average utilization of key species by livestock would be limited to a maximum of 60 percent of the annual forage production available to livestock.

MONITORING AND STUDY PROGRAMS

Present management includes an evaluation at the conclusion of the grazing cycle on the six existing intensive management units (AMPs). Evaluation methods include actual grazing use, range condition and trend, vegetation utilization, and climate analysis. Data collected from these methods would be used to make adjustments, as described in Alternative A, on the six intensive management units.

Monitoring and study programs on the existing less intensive management units has been and would continue to be limited to range condition and trend. Data from these studies has been used to determine the general range condition and trend in the White River Resource Area and would not be used to make individual allotment evaluations.

Range Improvements

No new range improvements would be undertaken or constructed. Existing range improvements would be maintained. Estimated annual maintenance cost to BLM would be approximately $60,000. Estimated annual maintenance costs to the permittees would be approximately the same, $60,000.

General Implementation Schedule

The No Action alternative, if selected, would be fully implemented within 1 year following filing of the final Environmental Impact Statement. No additional BLM personnel would be required during or after implementation of this alternative.

Administration of Grazing Management

Administration and management under this alternative would be accomplished through standard BLM operating procedures described under Alternative A (the Action Proposal).

ALTERNATIVE C - ELIMINATION OF LIVESTOCK GRAZING FROM PUBLIC LANDS

This alternative examines the impacts of complete elimination of livestock grazing from public lands in the EIS area.

The objectives would be to allow the wildlife and wild horse populations to reach a balance with available vegetation production without the influence of livestock grazing and to reserve all remaining vegetation for watershed protection and enhancement of visual and recreation resources.

Vegetation Allocation

All vegetation would be allocated to wildlife, wild horses, and for enhancement of resources other than livestock grazing. All authorized livestock grazing, except trailing use across the EIS area on designated livestock trails, would be eliminated from 1,508,966 acres of public land.

Vegetation allocation under this alternative in the long term would be 73,155 AUMs for deer, 5,082 AUMs for elk, 203 AUMs for antelope, 11,250 AUMS for wild horses, and 89,438 AUMS of excess livestock vegetation being allocated to watershed protection and enhancement of other resource uses.

The allocation to big game wildlife would provide vegetation for increased populations above the 1978 population estimates. The allocation would provide forage for a 23 percent increase in deer, an 8 percent increase in elk, and a 2 percent increase in antelope. The increased wildlife allocation is based upon the Colorado Division of Wildlife long range management goals (Strategic Plan).

Wild Horse Management Area

The allocation would provide vegetation for a wild horse population of 500 to 750 wild horses on 443,979 acres of public land. Wild horses would be maintained at this level with increased numbers being removed, approximately every 4 to 5 years.

Grazing Management

LIVESTOCK DRIVEWAYS AND STOCK TRAILS

Livestock trailing would continue to be authorized as described in Alternative A. Much of the present livestock trailing occurs to and from public land within the EIS area. Elimination of livestock grazing on public land would drastically reduce the amount of livestock trailing. However, continued use of established driveways and trails would be necessary to allow livestock movement to and from private, State, and National Forest lands.

MONITORING AND STUDY PROGRAMS

Wildlife and wild horse habitat condition studies would be implemented to monitor use under this alternative. Data from habitat studies would be used to identify habitat degradation and to make recommendations for reductions in wildlife and/or wild horse use.

Range Improvements

No new range improvements would be constructed nor would existing range improvements be maintained for the benefit of livestock grazing. However, construction of new or maintenance of existing range improvements could be undertaken to benefit resource uses other than livestock grazing. Livestock operators with investments in range improvements on public land would be entitled to appropriate project salvage rights (Public Law 94-579).

To achieve complete elimination of grazing, State and private lands intermingled with public lands would have to be fenced to exclude livestock from public land. Because private and State lands are mixed throughout the EIS area, extensive fencing (approximately 1,200 miles), may be necessary to control unauthorized livestock grazing use on public land. Construction and maintenance costs would be incurred by adjacent land owners for any fences constructed.

STANDARD DESIGN, CONSTRUCTION, AND OPERATION PROCEDURES

Any fences that would be constructed would be built by adjacent land owners. There would be no BLM control over the design of privately owned fences on State or private lands.

Implementation

It is anticipated that implementation of BLM actions under this alternative would be accomplished within 3 years following the filing of the final Environmental Impact Statement.

COSTS OF IMPLEMENTATION

Elimination of livestock grazing from public lands in the EIS area would incur costs for both BLM and livestock operators. An undetermined cost for payment of salvage rights for range improvements which livestock operators have on public land would be incurred by BLM.

The largest cost associated with this alternative is the construction of trespass control fences. Construction of fences could require an estimated investment of up to $3,600,000 by livestock operators if all 1,200 miles of fence were constructed.

Administration

This alternative would be administered and managed through standard BLM operating procedures. All existing livestock grazing permits, except trailing permits, would be cancelled. Any livestock grazing occurring on public land would be considered unauthorized grazing use and would be treated in accordance with regulations governing management of public lands. No additional BLM personnel would be required to implement this alternative.

ALTERNATIVE D - OPTIMIZE LIVESTOCK GRAZING

This alternative examines the impacts of optimizing livestock grazing to the sustained annual yield of vegetation on public lands in the White River Resource Area.

The objectives of this alternative are consistant with the objectives of Alternative A with a differing emphasis on the allocation of vegetation to livestock, big game wildlife, and wild horses. Livestock would be given preference in the allocation which would result in increased livestock use above that proposed in Alternative A (the Action Proposal) with a corresponding decrease in vegetation available to big game wildlife and wild horses.

Vegetation Allocation

Livestock would be allocated all usable livestock vegetation on rangeland suitable for livestock grazing. Livestock-wildlife and livestock-wild horse competitive vegetation would be allocated to livestock resulting in a decrease in vegetation available to big game wildlife and wild horses.

The initial vegetation allocation as shown in Table 2-7 would be 133,075 AUMs for livestock, 42,948 AUMs for big game wildlife, and 760 AUMs for wild horses. The projected allocation is estimated to be 180,114 AUMs for livestock, 48,482 AUMs for wildlife, and 797 AUMs for wild horses (Appendix B, Table B-3 for each allotment).

In the projected allocation, as in the initial, livestock would be given preference when allocating any increases in vegetation production. Increased allocations to big game wildlife or wild horses would be limited to increased production of vegetation not competitive with livestock.

Wild Horse Management Area

Under this alternative, wild horses would be managed on the same 107,000 acre wild horse range that was proposed in Alternative A (Map 2-1). However, a larger reduction in wild horses would occur with additional interior fences proposed which were not included in Alternative A. The proposed long term allocation of this alternative would provide 797 AUMs of noncompetitive vegetation for approximately 18 wild horses on Cathedral Bluffs, 18 wild horses on Yellow Creek, and 16 wild horses on Square S allotments. Approximately 314 wild horses would be removed from these allotments. Total removal of 259 horses would occur on the remaining 11 allotments which currently contain wild horses.

Grazing Management

The proposed level of intensive and less intensive grazing management under this alternative would be the same as that proposed under Alternative A (Appendix B, Table B-1 for each allotment). Livestock trailing use and the status of unallotted public land would continue as described under Alternative A.

Grazing treatments, period of use, kind of livestock, and monitoring and study programs proposed in this alternative would be the same as

TABLE 2-7
PROPOSED VEGETATION ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE D - OPTIMIZE LIVESTOCK GRAZING

Kind of Livestock 1/ & Period of Use	No. of Allotments	Acres Public Land	Acres Other Owner-ship	Present Authorized Livestock Use (AUMs)	Livestock Actual 2/ Use (AUMs)	Initial Allocation (AUMs) Livestock	Wildlife	Wild Horses	Total	Projected (20th yr) Allocation (AUMs) Livestock	Wildlife	Wild Horses	Total
EXISTING INTENSIVE MANAGEMENT													
Cattle Sp/Su/F	2	23,359	2,806	3,879	2,923	3,054	1,166	0	4,220	4,017	1,270	0	5,287
Cattle Sp/Su/F/W	4	133,112	23,883	10,241	10,023	15,118	4,293	220	19,631	18,150	6,803	240	25,193
Total	6	156,471	26,689	14,120	12,946	18,172	5,459	220	23,851	22,167	8,073	240	30,480
PROPOSED INTENSIVE MANAGEMENT													
Cattle Sp	4	46,142	6,770	2,996	1,856	2,916	1,988	0	4,904	4,153	2,284	0	6,437
Cattle Sp/Su	2	9,036	1,122	1,163	980	520	425	0	945	603	478	0	1,081
Cattle Sp/Su/F	14	202,810	41,681	17,848	16,875	10,779	3,702	0	14,481	14,837	4,116	0	18,953
Cattle Sp/Su/F/W	13	656,350	156,442	62,726	56,087	54,384	21,059	540	75,983	79,178	22,699	557	102,434
Cattle Sp/F/W	7	55,866	20,168	4,887	4,255	3,905	2,764	0	6,669	5,811	2,819	0	8,630
Cattle Su/F	8	20,823	8,811	3,766	3,168	2,324	868	0	3,192	3,357	1,079	0	4,436
Cattle F/W	2	12,420	1,760	1,117	1,117	1,154	389	0	1,543	1,533	390	0	1,923
Sheep Sp	1	9,070	720	758	451	516	10	0	526	793	12	0	805
Sheep Sp/F/W	7	46,818	11,356	5,588	4,184	4,923	891	0	5,814	7,021	896	0	7,917
Sheep Sp/W	10	157,662	22,730	21,107	12,715	9,837	328	0	10,165	14,400	284	0	14,684
Sheep W	5	42,313	2,425	3,985	3,446	3,109	382	0	3,491	4,383	437	0	4,820
Cattle & Sheep Sp/Su/F	1	17,144	10,994	2,083	1,647	1,887	607	0	2,494	2,335	639	0	2,974
Cattle & Sheep Sp/Su/F/W	1	14,100	456	1,622	1,541	1,946	558	0	2,504	2,643	558	0	3,201
Total	75	1,290,554	285,435	129,646	108,322	98,200	33,971	540	132,711	141,047	36,691	557	178,295
PROPOSED LESS INTENSIVE MANAGEMENT													
Cattle Sp	1	1,229	3,460	60	60	87	83	0	170	93	80	0	173
Cattle Su	1	1,040	3,216	21	21	67	62	0	129	68	76	0	144
Cattle Sp/Su	4	2,831	12,870	486	486	528	172	0	700	539	176	0	715
Cattle Sp/Su/F	19	14,308	50,221	3,188	2,972	3,474	914	0	4,388	3,601	1,070	0	4,671
Cattle Sp/Su/F/W	1	680	800	248	248	277	30	0	307	277	30	0	307
Cattle Su/F	4	9,749	5,964	1,945	1,229	907	455	0	1,362	932	465	0	1,397
Cattle F/W	1	860	106	45	45	77	59	0	136	77	59	0	136
Sheep Sp/Su	2	1,152	2,560	298	298	379	19	0	398	379	19	0	398
Sheep Sp/Su/F	11	8,301	41,565	2,533	2,450	3,290	311	0	3,601	3,307	325	0	3,632
Sheep Sp/Su/F/W	4	5,742	18,726	1,557	1,558	2,183	225	0	2,408	2,183	225	0	2,408
Sheep Su/F	1	450	1,760	113	113	136	4	0	140	136	4	0	140
Sheep Sp/W	4	9,945	8,392	886	735	580	20	0	600	588	22	0	610
Sheep W	2	3,065	2,339	150	107	146	15	0	161	148	18	0	166
Cattle & Sheep Sp/Su/F	2	2,440	3,240	663	663	791	64	0	855	791	64	0	855
Horses Sp/Su/F	1	149	160	25	25	31	5	0	36	31	5	0	36
Total	58	61,941	155,379	12,218	11,010	12,953	2,438	0	15,391	13,150	2,638	0	15,788
Unallotted	--	3,240	--	0	0	0	1,080	0	1,080	0	1,080	0	1,080
Stock Driveways	--	9,600	--	3,750	3,750	3,750	0	0	3,750	3,750	0	0	3,750
EIS AREA TOTAL	139	1,521,806	467,503	159,734	136,028	133,075	42,948	760	176,783	180,114	48,482	797	229,393

1/ Sp = Spring, 3/15 to 6/30
Su = Summer, 7/1 to 9/30
F = Fall, 10/1 to 11/15
W = Winter, 11/15 to 3/15

2/ Livestock Actual Use = Average active licensed livestock use

TABLE 2-8
PROPOSED VEGETATION ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE USES

Kind of Livestock 1/ & Period of Use	No. of Allotments	Acres Public Land	Acres Other Ownership	Present Authorized Livestock Use (AUMs)	Livestock Actual 2/ Use (AUMs)	Initial Allocation (AUMs) Livestock	Initial Allocation (AUMs) Wildlife	Initial Allocation (AUMs) Wild Horses	Initial Allocation (AUMs) Total	Projected (20th yr) Allocation (AUMs) Livestock	Projected (20th yr) Allocation (AUMs) Wildlife	Projected (20th yr) Allocation (AUMs) Wild Horses	Projected (20th yr) Allocation (AUMs) Total
EXISTING INTENSIVE MANAGEMENT													
Cattle Su/F	2	23,359	2,806	3,879	2,923	1,643	1,470	0	3,113	2,094	2,020	0	4,114
Cattle Su/F/W	3	108,342	20,303	8,103	8,001	4,874	5,421	1,680	11,975	6,270	8,933	2,355	17,558
Cattle Sp/Su/F/W	1	24,770	3,580	2,138	2,022	1,221	1,745	0	2,966	2,015	2,357	0	4,372
Total	6	156,471	26,689	14,120	12,946	7,738	8,636	1,680	18,054	10,379	13,310	2,355	26,044
PROPOSED INTENSIVE MANAGEMENT													
Cattle Sp/Su/F/W	2	171,641	22,197	14,883	11,413	5,537	2,660	0	8,197	7,522	5,457	0	12,979
Cattle Sp/F/W	2	26,980	13,491	2,188	1,390	631	2,191	0	2,822	1,157	2,683	0	3,840
Cattle Su/F	1	27,810	3,391	1,687	1,685	916	1,870	0	2,786	1,210	2,232	0	3,442
Cattle Su/F/W	3	210,795	77,532	24,769	23,745	9,921	13,006	0	22,927	14,193	18,258	0	32,451
Total	8	437,226	116,611	43,527	38,233	17,005	19,727	0	36,732	24,082	28,630	0	52,712
PROPOSED LESS INTENSIVE AREAS													
Cattle Sp	4	33,524	5,853	1,587	1,213	779	1,003	0	1,782	1,185	1,418	0	2,603
Cattle Sp/Su	1	8,657	2,776	898	629	376	638	0	1,014	585	781	0	1,366
Cattle Sp/Su/F	4	4,895	10,637	505	466	331	365	0	696	336	403	0	739
Cattle Sp/Su/F/W	3	128,387	12,038	10,117	8,659	4,107	4,206	0	8,313	6,505	7,070	0	13,575
Cattle Su	12	20,127	23,644	4,399	3,114	904	1,600	0	2,504	985	1,845	0	2,830
Cattle Su/F	33	233,666	90,869	23,864	23,044	9,025	8,447	990	18,462	12,846	13,124	1,815	27,785
Cattle Su/F/W	8	120,306	40,819	11,167	9,940	4,280	8,073	1,530	13,883	7,080	10,299	2,580	19,959
Cattle F/W	5	33,319	9,244	3,484	3,144	1,077	2,104	0	3,181	1,872	2,812	0	4,684
Cattle W	3	14,037	900	948	957	466	824	0	1,290	704	1,044	0	1,748
Sheep Sp/W	2	4,859	4,722	547	547	127	19	0	146	127	21	0	148
Sheep Sp/Su/F/W	1	497	1,630	125	125	75	53	0	128	75	78	0	153
Sheep Su	2	1,152	2,560	298	298	192	99	0	291	192	147	0	339
Sheep Su/F	11	17,958	34,580	3,139	2,873	1,635	1,613	0	3,248	1,774	2,169	0	3,943
Sheep Su/F/W	6	7,172	27,963	2,063	2,062	1,237	1,143	0	2,380	1,237	1,486	0	2,723
Sheep F/W	4	27,438	8,657	3,441	2,346	1,443	999	0	2,442	1,816	2,082	0	3,898
Sheep W	21	225,442	32,461	27,362	17,806	8,083	1,631	0	9,714	10,552	6,164	0	16,716
Cattle & Sheep Su/F	1	1,080	840	360	360	216	30	0	246	216	88	0	304
Cattle & Sheep Su/F/W	2	18,504	13,394	2,386	1,950	1,167	1,023	0	2,190	1,407	1,266	0	2,673
Cattle & Sheep Sp/Su/F/W	1	14,100	456	1,622	1,541	714	1,198	0	1,912	1,125	1,484	0	2,609
Horses Su/F	1	149	160	25	25	15	10	0	25	15	14	0	29
Total	125	915,269	324,203	98,337	81,099	36,249	35,078	2,520	73,847	50,634	53,795	4,395	108,824
Unallotted	--	3,240	--	0	0	0	1,080	0	1,080	0	1,080	0	1,080
Stock Driveways	--	9,600	--	3,750	3,750	3,750	0	0	3,750	3,750	0	0	3,750
EIS AREA TOTAL	139	1,521,806	467,503	159,734	136,028	64,742	64,521	4,200	133,463	88,845	96,815	6,750	192,410

1/ Sp = Spring, 3/15 to 6/30
Su = Summer, 7/1 to 9/30
F = Fall, 10/1 to 11/15
W = Winter, 11/15 to 3/15

2/ Livestock Actual Use = Average licensed livestock use those proposed in Alternative A (Appendix B, Table B-1 for each allotment).

UTILIZATION LEVELS OF KEY SPECIES

Utilization levels of key species of plants would be the same as proposed in Alternative A. Average combined livestock, wildlife, and wild horse utilization of key species within an allotment would be limited to 50 percent of annual production. Maximum utilization would not normally exceed 60 percent in the grazed pasture. If combined utilization levels are exceeded, BLM would take action to remove any excess wild horses, to reduce livestock use to the proper level, or in the case of wildlife, make recommendations to the Colorado Division of Wildlife to reduce populations of big game species of wildlife.

Range Improvements

Range improvements proposed for this alternative would be the same as those proposed and described under Alternative A. An additional 14 miles of interior fence would be proposed for the Cathedral Bluffs allotment (6337).

Standard design, construction and operation features, and design restrictions proposed and discussed under Alternative A would also apply to proposed range improvements under this alternative.

Implementation

Implementation of this alternative would occur as discussed in Alternative A with full implementation occurring 8 years after filing of the final Environmental Impact Statement. Adjustments proposed in livestock, wild horse, and big game wildlife grazing use as shown in the initial allocation of Table 2-7 (Appendix B, Table B-3 for each allotment) would be fully implemented within 3 years following filing of the statement. In addition to the costs associated with Alternative A (Tables 2-3 and 2-4), an additional cost for 14 miles of fence would occur under this alternative ($42,000). Total estimated cost of implementing this alternative would be $5,787,159 for construction related costs and $163,940 annual maintenance costs. No added BLM personnel above that required in Alternative A (ten added positions during implementation, three after) would be required.

Administration of Grazing Management

Administration of grazing management under this alternative would be through standard BLM operating procedures as discussed in Alternative A.

ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE USES

Under this alternative, livestock grazing would be managed to optimize or emphasize other resource values. Other resource values to be considered include:

- Protection and improvement of 55.5 miles of riparian habitat including the 6.5 miles on Lake and Soldier Creeks discussed in Alternative A.
- Improvement of sage grouse habitat.
- Accelerated improvement in watershed and soil protection.
- Provide vegetation for increased big game wildlife populations.
- Maintenance of 107,000 acres of wild horse range capable of supporting 450 wild horses.

Vegetation Allocation

Under this alternative, a larger quantity of forage would be allocated to increased big game wildlife populations throughout the EIS area and to increased wild horse populations on Cathedral Bluffs, Yellow Creek, and Square S allotments.

Initial allocations (short term) for wildlife and wild horses would be 64,521 AUMs for big game wildlife and 4,200 AUMs for wild horses (Table 2-8). Initial allocation for livestock would be 64,742 AUMs, 41 percent below the initial allocation in Alternative A and 54 percent below present active licensed use.

Projected allocations (20 years) would be 96,815 AUMs for big game wildlife and 6,750 AUMs for wild horses. Projected allocation for livestock would be 88,845 AUMs, 43 percent below the long term allocation of Alternative A and 35 percent below active licensed use (Table 2-8). Allocations for each allotment are presented in Appendix B, Table B-4.

Required livestock adjustments would be made during the first 3 years of implementation of this alternative. Big game wildlife populations would remain at the existing levels during this period. After necessary livestock adjustments are fully implemented, forage made available through livestock reductions would be partially allocated to big game wildlife populations. The allocation to big game wildlife would provide the following increase in competitive livestock-wildlife forage to wildlife: 23 percent for deer, 8 percent for elk, and 2 percent for antelope.

It is anticipated that deer populations would not expand to the level (23 percent increase) provided by the initial allocation, at least in the short term Summer populations of deer may expand to the allocation level but not wintering populations. Prior to expansion of wintering deer herds, increased production of mule deer winter forage would be necessary. Land treatments, proposed in this alternative, would be required to increase production of winter forage.

In addition to increased allocations to large consumptive users, the reduced livestock grazing use would provide accelerated improvement in watershed and soil protection through improved vegetation conditions (improved vigor, increased reproduction, and increased litter).

Improvement of 142 acres of riparian vegetation would involve livestock exclusion from 55.5 miles of streams. The initial allocation for livestock includes a reduction of 142 AUMs for improvement of these areas (Table 2-9).

Wild Horse Management Area

Wild horses would be managed on 107,000 acres of the existing 443,979 acre horse area, the same area proposed in Alternative A (Map 2-1). A maximum of 450 wild horses with a minimum of 280 horses would be maintained on this area. Wild horses would be allowed to increase to the maximum on each allotment as follows:

6027 Square S - 146 horses to 157 horses

6030 Yellow Creek - 133 horses to 172 horses

6337 Cathedral Bluffs - 87 horses to 121 horses

Removal of 259 wild horses from 11 allotments (excluding Square S, Yellow Creek, and Cathedral Bluffs) would be required under this alternative. In order to maintain a maximum of 450 wild horses on Square S, Yellow Creek, and Cathedral Bluffs allotments, removal of the number of horses above the minimum would be required about once in 4 years.

Grazing Management

EXISTING INTENSIVE MANAGEMENT AREAS

The six allotments presently under intensive management would continue under the existing management described in Alternative A (Action Proposal). However, these allotments would be subject to the vegetation allocation (Table 2-8) and grazing treatments (described below) proposed under this alternative.

PROPOSED INTENSIVE MANAGEMENT AREAS

Intensive management is proposed for eight allotments containing 437,226 acres of public land. Intensive management is proposed for these allotments to improve critical deer winter ranges on the North Dry Fork (6005), Greasewood (6036), Little Spring Creek (6038), and Twin Buttes (6346) allotments and to improve deer summer and winter ranges on the K Ranch (6307) and Wolf Creek (6323) allotments.

Allotment management plans along with the associated grazing systems and range improvements would be developed during implementation of this alternative. The grazing systems and range improvements would be designed to improve critical or limited wildlife habitat.

PROPOSED LESS INTENSIVE MANAGEMENT AREAS

Less intensive management is proposed for 125 allotments containing 915,269 acres of public land. The vegetation allocation (Table 2-8) and the grazing treatments discussed below would be incorporated into the grazing management of these allotments. Range improvements on these allotments would be limited to the types of improvements required to enhance resource values other than livestock grazing.

GRAZING TREATMENTS

The minimum rest requirements proposed for each allotment in Alternative A (Appendix B, Table B-1), would be applied each year on the entire allotment under this alternative (Appendix B, Table B-4). Applying these rest periods annually would eliminate spring livestock grazing from approximately March to June on lower elevation rangeland and from approximately April to July (in some cases mid-July) on higher elevation rangeland (above 7,000 feet). Elimination of spring livestock grazing would reduce livestock use during this period by 26,000 AUMs below that proposed in Alternative A.

In addition to the spring rest periods proposed, a fall minimum rest period is proposed for 11 allotments (Table 2-10). The fall rest periods are proposed for allotments with fall and winter livestock grazing within critical deer winter range. The fall rest periods would be designed to reduce livestock use of forage required by deer during late fall and winter. The fall rest period would reduce the short term livestock use proposed in Alternative A by 2,666 AUMs (Table 2-10).

The fall rest period would apply to the entire allotment and would eliminate fall/winter grazing on those allotments where the proposed fall rest would be applied annually. On allotments where the fall rest would be applied once in 2 years (Table 2-10), fall rest could occur on the entire allotment once every 2 years or on one-half of the allotment each year.

PERIOD OF USE AND KIND OF LIVESTOCK

No changes in the kind of livestock utilizing the allotment has been proposed. Periods of use would remain the same as proposed in Alternative A except for the changes discussed above (Table 2-10 and Appendix B, Table B-4).

Utilization levels of key species and monitoring and study programs would be the same as proposed in Alternative A.

Range Improvements

Range improvements proposed for this alternative were those identified for the optimization of the wildlife and aquatic wildlife resources in the Unit Resource Analysis (URAs) for the three planning units in the EIS area.

Livestock exclusion would occur along 55.5 miles of streams (Table 2-9). Both sides of each stream would be fenced to enclose the riparian zone which would require about 110 miles of fence. Water gaps would occur about each quarter mile to allow livestock and wild horse access to water. In addition, 62 miles of fence are proposed for the existing and proposed intensive management allotments to aid in control of livestock (Table 2-11 and Appendix A, Table A-4 for each allotment).

Additional watering facilities (94 reservoirs, 14 wells, and 28 springs) would be required on the proposed and existing intensive management allotments. The remaining water facilities (Table 2-11) would be constructed on deer summer range (3 reservoirs and 1 spring), on antelope summer range (7 reservoirs), and on the wild horse range (8 reservoirs and 5 springs).

Vegetation manipulation would be required on 83,890 acres which is about 5 percent of the public land in the EIS area. Vegetation manipulations include treatment of 34,370 acres of sagebrush and mountain shrub rangelands and 49,520 acres of pinyon-juniper woodlands (Table 2-11).

The manipulations would be developed on 71 of the 139 livestock grazing allotments. The primary objective of the manipulations would be to improve deer winter range and yearlong antelope range.

All range improvements proposed under this alternative would be subject to the standard operating procedures listed under Alternative A and to the design restrictions listed in Appendix A.

General Implementation Schedule

Adjustments in livestock and wild horse use, as discussed under Alternative A, would be implemented within 3 years after approval of the final EIS. Allotment management plans would be implemented on the 8 proposed intensive allotments within 5 years. Range improvements would be constructed within 5 years for support facilities and within 8 years for vegetation manipulations.

The six existing intensive management allotments would continue under present management with the required adjustments in livestock use implemented in 3 years. The proposed range improvements for these allotments would be complete in 5 years.

COSTS OF IMPLEMENTATION

The estimated cost of implementing this alternative would be $3,096,550 initial construction related costs and $50,356 annual maintenance costs (Table 2-11).

ADDITIONAL MANPOWER REQUIREMENTS

Additional BLM personnel requirements would be about eight positions during implementation and only three of these positions after implementation.

Administration of Grazing Management

Administration of grazing management under this alternative would be accomplished through the

TABLE 2-9
AREAS OF RIPARIAN VEGETATION PROPOSED FOR LIVESTOCK EXCLUSION

Allotment No.	Allotment Name	Stream Name	Miles to be Fenced	Acres of Riparian Vegetation	Livestock AUMs Reduced
6019	Cow Creek	Trappers Creek	3.0	3	3
6021	Naval Oil Shale	Trappers Creek	3.0	3	3
6304	Basin Springs	Trail Creek	1.5	2	2
6304	Basin Springs	K Creek	1.0	7	7
6307	K Ranch	K Creek	3.5	21	21
6307	K Ranch	Buckwater Draw	5.0	15	15
6307	K Ranch	Bull Canyon	2.5	2	2
6307	K Ranch	Bull Draw	0.5	1	1
6307	K Ranch	Willow Creek	2.5	7	7
6307	K Ranch	Middle Creek	0.5	2	2
6337	Cathedral Bluffs	Windy Canyon	1.5	2	2
6337	Cathedral Bluffs	Bear Park Creek	3.0	3	3
6337	Cathedral Bluffs	E. Douglas Creek	4.0	11	11
6337	Cathedral Bluffs	Sucker/Willow Creek	3.5	9	9
6346	Twin Buttes	West Creek	2.0	3	3
6354	E. Douglas Creek	Brush Creek	3.0	8	8
6357	Evacuation Creek	W. Foundation Creek	2.0	2	2
6353	Park Canyon/ Bitter Creek	Rathole Canyon	2.0	2	2
6367	Cathedral Creek	Lake Creek 1/	3.5	23	23
6367	Cathedral Creek	Soldier Creek 1/	3.0	6	6
6333	Pinyon Ridge	Crooked Wash	2.0	4	4
6600	McAndrew's Gulch	Crooked Wash	3.0	6	6
	Total		55.5	142	142

1/ Livestock exclusion was also proposed in Alternative A (Action Proposal)

TABLE 2-10
FALL MINIMUM REST REQUIREMENTS

Allotment No.	Allotment Name	Fall Rest Requirement Period	Fall Rest Requirement Cycle Applied	AUMs Reduced from Livestock
6006	Little Hills	11/1-1/30	1 in 2	863
6028	Hatch Gulch	11/1-1/30	1 in 2	266
6036	Greasewood	10/30-12/30	Yearly	405
6038	Little Spring Creek	10/30-12/30	Yearly	582
6337	Cathedral Bluffs	10/15-11/15	Yearly	135
6610	Gower Gulch	10/1-11/30	Yearly	42
6616	Goff Camp Gulch	10/1-11/30	Yearly	37
6617	Cave Gulch	10/1-11/30	Yearly	54
6620	Jordan Gulch	10/15-11/30	Yearly	63
6621	Lower Smith Gulch	10/1-2/28	1 in 2	96
6625	Smith-Crawford	10/1-12/15	1 in 2	123
	Total			2,666

TABLE 2-11
PROPOSED RANGE IMPROVEMENTS
ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE USES

Range Improvement	Units	Average Unit Cost 1/	Estimated Total Cost 1/	Annual Maintenance Cost 1/
SUPPORT FACILITIES				
Reservoirs	112	$ 1,740	$ 194,880	$ 9,744
Wells	14	13,500	189,000	4,725
Springs	34	1,000	34,000	1,360
Watering Troughs	52	2/	2/	2/
Storage Tanks	14	2/	2/	2/
Fences (miles)	172 3/	3,000	516,000	12,900
Sub Total			$ 933,880	$28,729
VEGETATION MANIPULATIONS				
Sagebrush (acres)				
Mechanical	4,480	$ 16	$ 71,680	$ 717
Burning	29,890	7	209,230	2,092
Pinyon-Juniper (acres)				
Mechanical	49,520	38	1,881,760	18,818
Sub Total	83,890		$ 2,162,670	$21,627
TOTAL			$3,096,550	$50,356

1/ Costs are in 1979 dollars.
2/ Costs of storage tanks and water troughs are included in the cost of other facilities, such as wells.
3/ The 172 mils of fence includes 110 miles to fence riparian zones and 62 miles for livestock management.

standard BLM operating procedures described under Alternative A (Action Proposal).

ALTERNATIVE F - OPTIMIZE WILD HORSES

This alternative examines the impacts of optimizing wild horse use within the existing wild horse range on public lands in the White River Resource Area.

The objectives of this alternative are consistant with the objectives of Alternative A with a different emphasis on the allocation of vegetation to livestock and wild horses. Wild horses would be allocated the forage required to obtain the maximization level for wild horses identified in the Unit Resource Analysis for the White River Resource Area.

Vegetation Allocation

Wild horses would be given preference over livestock in allocating vegetation within the existing wild horse range, covering 14 livestock allotments. The allocation on the remaining 125 allotments in the EIS area would be the same as that proposed in Alternative A.

The initial allocation as shown in Table 2-12 would provide 9,364 AUMs for the existing wild horse population. However, a decrease of 5,251 AUMs in livestock grazing use, below the initial allocation of Alternative A, would be required to provide for the long term wild horse populations.

The allocation for big game wildlife species would remain the same as proposed in Alternative A, which provides for present population levels. The initial allocation for the EIS area would provide 9,364 AUMs for wild horses, 103,752 AUMs for livestock, and 64,521 AUMs for big game wildlife.

The projected allocation (20th year) would provide 16,865 AUMs for wild horses, 141,780 AUMs for livestock, and 71,599 AUMs for big game wildlife (refer to Appendix B, Table B-1, for allotments without wild horses and Table 2-12 for wild horse allotments). Table 2-13 shows the total allocation that would occur under this alternative.

Wild Horse Management Area

Wild horses would continue to be managed on the 443,979 acres of public land in the present wild horse range. The present 625 wild horses would be allowed to expand to a maximum of 1,125 and a minimum of 700 wild horses.

The wild horse range would be divided into four separate herd management units (Map 2-4). The 500 horse increase above the present horse population would be evenly distributed among these four areas (Table 2-14). If and when the horse population approaches the maximum for any herd management unit, the number of horses above the minimum population for that unit would be removed.

Removal of horses from each herd management unit would be conducted under a 5 year rotation. Horses in excess of the minimum population for a unit would be removed approximately every 5 years so as to stay within the maximum horse population for that unit.

Grazing Management

EXISTING INTENSIVE MANAGEMENT AREAS

Intensive management would continue at the existing level as described under Alternative A (Action Proposal) for the six allotments presently under intensive management. However, the level of livestock grazing use on the Square S allotment (6027) would be reduced 656 AUMs below the initial allocation level of Alternative A in order to provide forage for an increase of 62 wild horses.

PROPOSED INTENSIVE MANAGEMENT AREAS

Under this alternative, intensive management would be implemented on 62 allotments containing 804,168 acres of public land. This level excludes only the 13 allotments in the existing wild horse range which were proposed for intensive management under Alternative A. Thus, all allotments proposed for intensive management under Alternative A, except wild horse allotments, are also proposed for intensive management under this alternative and would be managed as described in Alternative A.

PROPOSED LESS INTENSIVE MANAGEMENT

Under this alternative, less intensive management is proposed for the same 58 allotments which are proposed for less intensive management under Alternative A. In addition, the 13 allotments in the present wild horse range, which are not presently under intensive management would continue to be managed under less intensive management. Thus, 71 allotments containing 548,327 acres of public

TABLE 2-12
PROPOSED VEGETATION ALLOCATION
ALTERNATIVE F - OPTIMIZE WILD HORSES

Allotment No.	Allotment Name	Land Ownership 1/ Acres Public	Land Ownership 1/ Acres Other	Initial Vegetation Allocation (AUMs) Livestock	Initial Vegetation Allocation (AUMs) Wild Horses	Change in Present Vs. Proposed Authorized Use (AUMs) 3/ Qualifications	Change in Present Vs. Proposed Authorized Use (AUMs) 3/ Actual	Projected Vegetation Allocation (AUMs) 4/ Livestock	Projected Vegetation Allocation (AUMs) 4/ Wild Horses
6026	Square S	59,761 2/	3,840 2/	3,766	2,190	-624	-304	5,967	3,127
6030	Yellow Creek	72,485	4,180	2,438	1,992	-1,180	-680	3,048	2,933
6031	Duck Creek	21,859	1,359	1,346	231	-144	-142	1,683	498
6032	Spring Creek	38,884	1,600 2/	1,400	1,005	-3,167	-3,170	1,750	2,160
6036	Greasewood	27,810	1,600 2/	1,338	510	-349	-347	1,672	780
6038	Little Spring Creek	12,957 2/	1,280 2/	614	240	-569	+229	768	508
6039	Hammond Draw	7,097	0 2/	131	195	-84	-31	164	462
6040	Upper Fletcher	6,250	1,270	332	165	-348	-181	415	432
6041	Lower Fletcher	9,687	0 2/	356	95	-256	+45	445	195
6042	Boise Draw	8,246	0 2/	563	116	-460	-336	704	383
6337	Cathedral Bluffs	58,383 2/	1,600 2/	2,401	1,305	-2,670	-2,670	3,001	2,192
6338	Johnson-Trujillo	21,798	0 2/	836	75	-2,385	-683	1,045	387
6346	Twin Buttes	88,522 2/	2,880 2/	5,463	1,080	-5,908	-3,545	6,829	2,330
6354	E. Douglas Creek	10,240 2/	0 2/	1,773	165	-581	-581	2,216	478
	Total	443,979	19,609	22,757	9,364	-18,725	-12,396	29,707	16,865

1/ Land ownership within the wild horse area only.
2/ Does not include all acreage within the allotment.
3/ Qualification = Present authorized livestock use. Actual = Average active licensed livestock use.
4/ Wildlife allocation on all allotments and livestock allocation on non-wild horse allotments are the same as the allocations in Alternative A.

TABLE 2-13
PROPOSED VEGETATION ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE F - OPTIMIZE WILD HORSES

Kind of Livestock & Period of Use 1/	No. of Allotments	Acres Public Land	Acres Other Ownership	Present Authorized Livestock Use (AUMs)	Livestock Actual Use (AUMs) 2/	Initial Allocation (AUMs) Livestock	Wildlife	Wild Horses	Total	Projected (20th yr) Allocation (AUMs) Livestock	Wildlife	Wild Horses	Total
EXISTING INTENSIVE MANAGEMENT													
Cattle Sp/Su/F	2	23,359	2,806	3,879	2,923	2,750	1,470	0	4,220	3,675	1,649	0	5,324
Cattle Sp/Su/F/W	4	133,112	23,883	10,241	10,023	10,565	7,166	2,190	19,921	14,169	9,876	3,127	27,172
Total	6	156,471	26,689	14,120	12,946	13,315	8,636	2,190	24,141	17,844	11,525	3,127	32,496
PROPOSED INTENSIVE MANAGEMENT													
Cattle Sp	2	24,168	3,946	1,598	1,309	1,258	1,372	0	2,630	1,880	1,568	0	3,448
Cattle Sp/Su	2	9,036	1,122	1,163	980	365	580	0	945	430	651	0	1,081
Cattle Sp/Su/F	10	63,332	32,695	7,493	7,186	4,458	3,218	0	7,676	7,129	3,558	0	10,687
Cattle Sp/Su/F/W	9	371,147	131,148	42,243	37,969	28,346	20,261	0	48,607	42,154	21,370	0	63,524
Cattle Sp/F/W	6	46,179	19,216	4,275	3,944	2,602	3,478	0	6,080	4,329	3,556	0	7,885
Cattle Su/F	8	20,823	8,811	3,766	3,168	2,012	1,226	0	3,238	2,953	1,475	0	4,428
Cattle F/W	2	12,420	1,760	1,117	1,117	882	661	0	1,543	1,262	662	0	1,924
Sheep Sp	1	9,070	720	758	451	507	19	0	526	784	22	0	806
Sheep Sp/F/W	6	38,572	10,779	4,565	3,285	3,232	1,672	0	4,904	4,976	1,820	0	6,796
Sheep Sp/W	9	135,864	21,805	17,886	11,196	7,950	746	0	8,696	12,033	857	0	12,890
Sheep W	5	42,313	2,425	3,985	3,446	2,880	611	0	3,491	4,116	705	0	4,821
Cattle & Sheep Sp/Su/F	1	17,144	10,994	2,083	1,647	1,633	861	0	2,494	2,068	906	0	2,974
Cattle & Sheep Sp/Su/F/W	1	14,100	456	1,622	1,541	1,306	1,198	0	2,504	2,003	1,198	0	3,201
Total	62	804,168	245,877	92,554	77,239	57,431	35,903	0	93,334	86,117	38,348	0	124,465
PROPOSED LESS INTENSIVE MANAGEMENT													
Cattle Sp	3	23,203	6,284	1,458	607	812	1,068	435	2,315	1,004	1,209	970	3,183
Cattle Su	1	1,040	3,216	21	21	60	69	0	129	60	84	0	144
Cattle Sp/Su	4	2,831	12,870	486	486	441	257	0	698	444	269	0	713
Cattle Sp/Su/F	23	153,786	59,207	13,543	12,661	8,379	8,393	3,393	20,165	9,779	8,840	6,023	24,642
Cattle Sp/Su/F/W	5	285,883	26,094	20,731	18,366	11,223	5,659	3,060	19,942	13,966	6,636	5,780	26,382
Cattle Sp/F/W	1	9,687	952	612	311	356	95	95	546	445	105	195	745
Cattle Su/F	4	9,749	5,964	1,945	1,229	798	564	0	1,362	804	638	0	1,442
Cattle F/W	1	860	106	45	45	50	86	0	136	50	88	0	138
Sheep Sp/Su	2	1,152	2,560	298	298	298	99	0	397	298	99	0	397
Sheep Sp/Su/F	11	8,301	41,565	2,533	2,450	2,425	1,145	0	3,570	2,425	1,176	0	3,601
Sheep Sp/Su/F/W	4	5,742	18,726	1,557	1,558	1,554	965	0	2,519	1,554	965	0	2,519
Sheep Sp/F/W	1	8,246	577	1,023	899	563	91	116	770	704	91	383	1,178
Sheep Su/F	1	450	1,760	113	113	113	26	0	139	113	26	0	139
Sheep Sp/W	5	31,743	9,317	4,107	2,254	1,357	161	75	1,593	1,596	191	387	2,174
Sheep W	2	3,065	2,339	150	107	139	22	0	161	139	27	0	166
Cattle & Sheep Sp/Su/F	2	2,440	3,240	663	663	663	192	0	855	663	192	0	855
Horses Sp/Su/F	1	149	160	25	25	25	10	0	35	25	10	0	35
Total	71	548,327	194,937	49,310	42,093	29,256	18,902	7,174	55,332	34,069	20,646	13,738	68,453
Unallotted	--	3,240	--	0	0	0	1,080	0	1,080	0	1,080	0	1,080
Stock Driveways	--	9,600	--	3,750	3,750	3,750	0	0	3,750	3,750	0	0	3,750
EIS AREA TOTAL	139	1,521,806	467,503	159,734	136,028	103,752	64,521	9,364	177,637	141,780	71,599	16,865	230,244

1/ Sp = Spring, 3/15 to 6/30
Su = Summer, 7/1 to 9/30
F = Fall, 10/1 to 11/15
W = Winter, 11/15 to 3/15

2/ Livestock Actual Use = Average active licensed livestock use

land would be managed under less intensive management under this alternative.

The management of the livestock driveways and trails and the unallotted public lands would be the same as proposed and described under Alternative A. Grazing treatments, minimum rest periods, period of use, kind and number of livestock, utilization levels of key species, and the monitoring and study programs would be the same as proposed and described under Alternative A.

Range Improvements

The range improvements proposed for those allotments without wild horses in Alternative A are also proposed under this alternative. The types, amounts, and cost of these improvements are summarized in Table 2-15.

The range improvements proposed for the wild horse allotments are those identified for the optimization of wild horses in the Unit Resource Analysis (URA) for the White River Resource Area. Table 2-16 shows the range improvements proposed for development of the wild horse allotments.

Eighty-four miles of fence proposed in Alternative A would not be constructed under this alternative, because if constructed, they would be within the proposed wild horse range. In addition, all existing fences within the interior of the wild horse area would be modified under this alternative. Thirty-foot gates would be built in existing fences at suitable locations to allow wild horse movement within allotments. The gates would be opened by BLM, after the authorized use period for livestock has concluded, to allow wild horse movement between allotments.

Standard design, construction and operation features and design restrictions which were proposed and discussed in Alternative A would also apply to proposed range improvements under this alternative.

Implementation

Implementation of this alternative would occur as discussed in Alternative A with full implementation occurring 8 years after filing of the final Environmental Impact Statement. Adjustments proposed in livestock grazing use shown in Table 2-13 would be fully implemented within 3 years following filing of the final EIS.

COSTS OF IMPLEMENTATION

The estimated costs of implementing this alternative would be $5,220,195 initial construction related costs and $125,668 annual maintenance costs (Tables 2-15 and 2-17).

Additional BLM personnel requirements would be the same as proposed in Alternative A, ten additional positions during implementation and three additional positions after implementation.

Administration of Grazing Management

Administration of grazing management under this alternative would be accomplished through the standard BLM operating procedures described under Alternative A.

MITIGATING MEASURES TO BE INCLUDED IN EACH ALTERNATIVE

This section identifies the mitigation measures necessary to lessen the impacts associated with each alternative. The mitigation measures identified are only those that BLM has the authority to develop. Other avenues of mitigation are available for economic impacts but are beyond BLM authority and thus, cannot be committed by BLM. The mitigation measures identified would be included and become a part of the alternative selected as the preferred grazing management program. Alternatives with common mitigations will be discussed as a group.

Alternatives A, D, E, and F

Vegetation manipulations are the most common cause of adverse impacts requiring mitigation. Treatment of pinyon-juniper and sagebrush would have adverse impacts on production of wood products and wildlife habitat. Losses of firewood, ranging from 89,364 to 115,138 cords depending on the alternative, would be mitigated by conducting firewood sales before and/or after pinyon-juniper manipulation to salvage as much wood as possible.

Vegetation manipulations within pinyon-juniper and sagebrush vegetation types would be subject to site specific analysis to determine wildlife needs and values of the areas to be treated. Critical wildlife habitat values such as foraging areas, thermal cover, escape cover, seasonal use areas, and breeding areas for deer, elk, antelope, and sage

TABLE 2-14
WILD HORSE HERD MANAGEMENT UNITS

Herd Management Unit	Allotment Name	Present Number of Wild Horses	Minimum Number of Wild Horses	Maximum Number of Wild Horses
AREA #1	Square S	146	132	208
	Yellow Creek	133	121	196
Total		279	253	404
AREA #2	Cathedral Bluffs	87	100	146
	Spring Creek 1/	54	62	113
	Lower Fletcher	6	7	13
Total		147	169	272
AREA #3	Twin Buttes	72	108	155
	E. Douglas Creek	11	16	32
	Johnson-Trujillo	5	8	26
Total		88	132	213
AREA #4	Duck Creek	16	20	33
	Spring Creek 1/	13	18	31
	Greasewood	34	45	52
	Little Spring Crk	16	20	34
	Upper Fletcher	11	15	29
	Boise Draw	8	10	26
	Hammond Draw	13	18	31
Total		111	146	236
Resource Area Total		625	700	1,125

1/ 80 percent of Spring Creek allotment is in Area #2 and 20 percent in Area #4.

TABLE 2-15
PROPOSED RANGE IMPROVEMENTS - ALLOTMENTS WITHOUT WILD HORSES
ALTERNATIVE F - OPTIMIZE WILD HORSES

Range Improvement	Units	Average Unit Cost 1/	Estimated Total Cost 1/	Annual Maintenance Cost 1/
SUPPORT FACILITIES				
Reservoirs	384	$ 1,740	$ 668,160	$ 33,408
Check Dams	21	1,000	21,000	1,050
Wells	31	13,520	419,120	10,478
Water Catchments	29	10,900	316,100	7,902
Springs	56	1,000	50,000	2,000
Pipelines (miles)	31	2,260	70,060	1,401
Troughs	135	2/	2/	2/
Storage Tanks	60	2/	2/	2/
Fences (miles)	119	3,000	357,000	$ 8,925
Sub Total			$ 1,901,440	$ 65,164
VEGETATION MANIPULATIONS				
Sagebrush (acres)				
Mechanical	5,204	$ 16	$ 83,264	$ 833
Chemical	19,727	15	295,905	2,959
Burning	56,598	7	396,186	3,962
Pinyon-Juniper (acres)				
Mechanical	19,765	38	751,070	30,043 3/
Burning	3,244	15	48,660	487
Existing P/J Chainings (acres)				
Burning	5,690	10	56,900	120
Greasewood (acres)	3,410	15	51,150	225
Other Treatments (ac)	6,580	12	78,960	230
Sub Total	120,218 Acres		$ 1,762,095	$ 38,859
TOTAL			$ 3,663,535	$104,023

1/ Costs are in 1979 dollars.
2/ Costs of storage tanks and troughs are included in costs of associated projects.
3/ Annual maintenance costs would include costs of follow-up prescribed burning.

TABLE 2-16
PROPOSED RANGE IMPROVEMENTS - WILD HORSE ALLOTMENTS
ALTERNATIVE F - OPTIMIZE WILD HORSES

Allotment No.	Name	SUPPORT FACILITIES Fences 1/ (Miles)	Reservoirs (No.)	Wells (No.)	Springs (No.)	Trough (No.)	Pipelines (No.)
6026	Square S	2	4	1	4	6	2
6030	Yellow Creek	0	5	1	0	6	4
6031	Duck Creek	0	3	0	2	2	0
6032	Spring Creek	0	4	0	5	5	0
6036	Greasewood	0	1	1	0	3	2
6038	Little Spring Creek	0	2	0	0	0	0
6039	Hammond Draw	0	1	0	0	0	0
6040	Upper Fletcher	0	1	0	0	0	0
6041	Lower Fletcher	0	1	0	2	2	0
6042	Boise Draw	0	2	0	2	2	0
6337	Cathedral Bluffs	6	10	1	5	9	2
6338	Johnson-Trujillo	0	4	0	2	2	0
6346	Twin Buttes	7	6	1	4	10	4
6354	E. Douglas Creek	4	4	0	3	3	0
	Total	19	48	5	29	50	14

Allotment No.	Name	VEGETATION MANIPULATIONS (ACRES) Sagebrush Mechanical	Sagebrush Burning	P/J Mechanical	Greasewood
6026	Square S	1,000	1,500	2,750	0
6030	Yellow Creek	1,000	2,500	2,440	0
6031	Duck Creek	0	0	1,100	0
6032	Spring Creek	1,300	0	2,980	0
6036	Greasewood	600	600	1,050	0
6038	Little Spring Creek	700	1,500	0	0
6039	Hammond Draw	0	0	1,780	0
6040	Upper Fletcher	0	0	960	0
6041	Lower Fletcher	0	0	2,880	0
6042	Boise Draw	600	1,000	0	0
6337	Cathedral Bluffs	400	400	6,500	500
6338	Johnson-Trujillo	600	0	240	0
6346	Twin Buttes	800	1,500	6,000	1,000
6354	E. Douglas Creek	0	0	400	200
	Total	7,000	9,000	29,080	1,700

1/ Fences proposed would be outside of the wild horse use areas

TABLE 2-17
PROPOSED RANGE IMPROVEMENTS - WILD HORSE ALLOTMENTS
ALTERNATIVE F - OPTIMIZE WILD HORSES

Range Improvement	Units	Average Unit Cost 1/	Estimated Total Cost 1/	Annual Maintenance Cost 1/
SUPPORT FACILITIES				
Reservoirs	48	$ 1,740	$ 83,520	$ 4,175
Wells	5	13,520	67,600	1,690
Springs	29	1,000	29,000	1,160
Troughs	50	2/	2/	2/
Pipelines (miles)	14	2/	2/	2/
Fences (miles)	19	3,000	57,000	1,425
Sub Total			$ 237,120	$ 8,450
VEGETATION MANIPULATIONS				
Sagebrush (acres)				
Mechanical	7,000	$ 18	$ 126,000	$ 1,260
Burning	9,000	7	63,000	630
Pinyon-Juniper (acres)				
Mechanical	29,080	38	1,105,040	11,050
Greasewood (acres)	1,700	15	25,500	255
Sub Total	46,780 Acres		$1,319,540	$ 13,195
TOTAL			$1,556,660	$ 21,645

1/ Costs are in 1979 dollars.

grouse would be considered in all treatments. Vegetation manipulations within critical deer winter ranges would be scheduled for treatment after areas adjacent to those critical winter ranges have been treated, and after deer winter forage production is adequate to replace forage that would be lost during treatment of critical winter ranges.

Alternative D

Management of wild horses under this alternative would be designed to maintain a viable wild horse herd by minimizing winter death losses and undesirable genetic traits due to inbreeding. Gates or let down segments of fence would be constructed in existing and new fences within the interior of the wild horse range. Gates or let down fences would be left open, except during periods required to restrict livestock movements, to allow wild horse access to feeding and watering areas and to allow possible interchange between wild horse bands. Introduction of wild horse bloodlines, unrelated to the horses in the EIS area, would be considered and if possible, implemented as a measure to minimize the undesirable effects of inbreeding.

ENVIRONMENTAL CONSEQUENCES

This section compares relative differences in the impacts on major resources among the six alternatives considered in this EIS. That alternative which most equitably benefits all major resource uses and values and conforms most closely with the multiple use objectives in the White River Resource Area land use plan (Management Framework Plan) would be the preferred alternative or the preferred grazing management program. Resource values used for comparison are presented in Table 2-18. A more detailed discussion of the impacts of each alternative is located in Section 4, Environmental Consequences.

Air Quality

Long term air quality would remain good throughout the EIS area under all alternatives. However, short term adverse impacts would occur as a result of vegetation manipulations, especially prescribed burning, under the Action Proposal, Optimize Livestock Grazing, Emphasis on Other Resource Uses, and Optimize Wild Horse alternatives.

Adverse impacts would consist of the introduction of smoke into the atmosphere immediately following a prescribed burn and the introduction of dust particles through wind erosion on disturbed areas. Impacts from application of 2, 4-D by aerial spraying would be minimal. All of these impacts would be temporary, with the most severe case lasting several days at most. Wind erosion would be reduced through the long term following revegetation of treated areas.

Soils

On-site erosion would decrease from the current average of 31.7 tons/acre/year through the long term for all alternatives except No Action (continuation of present grazing management). The decrease of 3.6 tons/acre/year under the Elimination of Livestock Grazing alternative and 2.7 tons/acre/year under the Emphasis on Other Resource Uses alternative would represent the greatest reductions.

Similarly, sediment yields would be decreased under all alternatives except No Action. The greatest improvement would come with the Elimination of Livestock Grazing alternative, however, changes from the present sediment yield of 2.39 tons/acre/year that would occur under any alternative, are not expected to create significant improvements in water quality.

Water Resources

Implementation of any of the six alternatives would not incur significant (positive or negative) changes in water quantity or quality.

Vegetation

The criteria used to evaluate changes in vegetation between each alternative were composition, condition and trend, cover, and forage production available to livestock, wildlife, and wild horses. Of these, changes in condition and available forage production reflect the greatest differences between alternatives.

Changes in composition and cover would also differ among alternatives, however, these changes are closely related to changes in condition. On the average, there would be a 17 percent change (increase or decrease) in the amount of desirable species in the plant composition on areas displaying a change in condition class.

Total vegetation cover is not expected to change significantly from present levels in that available moisture is limited with most of it being utilized by the present plant community. Therefore, any change (increase or decrease) in the composition of desirable species would result in a similiar but opposite change in undesirable species.

Rangeland conditions would show significant improvements under all the alternatives except No Action. Implementation of this alternative would result in a decrease of 196 acres in good condition range and a decrease of 89,280 acres in fair condition range with a consequent increase of 89,476 acres in poor condition rangeland.

The Elimination of Livestock Grazing alternative would result in the greatest long term improvement in range condition. Good condition range would increase by 326,794 acres and fair condition range by 258,034 acres with poor condition range decreasing by 68,070 acres.

Long term production of available forage, that portion of total vegetation production that is available for use by livestock, wild horses, and big game wildlife, would be greatest under the Optimize Wild Horses, Action Proposal, and Optimize Livestock Grazing alternatives. The lowest long term level of forage production would occur under the No Action alternative.

Current levels of livestock and wild horse forage utilization were assumed to remain constant through the long term under the No Action alternative. This would result in a long term decrease in available forage production, as is evident in the declining range conditions in Table 2-18. This would contribute to a reduction in deer habitat carrying capacity and a reduction in the deer population (7,625 deer).

The Elimination of Livestock Grazing alternative would result in the lowest levels of forage utilization in both the short and long terms (77,635 AUMs and 93,440 AUMs, respectively). An estimated 98,592 AUMs of available forage would not be utilized each year, in the long term.

Riparian Vegetation

Riparian vegetation would improve under all alternatives except continuation of present grazing management (No Action). Under this alternative, those riparian zones displaying declining trends would continue to decline. Long term results would be a decline in riparian condition on 70 acres of the 297 acres of riparian vegetation on public lands.

The Elimination of Livestock Grazing alternative would incur the greatest improvement, with 95 acres in excellent condition, 174 acres in good condition, and 28 acres in fair condition, for a net improvement on 251 acres. The Emphasis on Other Resource Uses alternative would show similar results with a net improvement on 211 acres.

The Action Proposal and Optimize Wild Horses alternatives would also result in long term improvements with 108 acres in good condition, 154 acres in fair condition, and 35 acres in poor condition, for a net improvement on 82 acres. The Optimize Livestock Grazing alternative would follow closely, with a net improvement on 70 acres.

Wildlife

The vegetation allocations to big game wildlife, in the short term, would be the same under all alternatives (64,521 AUMs) except Optimize Livestock Grazing. Here, the allocation of 42,948 AUMs would be 21,573 AUMs (33 percent) less than the present situation and all other alternatives.

The long term allocation to big game wildlife would be different among all alternatives, except the Action Proposal and Optimize Wild Horses, in which 71,599 AUMs would be allocated in each. The Emphasis on Other Resource Uses alternative would entail the largest allocation to big game (96,815 AUMs). The second largest allocation to big game would occur under the Elimination of Livestock Grazing alternative, in which 78,440 AUMs would be available to big game. The No Action and Optimize Livestock Grazing alternatives would result in a reduction in available forage to big game by 7,594 and 16,039 AUMs (12 and 25 percent), respectively, below the present situation.

Long term mule deer carrying capacities would increase the most under the Emphasis on Other Resource Uses alternatives (23 percent to 55,835 deer), followed by the Elimination of Livestock Grazing (15 percent to 53,341 deer) and by the Action Proposal and the Optimize Wild Horses alternatives (11 percent to 51,526 deer in both). All of the above increases (among alternatives) would be due to anticipated winter habitat improvement, in response to proposed reductions in livestock use, improved livestock management, and vegetation manipulations. Deer carrying capacities would decline under the No Action and Optimize Livestock Grazing alternatives by 17 percent (to 37,769 deer) and 19 percent (to 36,579 deer), respectively.

The declines under the No Action would be attributable to poor browse conditions in response to a lack of vegetation manipulation, and localized heavy livestock and deer grazing pressure. Under the Optimize Livestock Grazing alternative, declines would be due to a lack of available allocated forage to support 1978 population levels.

TABLE 2-18
SUMMARY AND COMPARISON OF IMPACTS

Component or Resource	Present Situtation	ALTERNATIVE A ACTION PROPOSAL Short Term	Long Term	ALTERNATIVE B NO ACTION Short Term	Long Term	ALTERNATIVE C ELIMINATION OF LIVE-STOCK GRAZING Short Term	Long Term	ALTERNATIVE D OPTIMIZE LIVESTOCK GRAZING Short Term	Long Term	ALTERNATIVE E EMPHASIS ON OTHER RESOURCE USES Short Term	Long Term	ALTERNATIVE F OPTIMIZE WILD HORSES Short Term	Long Term
Soils													
Change in on-site erosion (Tons/Acre/Year) 1/	31.7		-1.6		+0.8		-3.6		-1.4		-2.7		-1.4
Sediment Yeild (Tons/Acre/Year) 2/	2.39		2.28		2.46		2.12		2.30		2.19		2.30
Water Resources													
Runoff (inches/acre) 3/	0.45		0.43		0.46		0.41		0.43		0.42		0.43
Vegetation													
Available forage production (AUMs) 4/	182,888	182,888	229,758	182,888	169,588	182,888	192,032	182,888	229,393	182,888	192,410	182,888	230,244
Forage Utilization (AUMs) 5/	209,913	182,888	229,758	209,913	202,363	77,635	93,440	176,783	229,393	133,463	192,410	177,637	230,244
Range Condition													
Good (Acres)	79,009	79,009	243,538	79,009	78,813	79,009	405,803	79,009	243,538	79,009	324,246	79,009	243,538
Fair (Acres)	996,742	996,742	855,945	996,742	907,462	996,742	738,708	996,742	855,945	996,742	805,470	996,742	855,945
Poor (Acres)	446,055	446,055	422,323	446,055	535,531	446,055	377,985	446,055	422,323	446,005	392,082	446,005	422,323
Riparian Vegetation													
Condition (Acres)													
Excellent	0	0	0	0	0	0	95	0	0	0	61	0	0
Good	38	38	108	38	43	38	174	38	108	38	156	38	108
Fair	206	206	154	206	131	206	28	206	142	206	80	206	154
Poor	53	53	35	53	123	53	0	53	47	53	0	53	35
Wildlife													
Big Game Wildlife Use (AUMs)	64,521	64,521	71,599	64,521	56,971	64,521	78,440	42,948	48,482	64,521	96,815	64,521	71,599
Maximum Population													
Deer	45,394	45,394	51,526	45,394	37,769	45,394	53,341	32,455	36,579	45,394	55,835	45,394	51,526
Elk	1,783	1,783	1,926	1,783	1,783	1,783	1,926	740	798	1,783	1,926	1,783	1,926
Antelope	219	219	224	219	219	219	224	97	103	219	224	219	224
Aquatic Wildlife													
Fish Habitat Trend (Stream miles)													
Improve			45		6		71		45		53		45
No Change			25		46		2		25		20		25
Decline			3		21		0		3		0		3
Wild Horses													
Wild Horse Use (AUMs)	9,364	1,350	2,101	9,364	9,364	9,364	11,250	760	797	4,200	6,750	9,364	16,865
Maximum Population	625	90	140	625	625	625	750	51	52	280	450	625	1,125
Recreation													
Change in Hunter Recreation Days	103,714		+18,684		-15,826		+21,251		-20,992		+27,749		+18,684
Economic Conditions 6/													
Change in Ranch Income ($)	2,631,865	-99,731	+125,188	0	0	-432,412	-432,412	+43,825	+24,507	-375,634	-272,682	-123,198	+75,956
Change in Income to 7/ Other Economy Sectors ($)	4,239,935	-160,667	+201,686	0	0	-696,616	-696,616	+70,602	+387,457	-605,146	-439,291	-198,472	+123,333
Change in Ranch Employment (man years)	198.63	-18.14	+9.71	0	0	-54.06	-54.06	+0.59	+24.78	-48.72	-35.94	-20.64	+3.96
Change in Ranch Values ($)	155,984,000	-4,227,580	-306,330	-1,975,500	-1,975,500	-12,998,660	-12,998,660	-2,222,000	+1,698,000	-7,916,000	-5,907,420	-4,665,000	-1,496,000
Change in Tax Base ($) 7/	46,795,200	-1,268,274	-91,899	-592,650	-592,650	-3,898,851	-3,898,851	-666,600	+509,400	-2,374,800	-1,772,226	-1,399,500	-448,800
Change in Property Tax ($) 7/	1,614,434	-43,755	-3,171	-20,446	-20,446	-134,536	-134,536	-22,998	+17,574	-81,931	-61,142	-48,283	-15,484
Change in Hunter Derived Income 8/	11,979,902		+2,743,213		-1,560,659		+2,996,355		-2,721,214		+3,639,834		+2,743,213
Livestock Grazing													
Authorized Use (AUMs) 9/	159,734	109,003	156,058	136,028	136,028	0	0	133,075	180,114	64,742	88,845	103,752	141,780
Actual Use (AUMs) 10/	136,028												
Forestry and Forest Products													
Wood Products not Utilized (cords) 11/			89,354		0		0		89,354		99,596		115,138

1/ On-site erosion is represented as tons/acre/year from a 2 year frequency, 30 minute rainfall (Appendix D).
2/ Sediment yeild is represented tons/acre/year based on data developed by the Colorado Land Use Commission, 1974.
3/ Runoff is represented as inches/acre from a 50 year 24 hour rainfall (Appendix D).
4/ Available forage production expressed in AUMs is 50% of the forage available to livestock, wild horses, and big game species of wildlife (Appendix C).
5/ The amount of forage used by livestock, wild horses and big game species of wildlife (Appendix B).
6/ All values represent annual changes based on 1978 dollars.
7/ Changes to other economy sectors as a result of changes in ranch income or ranch values.
8/ Changes in income to the state economy derived from nonresident big game hunting in the EIS area.
9/ Authorized Use (Active qualitifications) = Maximum livestock use allowed per year.
10/ Actual Use = A five year average of licensed active use (that portion of authorized use licensed each year).
11/ Excess wood products produced from pinyon-juniper manipulations that would not be utilized based on present demands of 200,000 cords.

Long term elk and antelope carrying capacities would increase by 8 and 2 percent (to 1,926 elk and 224 antelope), respectively, under all alternatives except No Action and Optimize Livestock Grazing. Under No Action, carrying capacities would remain at 1978 levels (1,783 elk and 219 antelope). The Optimize Livestock Grazing alternative would result in the only long term reductions, with elk and antelope carrying capacities declining below current levels by 55 and 53 percent (to 798 elk and 103 antelope), respectively.

The antelope population could be reduced to 97 head in the short term under the Optimize Livestock Grazing alternative, which could be a nonviable population.

Sage grouse habitat and populations would be improved under all alternatives except No Action. In this case, the cumulative effects of annual spring livestock use, livestock distribution problems, and a lack of vegetation manipulation would maintain poor to fair habitat conditions on nesting, brooding, and summering areas.

Aquatic Wildlife

Aquatic life, in general, would be enhanced through the long term on all 78 perennial streams in the EIS area under all alternatives except No Action. Under this alternative, aquatic habitat would decline in those streams presently exhibiting declining riparian vegetation trends.

Fish habitat would reflect the same pattern. With a continuation of present grazing management, long term fish habitat conditions would decline along 21 stream miles, continue to improve along 6 miles, and remain unchanged on 46 miles. The Elimination of Livestock Grazing alternative would create the largest increase, in that, 71 of the 73 total stream miles would improve. The Emphasis on Other Resource Uses alternative would follow with improvements along 53 miles. The Action Proposal, Optimize Livestock Grazing, and Optimize Wild Horses alternatives would result in long term improvements along 45 stream miles.

Wild Horses

Long term wild horse populations would vary from a low of 52 horses under the Optimize Livestock Grazing alternative to a high of 1,125 horses under the Optimize Wild Horses alternative. In addition, the present wild horse range of 443,979 acres would remain unchanged under the No Action, Elimination of Livestock Grazing, and Optimize Wild Horses alternatives. However, the horse range would be reduced to 107,000 acres under the other alternatives.

At some point in time between the present and the year 2000, wild horse populations would have to be controlled under all alternatives. The anticipated method of control would be gathering and removing the horses. Adverse impacts would occur to individual animals through stress and possible death.

Habitat conditions for wild horses would improve under all alternatives except No Action. However, under the Optimize Livestock Grazing alternative, the wild horse herd would be reduced to 52 head, which could possibly be a nonviable population.

Recreation

Impacts to recreation resources would result largely from changes in big game populations, which would lead to long term changes in hunter recreation days. The Emphasis on Other Resource Uses alternative would result in an increase of 27,749 hunter recreation days, followed by the Elimination of Livestock Grazing alternative with an increase of 21,251 hunter days. The Action Proposal and Optimize Wild Horses alternatives would each increase hunter recreation days by 18,684 days.

Long term reductions in recreation days would occur under the remainder of the alternatives. Hunter recreation days would be reduced by 15,826 days der the No Action alternative and by 20,992 days under the Optimize Livestock Grazing alternative.

Economic Conditions

Impacts on economic conditions would occur from both short and log term changes in livestock grazing use (AUMs) on public lands. Short term impacts could in some cases result in adverse impacts, while long term impacts under the same alternative would be beneficial.

Such short term adverse impacts would occur under all alternatives except No Action and Optimize Livestock Grazing. Under the Optimize Livestock Grazing alternative, short term increases would occur in annual net ranch income by $43,825, which would result in increases in annual net income to other economy sectors in the EIS area by $70,602. Ranch employment would decrease slightly by 0.59 to 198.04 man-years. Short term ranch values would decrease by $2,222,000 with resulting decreases in the local tax base and annual property tax revenues of $666,600 and $22,998 respectively.

In the long term, the Optimize Livestock Grazing alternative would provide the greatest improvement in economic conditions above current levels. Annual net incomes to ranching operations would be increased by $240,507, which would in turn increase the annual net income to other economy sectors by $387,457. Long term ranch employment would increase by 24.78 man-years of hired employment to 223.41 man-years. The increase in allowable AUMs over the long term would increase ranch values by $1,698,000, which would increase the local tax base and property tax revenues.

Implementation of the Action Proposal would produce a short term decrease in overall annual net ranch income by $99,731, which would result in a decrease in net income to other economy sectors by $160,667. Ranch employment would decrease by 18.14 to 180.49 man years. Short term ranch values would depreciate by $4,227,580, with resulting decreases in the local tax base and annual property tax revenues.

In the long term this alternative would produce increases in net ranch income of $125,188 and income to other economy sectors by $201,686. Long term ranch employment would increase by 9.71 to 208.34 man years. The long term authorized use (AUMs) would be less than present authorized use, therefore, ranch values would decrease by $306,330, with resulting decreases in the local tax base and property tax revenues.

The Optimize Wild Horses alternative would produce results similar to, but slightly lower than those economic values resulting from the Action Proposal. However, the Optimize Wild Horses alternative would create adverse short and long term economic losses for 14 ranching operations affected by wild horse increases.

The No Action alternative would not change income values from their present levels in either the short or long terms, however, due to reductions in present authorized livestock use, ranch values would decrease by $1,975,500. This would result in a decrease in the local tax base by $592,650, which would reduce annual property tax revenues by $20,446.

The Emphasis on Other Resource Uses alternative would result in a decrease in all economic values, however, the Elimination of Livestock Grazing alternative would cause the greatest decrease in economic values.

The Elimination of Livestock Grazing alternative would result in short term reductions in net ranch income by $432,412 and in net income to other economy sectors by $696,616. Short term ranch employment would decrease by 54.06 to 144.57 man-years. Ranch values would be decreased by $12,998,660, with resulting decreases to the local tax base and property tax revenues. Long term economic conditions under this alternative would not improve appreciably.

Changes in long term deer and elk populations would result in changes in nonresident hunter recreation days for all alternatives. This would in turn cause an increase or decrease in recreation-related income to the statewide economy. The Emphasis on Other Resource Uses alternative would result in an increase of $3,639,834 and the Elimination of Livestock Grazing alternative would increase this sector by $2,996,355. The Action Proposal and Optimize Wild Horses alternatives would result in a gain of $2,743,213 to this sector. The No Action and Optimize Livestock Grazing alternatives would result in decreases of $1,560,659 and $2,721,214 respectively.

It is evident that the greatest improvement in EIS area economic conditions would occur through optimization of livestock grazing. Long term economic conditions would also improve under the Action Proposal and Optimize Wild Horses alternatives, after short term decreases. Declines in the EIS area long term economic conditions would occur under the No Action, Elimination of Livestock Grazing, and Emphasis on Other Resource Uses alternatives with the greatest declines under Elimination of Livestock Grazing.

Livestock Grazing

Impacts to livestock grazing use would occur from the changes in authorized use proposed in each alternative. At present, the actual use of 136,028 AUMs (average active licensed use) is 15 percent below the authorized use of 159 734 AUMs. Changes in authorized livestock use that would occur under each alternative are compared with the present actual livestock use and not the present authorized use.

The Optimization of Livestock Grazing alternative would result in a short term decrease of 2,953 AUMs to 133,075 AUMs in livestock use, 2 percent of the present actual livestock use. In the long term there would be an increase of 44,086 AUMs to 180,114 AUMs, 33 percent above the present actual livestock use. This would represent the greatest increase in livestock grazing use of any of the alternatives.

Under the Action Proposal, actual use would decrease in the short term by 27,025 AUMs to 109,003 total AUMs, 20 percent below of the present actual use. In the long term, an increase of 20,030 AUMs to 156,058 AUMs (15 percent) would occur.

The Optimize Wild Horses alternative would show similiar results with a 24 percent short term decrease to 103,752 AUMs of authorized use, and a 4 percent long term increase to 141,780 AUMs.

The No Action alternative would result in no change from the present actual use of 136,028 AUMs. The Emphasis on Other Resource Uses alternative, however, would result in declines of 52 percent to 64,742 AUMs of authorized use in the short term and 35 percent to 88,845 AUMs in the long term. The Elimination of Livestock Grazing alternative would result in a total removal of all livestock from public lands.

Forestry and Forest Products

A loss of forest products would result from the vegetation manipulations proposed for four of the six alternatives. The No Action and Elimination of Livestock Grazing alternatives are the two alternatives in which no vegetation treatments are proposed.

The losses in wood products that would occur under the four alternatives are measured and compared with present demands for wood products (200,000 cords of wood). Future population increases in the EIS area that could occur as a result of increased energy development, could considerably increase the demands for wood products.

Under the Action Proposal and the Optimize Livestock Grazing alternatives, mechanical chaining of pinyon-juniper would produce 258,475 cords of wood products. Based on present demands, 200,000 cords would be utilized and 58,475 cords would not be utilized. Prescribed burning would destroy an additional 30,879 cords of standing green wood. This would result in a total of 89,354 cords not being utilized. This amount of wood has a heat energy equivalent of 14.3 million gallons of fuel oil and a stumpage value of $446,770.

The Emphasis on Other Resource Uses alternative would produce 299,596 cords of wood products through mechanical chaining of which 99,596 cords would not be utilized at present demands. This amount of wood has a heat equivalent of 15.9 million gallons of fuel oil and a stumpage value of $497,980.

The Optimize Wild Horses alternative would produce 295,512 cords of wood products through mechanical chaining of pinyon-juniper, of which 95,512 cords would not be utilized at present demands. Prescribed burning would destroy an additional 19,626 cords of standing green wood. This would result in a total of 115,138 cords of wood not being utilized. This amount has a heat energy equivalent of 18.4 million gallons of fuel oil and a stumpage value of $575,690.

It is evident that the No Action and Eliminate Livestock Grazing alternatives would not result in losses of forest products. The Optimize Wild Horses alternative would result in the greatest losses of the four alternatives proposing vegetation manipulations.

ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL OF THE ALTERNATIVES

The total energy requirements of each alternative cannot be determined. However, it is estimated that the differences in energy requirements of each alternative would be relatively similar over the long term.

Implementation of any alternative proposing substantial range improvements, especially facilities such as fences and water developments, would require expenditures of energy for construction and maintenance. Energy expenditures for maintenance would gradually increase with time as the improvements deteriorate.

In areas where range condition is deteriorating, improvement measures such as vegetation manipulations and range facilities would aid in slowing down or stopping the decline in range conditions and prevent continued deterioration expected with a continuation of the present management. Conservation of energy would be achieved by correcting range deterioration in the short term rather th n in the long term when greater energy expenditures would be necessary.

Range improvements, while being initially ergy consumptive, would increase levels of forage production over the long term. This increased forage would reduce energy requirements associated with producing and distributing alternate forage sources. Generally, expenditures of energy associated with red meat production increase as dependency on rangeland for livestock forage decreases (Cook 1976).

The No Action and Elimination of Livestock Grazing alternatives would require the least energy expenditure in the short term. However, under the No Action alternative, long term expenditures would have to drastically increase to regain the vegetation and red meat production potential of the rangelands. Energy expenditures resulting from the elimination of livestock grazing from public lands could exceed those of the other alternatives. If the red meat production lost from the use of public lands is to be replaced, higher energy consuming alternate forage sources may be required.

Energy expenditures of the other alternatives (Action Proposal, Optimize Livestock Grazing, Emphasis on Other Resource Uses, and Optimize Wild Horses) would increase in the short term. However, the energy conservation potential of these alternatives is expected to exceed the energy imput required to achieve the same forage and red meat production from an alternate forage source.

IDENTIFICATION OF THE PREFERRED ALTERNATIVE

The six alternative will be discussed according to their ability to conform to the multiple use objectives (refer to Section 1) determined through land use planning, as mandated by the Federal Land Policy and Management Act of 1976 (FLPMA). The alternative that least agrees with these objectives will discussed first, followed by the other alternatives in increasing order of conformance. The alternative that best accomodates the multiple use objectives would be the perferred alternative or preferred grazing management program, discussed last.

No Action (Alternative B)

A continuation of present grazing management would not meet most multiple use objectives since most major resource values would decline over the long term. Continuation of the present grazing levels for livestock, wild horses, and big game wildlife, especially deer, would result in long term declines in rangeland and habitat conditions. Declines in vegetation conditions would lead to long term increases in soil displacement and increased sediment yields as a result of increased runoff, especially during high intensity storms. Big game wildlife populations and carrying capacities would fluctuate, however, the trend would probably be a long term decline, especially for deer, resulting from a decline in habitat conditions. Present wild horse numbers are in excess of the levels identified through land use planning and would continue to increase, if not controlled. Livestock grazing levels would continue at present levels through the long term, however, at some point during the long term (before the year 2000), livestock levels may require downward adjustments in response to declining rangeland conditions and production.

Elimination of Livestock Grazing from Public Land (Alternative C)

Eliminating livestock grazing use would enhance most other resource uses on public lands. Dramatic improvements iW vegetation conditions would occur in a relatively short period of time, providing the maximum soil protection in the long term. Decreases in runoff and sediment yield would be maximized. Water quality changes in most major watersheds would improve, but not a significant improvement above the present. Significant improvements in the conditions of riparian zones and aquatic habitats would occur. Big game populations would increase to desired levels, except for deer populations. Deer populations would increase but would be limited to improvements in pXoduction of preferred winter forage (browse) on winter ranges. Deer populations could decrease at some point in time, beyond the long term (year 2000), as a result of long term declines in the availability of preferred winter forage. The loss of livestock grazing from public lands would result in the loss of a renewable resource; that portion of the vegetation resource not utilized by other users that could be utilized by livestock. Adverse economic impacts would occur to the EIS area economy and livestock industry, especially to the ranching operations dependent upon public land grazing.

Optimize Livestock Grazing (Alternative D)

Optimization of livestock grazing on public lands would provide for the multiple use objectives of most major resource uses except those dealing with wildlife and wild horses. This alternative would result in improved rangeland conditions, which would contribute to improved soil and watershed conditions. Riparian and aquatic habitats would show slow improvement. The major disadvantages under this alternative would be the significant reductions in wildlife and wild horses required to optimize livestock use. The amount of forage that would be provided to big game wildlife would create long term populations declines for deer (19 percent), elk (55 percent), and antelope (53 percent). The substantial reduction in wild horse numbers that would be required could result in a nonviable wild horse population. Management of a nonviable population would be in nonconformance with the Wild and Free-Roaming Horses and Burros Act and would require actions by BLM to assure contintation of a viable population. Long term livestock grazing use would increase by 25 percent, which would result in favorable economic impacts to the livestock industry and economy of the EIS area.

Emphasis on Other Resource Uses (Alternative E)

Optimization of wildlife, watershed, and recreation values would enhance most resource values and uses. Emphasis on resource uses other than livestock grazing would result in improved rangeland conditions, which would contribute to improved soil and watershed conditions. Deer, elk, and antelope populations could increase by 23, 8, and 2 percent respectively. Sage grouse habitat conditions would improve. Aquatic and riparian habitat would exhibit significant improvements. Although wild horse range would be reduced, populations would increase on the remaining horse range. Recreation opportunities associated with big game hunting would improve. Present livestock grazing levels would be reduced 48 percent in the short term and 35 percent in the long term. An associated decline in ranch incomes would occur, causing significant economic losses to the livestock industry and other economy sectors in the EIS area.

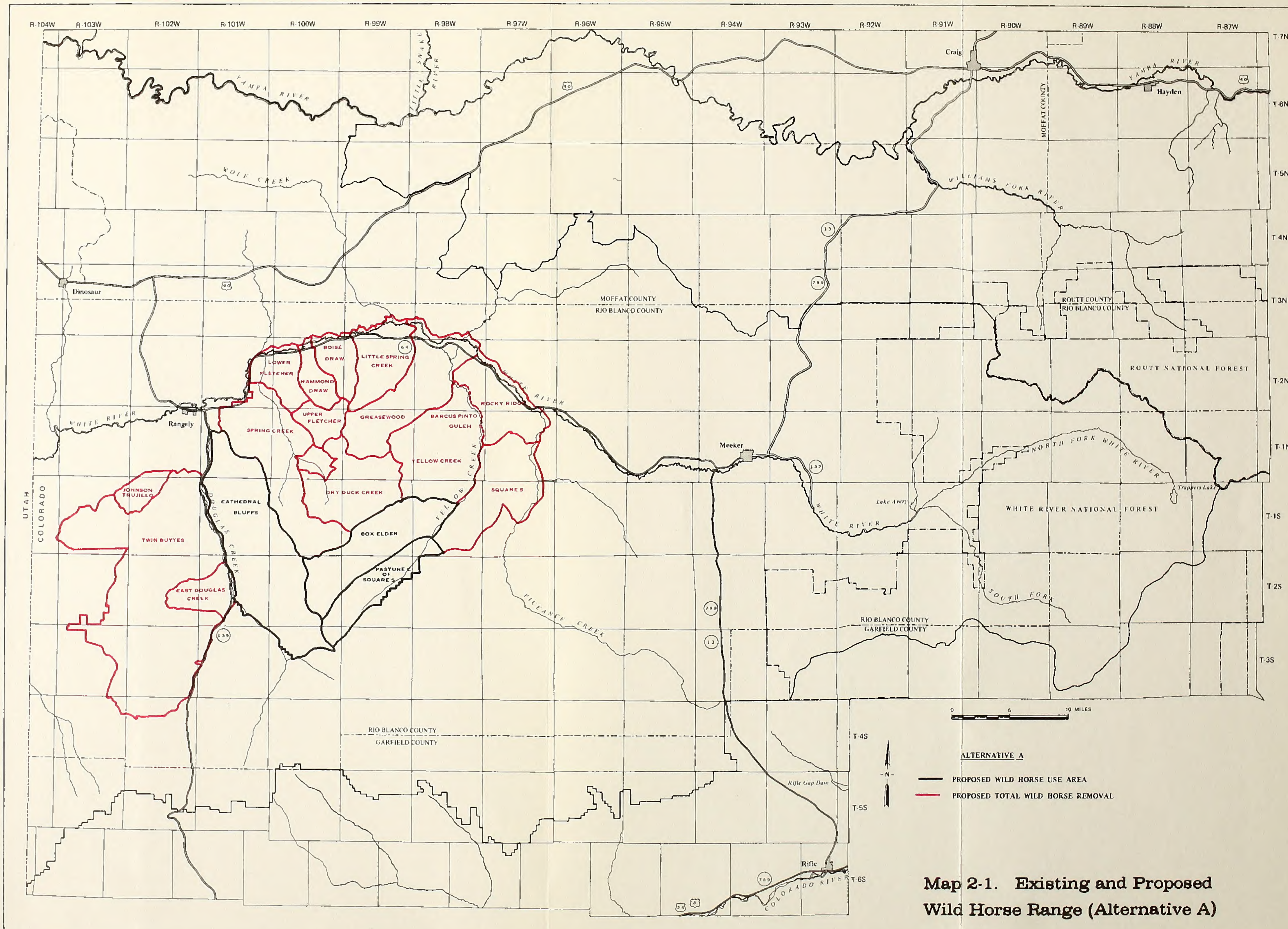
Optimize Wild Horses (Alternative F)

As with Alternative E, most resource values and uses would be enhanced with the optimization of wild horses. Improved rangeland conditions would occur, which would contribute to improved soil and watershed conditions. Deer, elk, and antelope populations would increase by 11, 8, and 2 percent respectively. Habitat conditions for sage grouse would improve, as well as aquatic and riparian habitat conditions. By allowing increased forage for wild horses, population Wumbers would increase on the present horse range. Livestock use would be reduced on the horse range to provide increased forage for wild horses. Total livestock use proposed under this alternative would result in a short term reduction of present levels by 24 percent, however, long term use would increase 4 percent above present levels by the year 2000. Long term ranch incomes and incomes to other sectors of the EIS area economy would increase after short term decreases.

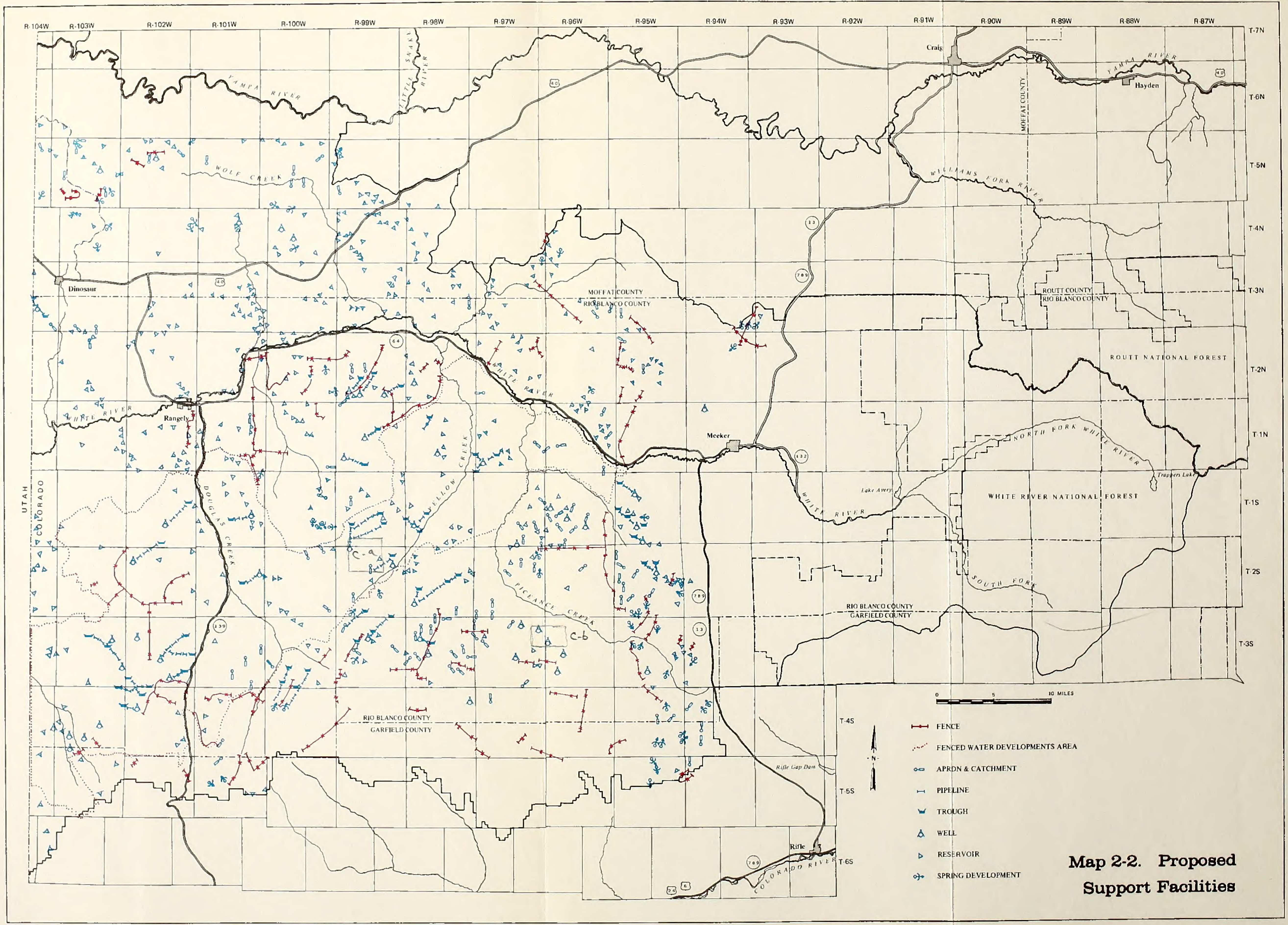
Action Proposal (Alternative A)

The Action Proposal would most comprehensively meet all the multiple use objectives outlined in the White River Resource Area land use plan. This alternative would allow for improved rangeland conditions, which would result in improved soil and watershed conditions. Deer, elk, and antelope populations could increase by 11, 8, and 2 percent respectively. Habitat conditions for sage grouse would improve, along with aquatic and riparian habitat conditions. The wild horse population and range would be reduced considerably, however, improved habitat conditions would benefit the remaining horses. Present livestock use levels would be reduced by 20 percent in the short term, which would create significant decreases in ranch incomes. By the year 2000, livestock use would exceed present levels by 13 percent with favorable increases in ranch incomes and incomes to other economy sectors in the EIS area.

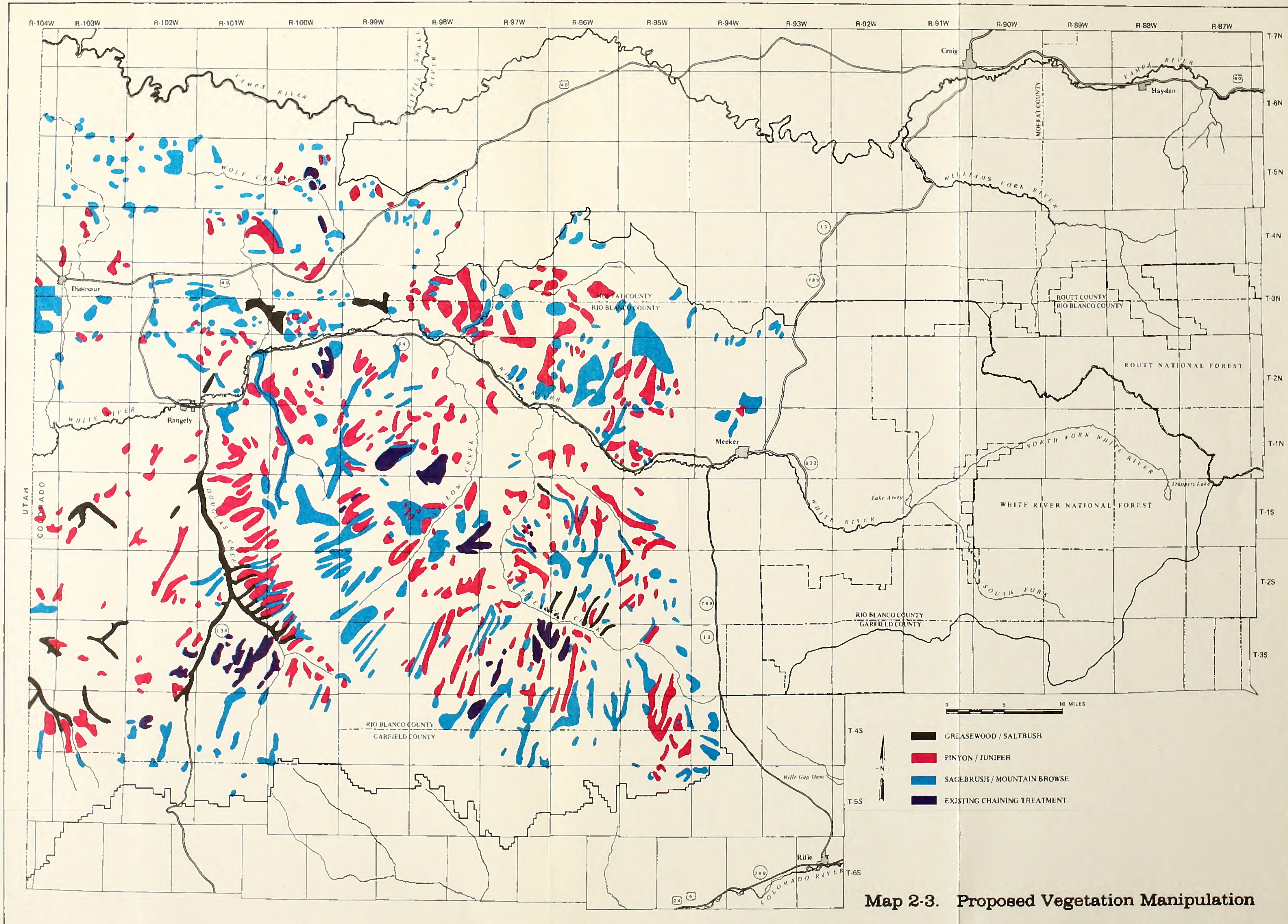
The Action Proposal would provide improvement in, and enhancement of, major resource values and competing land uses, while at the same time, providing for the least economic disruption. Based upon analysis of the alternatives, the Action Proposal would be the preferred alternative.



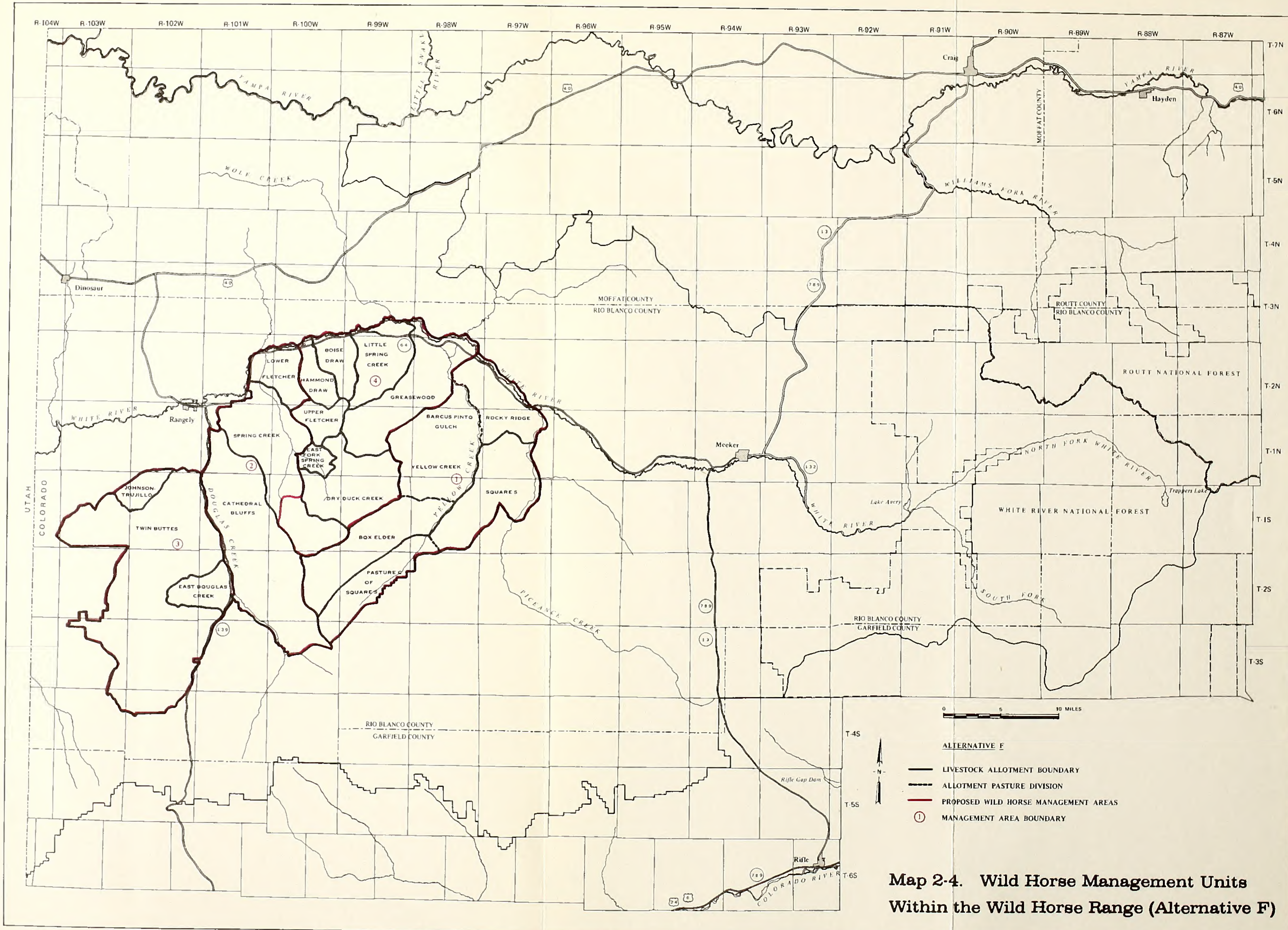
Map 2-1. Existing and Proposed Wild Horse Range (Alternative A)



Map 2-2. Proposed Support Facilities



Map 2-3. Proposed Vegetation Manipulation



Map 2-4. Wild Horse Management Units Within the Wild Horse Range (Alternative F)

Section 3

AFFECTED ENVIRONMENT

SECTION 3

AFFECTED ENVIRONMENT

CLIMATE

The climate of the White River Resource Area is semi-arid and continental in nature and is characteristic of a steppe region. Precipitation, which ranges between 9 and 21 inches in the area (Table 3-1), is highly dependent on elevation and a net annual deficit of soil moisture exists.

Most precipitation occurs as snowfall at higher elevations. Snowfall occurs from late September to April with December, January, and February showing the greatest amounts. At lower elevations, the majority of annual precipitation occurs as rain, falling in late spring, late summer, and fall. Most of the rainfall comes from short duration, high intensity thunderstorms. Years of below average precipitation occur three or four years out of ten. Annual precipitation trends are indicated in Map 3-1a.

The resource area experiences a large annual temperature range with temperatures reaching from 90°F to 100°F during the summer and dropping frequently below 0°F (Table 3-1) during the winter. The frost-free season (growing season) varies widely with elevation (Table 3-1).

Though no wind information has been gathered in the resource area, the prevailing surface wind direction is from the west. However, it is highly dependent on topography and may differ over relatively short distances.

AIR QUALITY

The air quality in the resource area is generally very good. Baseline studies submitted for the C-b oil shale project (Occidental Oil Shale, Inc. 1979) has shown significant values for total suspended particulates. High particulate concentrations are the result of "fugitive dust". These particulate levels are highest in summer and fall with minimums occuring in winter, and are generally associated with vehicular traffic on dirt roads. Areas of heavy vehicular traffic, and therefore high particulate concentrations, include the Douglas Creek drainage area due to oil and gas activity, and the Piceance Basin which receives heavy hunter use in the fall. The Colorado Air Pollution Control Division has determined background levels for particulates in this region at 15 $\mu g/m^{T13}$ (Mohr 1979). Concentrations of sulfur dioxide, hydrogen sulfide, carbon monoxide, and nitrogen oxides appear to exist at minute levels.

Areas of major concern for air quality are the Federal Class I areas, Dinosaur National Monument and the Flat Tops Wilderness Area, that lie adjacent to the EIS area.

GEOLOGY AND TOPOGRAPHY

The EIS area can be divided into two major geologic and physiographic provinces, the Rocky Mountain province and the Colorado Plateau province. The Flat Top Mountains (elevation: 8,500 to 12,000 feet) and the Danforth Hills (elevation: 8,000 to 9,000 feet) in the eastern part of the area near Meeker, are part of the Southern Rocky Mountains. Blue Mountatin (elevation: 8,700 feet) in the northwest corner of the EIS area is the eastern extension of the Uinta Mountains, part of the Middle Rocky Mountain physiographic province.

Included in the Colorado Plateau province are major topographic features such as the Piceance Basin (elevation: 6,000 to 8,000 feet) located in the south-central part of the area, the Roan Plateau (elevation: 8,000 to 9,000 feet) on the southern boundary of Piceance Basin, Cathedral Bluffs (elevation: 7,000 to 9,000 feet) west of Piceance Basin, and the Douglas Pass area (elevation: 8,000 to 9,000 feet) south of Rangely.

Contained within the EIS area is a variety of important energy minerals such as oil shale in the Piceance Basin, coal in the Danforth Hills and northeast of Rangely, and uranium in the Flat Tops northeast of Meeker, as well as oil and gas deposits throughout the EIS area.

Paleontology

A comprehensive study of the paleontology of the EIS area has not yet been performed. As a result, information on the fossils of the area is sparse, however, a few significant fossils have been discovered. Significant fossils are considered to be those specimens which make a substantial contribution to scientific knowledge. Although the possibility of disturbing any significant fossils is very low, the most likely areas to encounter such fossils would be in the surface exposures of the Morrison

TABLE 3-1
SUMMARY OF CLIMATOLOGICAL DATA
1959-1977

	Marvine Ranch	Meeker	Little Hills Station	Rangely	Dinosaur
Elevation (Ft)	7,800	6,347	6,140	5,216	5,921
Tempt. (^{o}F)					
Mean	41	44	43	46	46
Avg Max	61	67	65	73	72
Avg Min	17	20	20	15	18
Avg An Precp (in.)	21	16	13	9	11
Frost Free Period (days)	1-110	46-121	1-99	66-157	83-147

Formation in the Skull Creek area or in the Wasatch Formation in the Crooked Wash area.

Alluvial Valleys

A detailed study of the EIS area which delineates all the alluvial deposits with potential for subirrigation has not been completed. However, the flood plains of the White River and the Piceance Creek are the only stream valleys known to have potential for subirrigation. These areas are located almost entirely on private lands. All other stream valleys in the area are not considered to have a sufficient quantity of groundwater to qualify as alluvial valleys.

SOILS

Soil Types

Soils in the EIS area are mainly calcareous, clayey shales and sandstones, and alluvium parent materials. Some wind blown deposits occupy portions of the rolling upland divides between creeks. Valley bottoms have been influenced in many places by sediments and material moving down from nearby slopes. Many of the slopes contain high amounts of channery and stone.

Soil Conservation Service (SCS) soil surveys had been completed on 55 percent of the EIS area up to 1978. By 1979, 100 percent of Rio Blanco County and a small portion of Moffat County had been surveyed. Garfield County has not been surveyed to date.

Nineteen soil associations have been identified for the EIS area as indicated on Map 3-1b.Geographic settings and locations, acreages, and soil series are listed for each soil association in Appendix D. A summary of the characteristics of the soil associations is listed in Table 3-2 (more detailed information on soil associations and soil series is available at BLM offices in Meeker and Craig).

Present Erosion Conditions

Channel cutting typifies the historic pattern of soil erosion in the EIS area. Although many areas have been dissected by gullies, most are currently healing. Erosion susceptibility classes are indicated in Appendix D, Table D-3. Approximately 17 percent of public lands in the EIS area are in a slight erosion susceptibility class, 36 percent are in a stable, 13 percent are in a moderate, 12 percent are in a moderate-severe, and 22 percent are in a severe susceptibility class. Refer to Appendix D, Table D-1 for an analysis of on-site erosion by representative allotments.

WATER RESOURCES

Surface Water Resources

The White River Basin is located in west-central Colorado between the Colorado River on the south and the Yampa River on the north. The White River originates in the White River Plateau and flows west to its confluence with the Green River in Utah. The river basin is approximately 107 miles long and averages 35 miles wide, with a total land area of approximately 3,808 square miles. The EIS area covers about 87 percent of the watershed.

The major tributaries in the EIS area are Piceance Creek, Yellow Creek, and Douglas Creek. Information on these drainages and the main stream are summarized in Table 3-3. Major watersheds are depicted on Map 3-2.

In the EIS area, most surface runoff results from spring snow melt and high intensity summer thunderstorms. Peak discharges and sediment yields from summer thunderstorms are normally greater than those originating from spring snow melt. Table 3-3 gives examples of the hydrologic parameters (i.e. runoff, peak discharge, and sediment yield) in the major watersheds of the EIS area.

The major vegetation classifications (and elevation ranges) that fall within the representative watershed are (1) desert shrubs (4,500 to 6,500 feet), (2) pinyon, juniper, sagebrush (6,000 to 8,000 feet), and (3) oakbrush, aspen, Douglas fir, and sagebrush (7,000 to 9,500 feet). Vegetation variations occur within each zone depending on topography, precipitation, and land use.

The hydrologic soil groups for the watersheds range from an average infiltration rate of 0.25 in/hr to a rate of 3.50 in/hr (Soil Conservation Service 1972).

Surface Water Quality

Water Quality is monitored principally by the Colorado State Health Department and the U.S. Geological Survey (USGS). Few of the present water quality measurements can be directly related to water quality of runoff yielded from public lands in the EIS area. The majority of the stations are located on the White River and larger tributaries.

TABLE 3-2
SUMMARY OF PHYSICAL AND CHEMICAL SOIL ASSOCIATION CHARACTERISTICS

No.	Soil Association	Acres	Geographic Location	Slope	Depth	Drainage	Surface Texture 1/	Infiltration Rate	Available Water Capacity	Surface Runoff	Favorable Years Forage Production 2/	Unfavorable Years Forage Production 2/	Erosion Susceptibility	Soil Reaction (pH)
1	Glenburg-Uffens-Billings	52,141	stream and river terraces	level gently sloping	deep	moderately well-drained	medium	moderate	moderate	medium	1,175	710	moderate to high	7.4-8.4+
2	Havre-Glendive-Redrob	67,091	stream and river terraces	nearly level to moderately steep	deep	somewhat poorly drained	medium	moderate	moderate	medium	3,370	1,400	slight	6.9-9.0
3	Kinnear-Azfield-Nihill	19,573	terrace uplands, benches, broad fans	nearly level to steep	deep	well-drained	medium	moderate	high	medium	1,200	640	slight to moderate	7.4-9.0
4	Chipeta-Billings-Killpack	141,590	low hills, toeslopes, hillsides	nearly level to hilly	shallow, deep and moderately deep	well-drained	fine	slow	moderate	rapid	490	190	moderate to high	7.4-9.0
5	Pintwater-Chipeta-Rock outcrop	86,642	low hills, steep sideslopes and ridges	gently sloping to steep	shallow	well-drained	medium	moderate	low	rapid	425	150	moderate	7.4-8.4
6	Rentsac-Moyerson-Blazen	521,086	side and toeslopes of mountains, canyons	gently sloping to steep	shallow	well-drained	medium	moderate	low	medium	930	470	moderate	6.6-9.0
7	Zoltay-Work-Piceance	28,878	upland, terrace, and bench slopes	nearly level to hilly deep	moderately deep to deep	well-drained	fine	moderate	high	medium	1,800	1,230	slight to moderate	6.6-9.0
8	Mergel-Kobar-Castner	92,210	mountain and broad ridge tops, side and toeslopes	sloping to steep	shallow and steep	well-drained	medium	moderate	moderate	medium	1,270	800	moderate	6.6-9.0
9	Owen Creek-Jerry-Maurice	42,712	mountain summits, sideslopes, steep narrow ridges and toeslopes	sloping to steep	moderately deep to deep	well-drained	fine	moderate	moderate	medium	3,000	1,800	slight to moderate	5.6-9.0
10	Parachute-Irigul-Starman	254,329	mountain crests, sideslopes, and high ridges	sloping to very steep	shallow and moderately deep	well-drained	medium	moderate	very low	medium	1,110	650	moderate	7.4-9.0
11	Bead-Fitzgerald-Tamp	2,998	mountain sideslopes, high upland slopes, and terraces	gently sloping to steep	deep	well-drained	fine	moderate	high	medium	900	400	moderate	4.5-6.5
12	Miracle-Lamphier-Tamp	869	mountain sideslopes and crests of upland hills and ridges	gently sloping to steep	moderately deep to deep	well-drained	medium	moderate	high	medium	2,070	1,300	slight	6.6-8.4
21	Borollic Camborthids	3,282	uplands and valleys	gently sloping to moderately steep	moderately deep to deep	well-drained	fine	moderate	high	medium	1,330	800	moderate to high	7.4-8.4
33	Typic Torriorthents	891	steep slopes on breaks	gently sloping to steep	shallow	well-drained	fine	slow	low	rapid	710	310	high	7.4-9.0
34	Ustic Torriorthents	22,288	alluvial fans and floodplains	gently sloping to moderately steep	moderately deep to deep	well-drained	medium	moderate	high	medium	650	290	moderate	7.4-8.4
41	Lithic Ustic Torriorthents	41,164	breaks and mesas	nearly level to moderately steep	shallow	well-drained	medium	rapid	low	medium	575	275	moderate to high	6.6-8.4
42	Lithic Ustic Torriorthents	56,318	steep slopes along breaks, low hills, coluvial slopes	moderately steep to steep	shallow	well-drained	medium	moderate	low	rapid	575	275	high	7.4-8.4
53	Aridic Calciborolls	74,929	benches, mountain slopes, fans, high terraces, breaks	gently sloping to steep	moderately deep to deep	well-drained	medium	moderate	low	slow	900	500	slight	7.9-8.4
58	Argic Cryoborolls	15,425	benches, high terraces, mountainsides	gently sloping to steep	moderately deep to deep	well-drained	medium	moderate	low	slow	280	150	slight to high	8.0-11.0

1/ moderate - surface textures predominately loam and sandy loam.
fine - surface textures predominately clayey, ie. clay loam, clay, silty clay loam.

2/ combined averages for the soil series within a soil association.

TABLE 3-3
SUMMARY OF WATER RESOURCES DATA FOR
THE WHITE RIVER WATERSHED

	USGS Gage Number	Drainage Area Mi^2	1978 Annual Discharge ac-ft	1978 Minimum Flow ft^3/s	1978 Maximum Flow ft^3/s	Historical Peak Flow ft^3/s	Average Suspended Sediment Discharge Tons/day	Average Total Dissolved Solids 2/ mg/l	Period of Record yrs.
Stewart Gulch	09306022	43.4	452.19	0.01	3.8	38	0.258	929	4
Black Sulphur Creek	09306175	103	951.87	0.20	7.9	44	3.66	1,250	4
Piceance Creek	09306222	630	6,409	2.0	625	628	62.27	1,835	10
Yellow Creek	09306255	262	825.87	0.0	6,800	6,800	810.0	2,790	6
Douglas Creek	09306380	425	2,793.18	0.0	104	3,250	---	1,852	2
North Fork, White River 1/	09303000	254	126,897	108	1,500	3,150	3.37	242	34
South Fork, White River 1/	09304000	170	119,351	76	3,000	3,000	2.92	163	29
White River below Meeker	09304800	1,040	265,081	175	4,750	4,750	218.1	384	17
White River near Rangely	09306300	2,790	262,198	237	3,940	4,260	6,636	470	5

From Water Resources Data for Colorado Vol. 3 Water Year 1978.

1/ For comparison of water entering EIS area

2/ Indicator of Salinity.

Water quality at these stations is affected by the management on the National Forest, State and private lands as well as public lands. Water quality data for these stations are available on the computer program STORET through the Environmental Protection Agency (EPA) or the Colorado State Health Department.

Generally, the headwaters of streams, such as Piceance Creek, Stewart Gulch, and Douglas Creek, meet the Federal Drinking Water Standards. Some others, however, such as Black Sulphur Creek (lead), Yellow Creek (fluoride, strontium 90) and the White River near Rangely (lead, gross beta, strontium 90) exceed the maximum contaminant levels of the Safe Drinking Water Act of 1974.

Salinity and sediment are the two most serious water quality problems. The ultimate source of nearly all the dissolved ions (salinity) entering the rivers is the mineral composition of rocks (and soils developed on the rocks) underlying the Upper Colorado River drainage basin (USDI 1978). Geologic functions that contribute most to the salinity of the Colorado River are shales, such as the Lewis and Mancos shales of the Cretaceous age, and those formations made up largely of shales, siltstone, and mudstone, such as the Green River Formation of the Tertiary age. Total dissolved solids, a measure of salinity, range from less then 100 mg/l in the headwaters of several streams to more then 3,000 mg/1 at the confluence with the White River. Under natural geologic conditions, a large portion of the salinity being contributed to the White River in the EIS area is from public lands. The remainder is from irrigation return flows and other sources (Elkin 1976).

The 1966-1975 average salt load of the Colorado River at the Colorado-Utah state line is 3,595,000 tons and for the White River near Watson, Utah is 275,100 tons or 8 percent of the Colorado River. The average discharge of the White River for this period is 11 percent of the Colorado River. However, the average concentration of salt of the White River is 68 percent of the concentration found in the Colorado River for these dates (USDI 1978).

Sediment production is the result of two major types of erosion: sheet and/or rill erosion and channel erosion. The majority of the sediment being produced in the EIS area is the result of channel erosion. Map 3-3, a sediment yield map adapted from maps developed by the Colorado Land Use Commission, shows the major classes of sediment production.

In the White River Resource Area, there are 485,230 acres with low sediment yields (0.28-0.56 tons/acre/year), 528,420 acres with moderate yields (0.56-1.41 tons/acre/year), 930,995 acres with high yields (1.41-2.82 tons/acre/year), and 181,030 acres with very high sediment yields (2.82-8.47 tons/acre/year).

Flood Hazards

The erratic random pattern of intense summer thunderstorms results in occasional local damage to agricultural or other lands, to improvements, or to facilities such as roads, structures, and canals. During the snowmelt season in years of heavy snow accumulation, extensive flooding of low lying lands occur. Recently, attention has been placed on the beneficial functions of flood plains to preserve the natural biological, physical, ecological, and environmental actions that commonly occur in a flood plain.

Ground Water Resources

The ground water resources in the EIS area are used mainly to augment surface water supplies on farms and ranches. There is very little development of the ground water resource because of the availability of surface water and the fact that well yields are generally small and of poor quality. However, there are vast supplies of ground water in several geologic formations.

Almost every stream in the White River Basin has the valley-fill deposits along part of its course that contain aquifers that will yield 5 to 100 gallons per minute (gpm). The deposits are largely clay, sand, and gravel derived from stream action and glaciation of upland areas. The aquifers in the deposits generally are more permeable, but thinner and less extensive than most of the other major water-bearing formations. Yields of as much as 1,000 gpm are common or could be expected in most of the large valley-fill deposit areas. Where the saturated thickness is less than 10 feet, yields of more than 100 gpm are uncommon.

Most valley-fill aquifers have hydraulic convection with adjacent streams. The streams are sustained in dry periods by water draining from the valley-fill aquifers. The water level in the aquifers, generally, is within a few feet of stream level. Because most valleys in the area are narrow (less than 1 mile), water withdrawn from wells affects the flow in the stream within a few hours or days.

Water in the valley-fill depoists commonly is hard and contains varying amounts of calcium, magnesium, bicarbonate, and sulfate. The water generally is more mineralized than that in adjacent streams. In some areas dissolved solids content exceeds 1,000 mg/1 particularly where irrigation water leaches salts from underlying or adjacent rocks. Salts also concentrate in water due to evaporation areas that are poorly drained where the water table is close to the land surface.

TERRESTR!AL VEGETATION

Discussion will center around major vegetation types occuring in the EIS area with emphasis on existing composition, condition and trend, cover, and productivity. Condition and trend information, presented in Table 3-5, refers to livestock forage condition and trend. Map 3-4 depicts the major vegetation types by locality. Methodology for determination of condition and trend is found in Appendix E.

Grassland Type

Grasslands occur in the area as a subdominant vegetation type occurring within more extensive plant communities. Grasslands cover about 48,306 acres (3 percent of the EIS area). Most stands seldom exceed several thousand acres in size. Grassland openings are common at all elevational ranges but are most prevalent at elevations below 7,000 feet. Major species comprising the type at lower elevations are western wheatgrass and needle-and-thread grass. Above 7,000 feet, major species are subalpine needlegrass, Letterman needlegrass, and various bluegrasses.

The majority of the grassland type (36,496 acres) is in fair condition and 11,810 acres are in good condition. At present, trend is static over most of the type (43,933 acres) but improving on 3,269 acres. A declining trend is apparent on 1,104 acres.

Grass and forb cover averages 31 percent, and ranges from 26 to 38 percent. Production estimates (McKell and Goodin 1973) range from 600 to 2,200 lb/acre on mountain meadows. Lower elevation grasslands average up to 400 lb/acre.

Sagebrush Type

The sagebrush type covers approximately 473,732 acres (31 percent) and is the major shrub community in the EIS area. Sagebrush stands are characterized by mixed high and low growing shrubs dominated by big sagebrush with a wide variety of understory grasses and forbs. The sagebrush type occurs at all elevations, with the larger expanses occurring below 7,000 feet.

Major plant species associated with sagebrush at lower elevations are western wheatgrass, Colorado wildrye, Indian ricegrass, and needle-and-thread. Associated species above 7,000 feet are various bluegrasses, needle grasses, and lupine.

Overall condition and trend is fair (387,907 acres) and static (392,235 acres). Poor condition range occupies 48,027 acres while good condition range covers 37,798 acres. Range trend is declining on 73,073 acres and improving on 8,424 acres.

Cover varies throughout the type. In some instances big sagebrush dominates a site, contributing almost 100 percent of the total cover, while on other sites it may contribute less than 20 percent. Cover attributed to all species occuring in the type, based on EIS data, averages 32 percent.

Productivity of the sagebrush type is also highly variable. Dense stands support very little understory vegetation while open stands can produce from 800 to 1,800 lb/acre. Dense stands of sagebrush, while limited in understory forages, do contribute a significant amount to wildlife diets on critical winter ranges.

Mountain Shrub Type

The mountain shrub type, occupying 226,046 acres or 15 percent of the EIS area, occurs above 7,000 feet, and is usually most prevalent on north facing slopes along steep ridges and foothills. The major species characterizing the type are Utah serviceberry, Gambel oak, mountain mahogany, and snowberry. Major understory species are carex, arrow-leaf balsamroot, western yarrow, and slender wheatgrass.

Ninety-three percent of the mountain shrub type is in fair condition while 79 percent has a static trend. Areas in poor condition (6,643 acres) are usually higher elevation stands bordering valley bottoms in the vicinity of water developments. Fourteen percent of the type has a declining trend. Depleted understories and decadent shrubs typify poor condition range.

Cover is attributed primarily to overstory species and averages 41 percent. In some areas cover of overstory species is nearly 100 percent and is usually associated with dense stands of Gambel oak.

Productivity in the mountain type is higher than in most of the other vegetation types, due mainly to higher moisture associated with elevation. Production, both herbaceous and browse, ranges from 900 to 1,500 lb/acre.

TABLE 3-5
SUMMARY OF VEGETATION CONDITION AND TREND
ON PUBLIC LANDS

Vegetation Type	CONDITION Poor	Fair	Good	Total	TREND Improving	Static	Declining
Grassland	0	36,496	11,810	48,306	3,269	43,933	1,104
Sagebrush	48,027	387,907	37,798	473,732	8,424	392,235	73,073
Mountain Shrub	6,643	210,590	8,813	226,046	16,939	178,259	30,848
Pinyon-Juniper	199,341	286,410	9,330	495,081	1,347	416,763	76,971
Saltbush	25,019	29,454	6,646	61,119	678	53,300	7,141
Greasewood	35,974	8,793	0	44,767	1,041	38,793	4,933
Broadleaf	2,960	8,564	1,770	13,294	0	11,247	2,047
Conifer	3,260	15,688	2,842	21,790	0	19,653	2,137
Barren	4,261	0	0	4,261	0	4,261	0
Waste	120,570	0	0	120,570	0	120,570	0
Unallotted lands	0	3,240	0	3,240	0	3,240	0
Livestock Driveways	0	9,600	0	9,600	0	9,600	0
Total	446,055	996,742	79,009	1,521,806	31,698	1,291,854	198,254

Pinyon-Juniper Type

The pinyon-Juniper type covering over 33 percent of the EIS area, is a broad classification covering several associations of pinyon pine and various western junipers; the main species being Utah juniper.

Major species occurring in the type are Utah serviceberry, mountain mahogany, big sagebrush, bitterbrush, junegrass, and beardless bluebunch wheatgrass.

The pinyon juniper type grows on nearly all soil types, degrees of slopes and aspects within its elevational range of 5,500 feet to 8,000 feet. Pinyon pine occurs more frequently at the higher elevations. On areas disturbed by fire, pinyon-juniper occurs mostly on rocky ridges and slopes while undisturbed communities extend into flatter areas with deeper soils. Dense stands on slopes of less than 20 percent could be most affected by intensive grazing management of the EIS area.

At present, 40 percent of the pinyon-juniper woodland is in poor condition, 58 percent is in fair condition and 2 percent is in good condition. Less then 1 percent is improving while 16 percent is declining.

Pinyon-juniper can be very dense and have an almost closed canopy cover. Little or no herbaceous understory vegetation occurs under such stands although desirable browse production may be significant. As density decreases, understory species increase. Overall ground cover estimates average 34 percent for the type.

Forage production varies with pinyon-juniper density and can range from virtually no understory production up to 300 lb/acre in good condition stands. Vegetation manipulation can increase productivity to 1,200 lb/acre. The dense stands of pinyon-juniper are typically in static or declining condition with low productivity due primarily to age and overstocking of the pinyon-juniper trees. On these sites, over-mature trees and stands are highly susceptible to disease and insect attacks.

Saltbush Type

The saltbush vegetation type, covering approximately 4 percent of the EIS area, is located primarily north of the White River and consists of mixed saltbush and segebrush stands. Dominant shrubs include Gardner's saltbush, mat saltbush, shadscale, bud sagebrush, big sagebrush, and winterfat. Associated species are bottlebrush squirreltail, western wheatgrass, Colorado wildrye and cheatgrass. The saltbush association occurs below 6,000 feet and is found on lower elevation foothill slopes, semi-arid drainage bottoms, and alluvial deposits. Saltbush occupies heavy, fine texture soils that are less saline-alkaline than are normally found supporting greasewood. Saltbush communities are characterized by low growing, widely spaced plants, varying in species composition and density. These communities range from pure stands of an individual saltbush species to intermixed communities of many species.

Poor condition occurs on 41 percent (25,019 acres) of this type with 11 percent (6,646 acres) in good condition. Trend is declining on 7,141 acres (12 percent) while 53,300 remain in a static trend. Areas with improving trend amount to 2 percent of the type.

Overall cover in the saltbush type averages 25 percent, with the shrub component making up most of the cover percent. Productivity is presently below potential, but based on SCS data, productivity could range from 50 lb/acre on poor condition range to 350 lb/acre on good condition range.

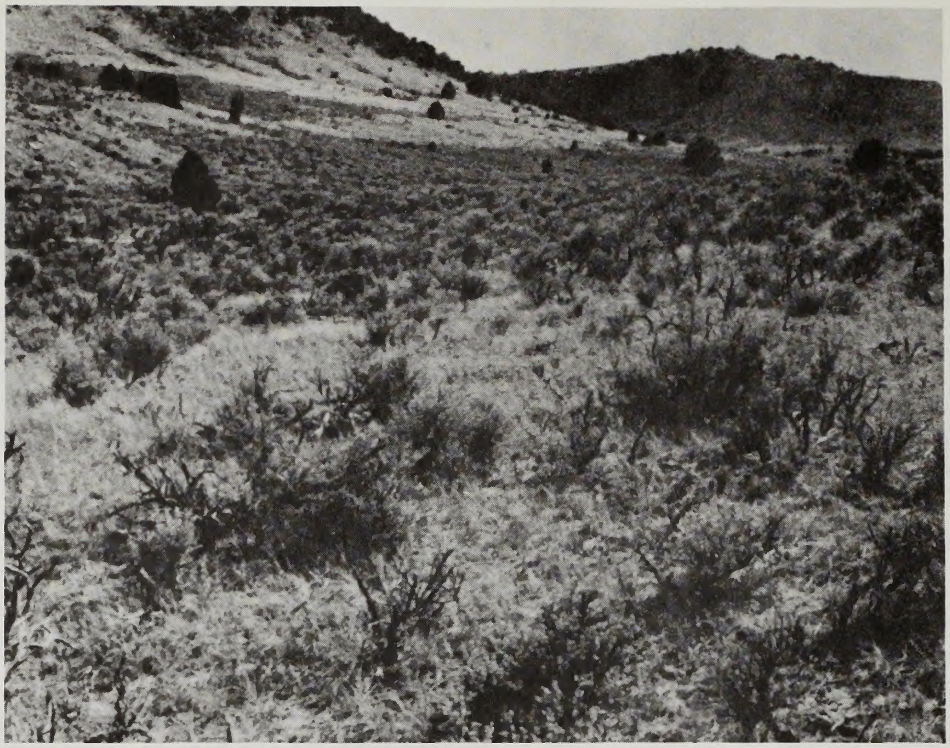
Greasewood Type

The greasewood type covers approximately 44,767 acres and is most prevalent on deep, poorly drained, alluvial saline-alkaline soils at elevations below 6,600 feet. Greasewood occurs both in dense and open stands with varying amounts of understory vegetation. Major associated species are big sagebrush, shadscale, rubber rabbitbrush, western wheatgrass, cheatgrass, mustard, and Russian thistle.

Eighty percent of the type is in poor condition with the remaining 20 percent in fair condition. Declining trend characterizes 11 percent of the type with 5 percent improving. Static trend dominates the remaining 84 percent of the type.

Cover in the greasewood type is dominated by greasewood. Very dense stands can have a nearly closed canopy with little understory vegetation cover while more open stands support more diverse understory cover. The average cover of greasewood and associated shrubs and grasses is 28 percent.

Productivity in the greasewood stand varies with greasewood density. SCS estimates, on greasewood dominated areas, range from 400 to 700 lb/acre.



The low elevation sagebrush type (below 7,000 feet) is widely distributed throughout the EIS area. Western wheatgrass dominates the understory of this type.

The low elevation sagebrush type which is typical of most drainage bottoms in the Piceance Basin.

The high elevation sagebrush type (above 7,000 feet) which is typical of the northwest portion of the EIS area. Western wheatgrass, needle grasses, and blue grasses are the dominant understory.

The high elevation sagebrush type along the Cathedral Bluffs (foreground). The windswept ridges and knobs along the Cathedral Bluffs form a significant portion of the grassland type in the EIS area (background).

Mountain shrub type is widely distributed throughout the area above 7,000 feet. The dominant shrubs pictured are serviceberry, mountain mahogany, and sagebrush.

The pinyon-juniper type is the most abundant vegetation type in the EIS area. The pinyon-juniper type pictured is typical of elevations below 7,500 feet.

Desirable browse production in the pinyon-juniper type is an important element of many mule deer winter ranges in the EIS area. Mountain mahogany is the shrub pictured.

Natural fires in the pinyon-juniper type make up about 5,000 acres of the grassland type in the EIS area.

Saltbush type occurs at elevations below 6,000 feet north of the White River. Shadscale is the dominant shrub and Colorado wildrye and squirreltail the dominant grasses pictured.

Greasewood bottom with the understory dominated by annual grasses and forbs. This type is typical of the low elevation tributaries to the White River in the western portion of the EIS area.

The high elevation sagebrush, aspen, and conifer types typical of the Roan Plateau and Douglas Pass areas in the southern portion of the EIS area.

The aspen, conifer, and mountain shrub types on north and east exposures with sagebrush and mountain shrub types on south and west exposures and dry meadows (grassland type) in the bottoms are typical of the Danforth Hills in the northeastern portion of the EIS area.

Broadleaf Type

Quaking aspen is the major species associated with this type which covers 13,294 acres. It is restricted to elevations above 7,000 feet with the majority of the trees occurring above 8,000 feet. Various willows and cottonwoods form another type but are very limited on public lands. They usually occur in drainage bottoms along perennial streams. At lower elevations aspen occurs in the upper end of drainages but occurs over wider expanses at higher elevations. The understory plant community includes bluegrasses, needlegrasses, snowberry, yarrow, and lupine. The majority of the type is in a fair and stable condition with productivity similar to that of the mountain shrub type.

Conifer Type

The conifer type, occurring above 6,000 feet, is a broad classification covering several types whose major species include Douglas fir, blue spruce Engelman spruce, subalpine fir, ponderosa pine (very small amounts), and lodgepole pine. The major concentrations of conifers occur along upper elevation drainages on northern exosures. Major understory species include snowberry, elksedge, and meadow rue, however, very few conifer stands support significant understory production.

Agricultural Land

Agricultural lands in the EIS area are non-public. Irrigated lands are used primarily for grass and alfalfa hay production while wheat is the major crop on non-irrigated areas. The major grain producing areas lie northeast of Meeker along the upper slopes of the White River Valley; most hay production occurs on lower slopes and along the White River between Buford and Rangely.

Barren and Waste Lands

Barren lands are those areas such as barren rock, erosion pavements, or rock outcrops having no significant amounts of vegetation. Waste lands are areas which are too steep and/or rocky to be beneficial to livestock or big game. These areas include mostly steep inclines such as cliffs and rockslides. These two land categories are found throughout the EIS area but are most prevalent in the western half on the EIS area.

RIPARIAN VEGETATION

The riparian vegetation of the EIS area is generally associated with small, perennial streams, manmade reservoirs and stock ponds holding year-round waters, and spring sources. Riparian plant communities or zones are, typically, narrow bands that follow stream courses, and are very distinct from other rangeland plant communities. The importance of these communities lies in the fact that on a given number of acres they support higher population densities and greater diversity of species of both plants and animals than any other rangeland plant community.

The present conditions of existing riparian communities have been generally affected by a number of natural and man-induced factors. The arid climate, high evaporation rate, and seasonal thunderstorms producing high sediment yields, have played a key role in structuring and limiting the present communities. Since the turn of the century livestock grazing has also been a dominant factor and has produced many detrimental effects.

Appendix E indicates those streams in the EIS area where riparian communities are known to exist, along with approximate acreage, condition status, and dominant species of the individual riparian zones. Locations of riparian zones on public land are shown on Map 3-5. Of the 297 acre total of known riparian habitat, 53 acres are in poor condition, 206 acres are in fair condition, and 38 acres are in good condition.

Differences in species composition occur with changes in elevation along the same stream, and with changes in geographic locations between streams. Exceptions to this generalization occur where heavy grazing has altered species compositions within a geographic location. In the higher elevations, above 7,500 feet, dominant overstory types include aspen, Douglas fir, spruce, snowberry, currant, and rose. Understory composition in these higher elevations are generally dominated by bluegrass, and a variety of forbs including yarrow, geranium, and lupine. Moving downstream to lower elevations, the overstory is generally dominated by willows, a few scattered cottonwoods, and box elder. Understory conditions are move diverse in these lower elevations with bluegrass generally dominating. Other dominant understory types include sedges, rushes, bulrushes, cattails, horsetail and spikerush. Understory forbs in lower areas include dandelion, clover, yellow sweetclover, thistle, and milkweed. In certain heavily grazed areas along lower stream segments sagebrush, rabbitbrush and greasewood have invaded the riparian zone. Dominant stands of salt cedar have also been established at lower elevations.

Sizes of riparian zones generally accomodate the stream size, and are often limited by the steep banks of eroded gullies in which many stream beds are located. Narrow zones, 1 to 5 feet across, are located in higher elevations and spread out gradually to as much as 50 to 75 feet in lower elevations. The riparian community in the lower portion of East Douglas Creek, where the gulley effect is predominant, is 200 feet wide in some places.

Vegetation ground cover in riparian communities varies with the degree of livestock use, the soil type, and the amount of surface and ground water flow. Percent cover is shown in Appendix E for each riparian community.

THREATENED AND ENDANGERED PLANTS

There are at least 13 threatened or endangered (T/E) plant species that are known to occur in the EIS area. The official status of each species, its location, habitat, and elevational range, as well associated plants, taxonomic difficulties, number of known populations, and the estimated individuals per population are referenced in Appendix E. Information in T/E plant species on the EIS area is lacking due to limited survey coverage.

One area of major concern is Raven Ridge, just northwest of Rangely. This particular outcrop of the Green River Formation harbors several T/E plant species. Among these are *Eriogonum ephedroides*, *Astragalus detritalis*, *Parthenium ligulatum*, *Penstemon grahamii*, and *Cryptantha rollinsii*.

Cathedral Bluffs is another area of concern, given the occurrence of *Astragalus lutosis* and *Aquilegia barnebyi*. It is suspected that *Festuca dasyclada* may also be present.

TERRESTRIAL WILDLIFE

The EIS area supports a large variety of resident and migratory wildlife species. Those species or groups of similar species which would be significantly affected by the various alternatives are discussed below. Detailed information is limited on most wildlife species. The bulk of available information concerns the major game animals in the EIS area: deer, elk, antelope, and sage grouse.

Big game habitat condition and trend data used in this EIS is a compilation of BLM and Colorado Division of Wildlife (CDOW) habitat surveys, conducted from 1966 to 1976. The results are summarized in the White River Resource Area URA and Piceance Basin Habitat Management Plan (HMP). A survey of sage grouse seasonal ranges and strutting ground complexes was conducted in the Piceance Basin by CDOW in 1976.

Mule Deer

The White River deer herd was considered to be the largest migratory deer herd in North America during the 1950's and 1960's. Several severe winters in the early 1970's resulted in a drastic population reduction. The mule deer population on public lands in the EIS area (about 45,394 deer), going into the winter of 1978-1979, was at the highest recorded level since 1971. A 44 percent winter mortality rate (CDOW) reduced the herd to an estimated 25,400 deer by the spring of 1979.

Public lands in the EIS area support 64 percent of the resident deer population on summer range, while private and State lands support the remaining 36 percent. On winter range and critical winter range, public lands support 75 and 81 percent of the deer population, respectively. Long term CDOW management goals for the northwest region, which includes the EIS area are that deer populations increase by 23 percent of the 197A populations.

Three deer herds inhabit the EIS area (Map 3-6). Two deer herds occupy areas north and south of Rangely and are more or less residents of the EIS area (Table 3-6). The Meeker and Piceance Basin Planning Units form the major winter ranges of the migratory White River deer herd (Table 3-6), which largely migrates to higher elevations east of the EIS area for summer range.

The major seasonal ranges in the EIS area are winter range (below 7,400 feet in elevation) and summer range (above 6,800 feet). Winter ranges typically occur in sagebrush and pinyon-juniper habitats while summer ranges consist of sagebrush, mountain shrub, aspen, and spruce-fir plant communities.

Summer range is a limiting factor on the Rangely deer herds, in terms of space, food, and water. Cover is limiting on the winter ranges between the White River and Highway 40.

Forage availability and quality on winter ranges is the limiting factor of the White River deer herd with 34 percent of the winter range in poor condition (Table 3-7). Approximately 41 percent of the wintering deer population in the EIS area is supported on these poor condition winter and critical winter ranges. Energy development on winter ranges of the White River deer herd would exert major influences on future carrying capacities and population trends.

TABLE 3-6
DEER HERD POPULATIONS AND SEASONAL MOVEMENTS 1/

	White River Deer Herd	Blue Mt. Deer Herd	Douglas Cr. Deer Herd
Summer Range	8,617	1,565	2,868
Winter Range	27,664	2,964	1,843
Critical Winter Range	12,369	38	670
Total Population	40,033	3,002	2,868
% Resident	22	52	100
% Migratory (winter influx)	78	48	--
% Emigratory (winter efflux)	--	--	12

1/ based on 1978 population estimates

TABLE 3-7
CURRENT DEER HABITAT CONDITION AND TREND ON PUBLIC LANDS (acres)

	Winter Range (%)	Critical Winter Range (%)	Summer Range (%)	Total (%)
Good				
Up	--	--	--	--
Static	3,500 (*)	700 (*)	21,000 (7)	25,200 (2)
Down	--	--	--	--
Total	3,500 (*)	700 (*)	21,000 (7)	25,200 (2)
Fair				
Up	--	--	--	--
Static	547,200 (59)	93,200 (61)	209,200 (66)	849,600 (61)
Down	62,800 (7)	3,700 (2)	9,400 (3)	75,900 (5)
Total	610,000 (66)	96,900 (63)	218,600 (69)	925,500 (66)
Poor				
Up	--	--	--	--
Static	140,900 (15)	23,800 (16)	2,000 (*)	166,700 (12)
Down	177,200 (19)	30,800 (20)	75,700 (24)	283,700 (20)
Total	318,100 (34)	54,600 (36)	77,700 (24)	450,400 (32)
Grand Total	931,600 (100)	152,200 (100)	317,300 (100)	1,401,100 (100)

* Less than one percent.

Poor condition winter range is the result of several interacting factors which differentially influence pinyon-juniper, sagebrush, and mountain shrub habitats. Poor conditions in pinyon-juniper woodlands are characterized by decadent desirable browse production. These areas provide valuable cover in winter ranges and are subjected to heavy deer browsing pressure. Overall densities on critical winter range average about 60 deer per square mile, or 1.78 acres per deer month, which is considered heavy deer use (McKean and Bartmann 1971). Densities in pinyon-juniper woodlands are considerably greater than in sagebrush expanses and thus receive relatively heavier browsing pressure. A lack of periodic stand renewal, such as that which would result from wildfire, has maintained browse production below site potentials.

Poor condition sagebrush winter range is typified by monotypic sagebrush stands with depleted understories. Deer, and in a few instances sheep use, have selectively overutilized desirable browse components through time, while in other areas, wildfire suppression and heavy livestock use has led to sagebrush dominance to the exclusion of grass-forb production. In a much more localized extent, heavy deer and/or sheep use has converted sagebrush-grassland conplexes into dominant grasslands.

Mountain shrub habitats in poor condition result primarily from a lack of recurrent wildfire, which maintains shrubs at a usable height for deer and elk browsing. Lack of fire has allowed most browse production to grow out of reach, resulting in heavy use of limited basal production. The net result are older, less productive stands whose limited production is essentially unavailable to big game.

Mountain mahogany, serviceberry, sagebrush, and other browse comprises about 80 percent of mule deer winter diets. Sagebrush contributes important emergency forage on poor condition winter ranges where both desirable browse and herbaceous forage availability are limited. Forbs, grasses, serviceberry, and Gambel oak are important from spring through fall.

Elk

Local elk populations have been steadily increasing in recent years. Current populations are listed in Table 3-8. Management goals for the Piceance Basin (Piceance Basin HMP) are that elk populations be allowed to increase up to a maximum level that does not lead to significant deer-elk dietary competition. CDOW long term management goals for the northwest region, which includes the EIS area, are that elk populations increase by 8 prtcent.

Elk are largely yearlong resident north and south of Rangely and along the Cathedral Bluffs (Table 3-8; Map 3-7). The Meeker and Piceance Basin Planning Units form major winter ranges of the migratory White River elk herd, which largely migrates to higher elevational summer ranges in the White River National Forest (Table 3-8). Public lands support about 54 percent of the elk population on summer range in the EIS area, while private and State lands support the remaining 46 percent. On winter range, public lands support about 59 percent of the elk population.

Summer and winter rages generally occur within the same elevational zone (above 7,000 ft.) (Map 3-7). Scattered stands of spruce-fir and aspen provide cover from spring through fall, while mountain shrub and pinyon-juniper are mainly used during winter.

Forage conditions are considered adequate on all seasonal ranges, although summer habitats are in better condition than winter habitats (Table 3-9). Although elk are broad spectrum foragers, grasses and forbs generally comprise the largest fraction of their diet.

Different limiting factors appear to be operating on the 3 elk herds in the EIS area. The Blue Mountain elk herd is limited by space and cover, primarily on summer range. It appears that disturbances associated with oil and gas development will, if not currently, limit elk populations of the Douglas Creek herd. Hunting pressure and energy development are limiting the rate of increase in the White River elk herd.

Antelope

Antelope are largely restricted to a narrow band of saltbush- sagebrush range north and east of Rangely (Map 3-8). A yearlong population of about 219 animals is resident to the EIS area. Over 90 percent of the herd is supported on public lands yearlong. CDOW long term management goals for the northwest region, which includes the EIS area are that antelope populations increase by 2 percent.

Antelope diets vary widely by season and use area. Succulent herbaceous material is important from spring through fall, whereas shrubs are largely consumed during the winter.

About 77 percent of the antelope habit is in poor condition (Table 3-10). Suboptimal forage conditions may be limiting herd productivity (Wagner

TABLE 3-8
ELK HERD POPULATIONS AND SEASONAL MOVEMENT 1/

	White River Elk Herd	Blue Mt. Elk Herd	Douglas Cr. Elk Herd
Summer Range	173	67	128*
Winter Range	800	95	128*
Critical Winter Range	92	--	160
Total Population	892	95	128
% Resident	19	71	80
% Migratory (winter influx)	81	29	20

* population of resident herd
1/ based on 1978 population estimates

TABLE 3-9
CURRENT ELK HABITAT CONDITION AND TREND ON PUBLIC LANDS (acres)

	Winter Range (%)	Critical Winter Range (%)	Summer Range (%)	Yearlong Range (%)	Total (%)
Good					
Up	--	--	--	--	--
Static	1,500 (*)	100 (2)	—	--	1,600 (*)
Down	--	--	--	--	--
Total	1,500 (*)	100 (2)	--	--	1,600 (*)
Fair					
Up	--	--	--	--	--
Static	92,700 (44)	4,000 (87)	67,400 (60)	16,300 (62)	180,400 (51)
Down	23,300 (11)	—	18,600 (17)	—	41,900 (12)
Total	116,000 (55)	4,000 (87)	86,000 (77)	16,300 (62)	222,300 (63)
Poor					
Up	--	--	--	--	--
Static	1,700 (*)	--	1,900 (2)	—	3,600 (1)
Down	89,900 (43)	500 (11)	23,700 (21)	9,900 (38)	124,000 (35)
Total	91,600 (44)	500 (11)	25,600 (23)	9,900 (38)	127,600 (36)
Grand Total	209,100 (100)	4,600 (100)	111,600 (100)	26,200 (100)	351,500 (100)

* less than one

TABLE 3-10
CURRENT ANTELOPE HABITAT CONDITION AND TREND ON PUBLIC LANDS (acres)

	Winter Range (%)	Critical Winter Range (%)	Summer Range (%)	Yearlong Range (%)	Total (%)
Good					
Up	--	--	--	--	--
Static	--	--	--	--	--
Down	--	--	--	--	--
Total	--	--	--	--	--
Fair					
Up	--	--	--	--	--
Static	--	--	26,400 (31)	--	26,400 (23)
Down	--	--	--	400 (6)	400 (*)
Total	--	--	26,400 (31)	400 (6)	26,800 (24)
Poor					
Up	--	--	--	--	--
Static	10,800 (62)	--	36,700 (43)	4,000 (59)	51,500 (46)
Down	6,500 (38)	3,500 (100)	21,800 (26)	2,400 (35)	34,200 (30)
Total	17,300 (100)	3,500 (100)	58,500 (69)	6,400 (94)	85,700 (76)
Grand Total	17,300 (100)	3,500 (100)	84,900 (100)	6,800 (100)	112,500 (100)

* less than one

1977). Lack of available water and space on summer ranges may limit yearlong populations.

Other Mammals

Approximately 75 species (other than big game) occur in the EIS area. Carnivores and small herbivores represent two major life forms. Carnivores are dependent upon small herbivores as a prey base.

Many small mammal species inhabiting climax plant communities have highly specialized habitat requirements, whereas more adaptable species are more tolerant to disturbances and occur in many habitats.

Sage Grouse

Historically, northwest Colorado produced the largest sage grouse populations in the State. Since 1953, previous population declines have been reversed and current population trends are considered stable in the EIS area.

Most sage grouse range (Map 3-9) is considered yearlong habitat. Summer and winter ranges largely overlap during average winters. Some populations move to lower elevations during severe winters.

Nesting, brooding, and winter habitat conditions are probably the major factors regulating population levels and productivity. Nesting and brooding habitats are generally in fair condition while winter habitat appears to be in good condition.

Krager (1977) found indications in the Piceance Basin that sage grouse nesting density is greatest within a 2 mile radius of strutting grounds. Juvenile grouse are dependent upon forbs, insects, and grasses until they are about 12 weeks old. Throughout the rest of the year, and especially during winter, both juveniles and adults are almost totally dependent upon sagebrush for food. Sage grouse distribution is associated with available water throughout the summer.

Other Birds

One hundred ninety-five species have been observed in the EIS area. The major habitat components that are relevant to the various alternatives are vegetation structure and diversity. Bird species diversity and abundance typically decrease as vegetation complexity decreases within a given habitat or as the interspersion of different habitat types decreases within a given area.

Threatened and Endangered Species

Four federally listed endangered species, peregrine falcon, bald eagle, whooping crane, and black-footed ferret, and one State listed endangered species, greater sandhill crane, have been documented as occurring in the EIS area. Only the bald eagle occurs regularly. Map 3-10 depicts the known habitat of threatened and endangered species.

The peregrine falcon occurs in Dinosaur National Monument but has been observed only a few times flying over the EIS area, usually south of the monument around Blue Mountain.

The bald eagle winters annually in the EIS area. A census, taken in the winter of 1978-1979, estimated a population of about 100 birds; the large majority were concentrated along a band paralleling the White River. Most known roosting sites and concentration areas occur on private lands, although one or two sites on public land are used extensively for feeding (primarily on cottontails) and roosting.

The whooping crane has been observed once in the EIS area. It occurred with greater sandhill cranes (which have been observed several times) and was part of the flock which annually migrates over northwest Colorado, from new Mexico to Idaho. It is felt that they do not normally stop or rest in the EIS area during migration, except when forced down by adverse weather conditions.

The black-footed ferret has not been officially sighted in the EIS area since the early 1900's (Felger 1910). A BLM study during 1976 failed to find any ferrets in the EIS area. Several unsubstantiated sightings have been reported in recent years. Potential habitat exists in the many prairie dog colonies found in sagebrush-saltbush plant communities throughout the EIS area.

AQUATIC WILDLIFE

Located within the boundaries of the EIS area are 78 perennial streams totaling 620 stream miles, 229 miles (37 percent) of which flow through public lands administered by BLM. Because riparian vegetation is at the interface between the aquatic and terrestrial environments, it regulates the energy base of the aquatic ecosystem by shading and supplying plant and animal detritus to the stream (Meehan et al. 1977). It can thus be inferred that most of the aquatic habitat in the EIS area reflects the same condition as its associated riparian vegetation (Appendix E).

Most of these streams are characterized as small headwater streams, 1 to 5 feet in width and less than 2 feet deep, with low flow rates, generally less than 0.5 cubic feet per second. Many streambeds lie in highly eroded gullies that flow through sagebrush or greasewood bottoms. In these cases riparian vegetation is generally restricted to the gully bottom or nonexistent, erosion is high, bank stability is poor and a large percentage of the stream bottom is covered with sediment. Only 8 of these streams possess the necessary qualities for a healthy aquatic environment. In these streams, the riparian vegetation is in good condition, the banks are stable, and the stream bottoms are generally rocky with a diversity of habitat features.

Aquatic Invertebrates

Aquatic invertebrates have been surveyed in the White River, Piceance Creek, and Yellow Creek (Everhart and May 1973, Pennak 1974, Pettus 1974, Ames 1977). Organisms were collected from the following major taxonomic groups: Diptera (blackflies, midges, etc.) Ephemeroptera (mayflies), Tricoptera (caddisflies), Plecoptera (stoneflies), Nematoda (roundworms), and Planaria (flatworms). Limiting factors for aquatic invertebrates are salinity in Yellow Creek and the lower portion of Piceance Creek, and habitat degradation through sedimentation. These problems generally result from poor watershed conditions and produce a variety of detrimental effects on aquatic life. The gill-breathing larvae of some aquatic insects can be smothered and eventually eliminated by a continual influx of sediment into the stream. The settling of sediment on rocks and other debris will eliminate habitat structures or substrate upon which many aquatic invertebrates attach. Even though no data exists on many of the streams in the EIS area, it can be assumed that these conditions are prevalent, and that aquatic invertebrate species diversity and biomass are below potential levels.

Fish

Through BLM and CDOW surveys covering the entire EIS area, only 17 streams and 3 reservoirs located on public land were found to support game fish populations (Table 3-11). The portions of these streams that flow through public lands make up about 24 percent of their total mileage. All of these waters except the White River below Piceance Creek, and Divide Creek Reservoir support cold water species. This lower portion of the White River maintains populations of channel catfish and black bullheads. Divide Creek Reservoir has been stocked with bluegill and black bullhead. Most of the trout streams are found at higher elevations, and support only marginal populations of generally small fish due to the small size (width and depth) and flow regime of these streams. The major trout fisheries are Piceance Creek and the White River east of the Piceance Creek confluence. Only short, intermittant frontages of public land are located along both streams.

No information or data is available concerning fish biomass in these 17 streams, however, this is assumed to follow the same condition and trend of the associated riparian vegetation. Research has shown that riparian habitat conditions are positively correlated with fish biomass (Armour 1977, Duff 1977, Kimbal and Savage 1977, Berry 1979).

Angling use in the public land waters of the EIS area is somewhat limited. The smaller trout streams do not contain populations that can sustain public fishing pressure thus it is assumed that little or no angling use occurs on public land segments of the streams. Divide Creek Reservior does maintain a small fishery, but due to its remoteness, it provides only limited angling use. Fishing in the White River and Piceance Creek probably occurs mostly along private frontages.

Threatened and Endangered Fish

Three threatened or endangered fish species have been collected from waters within the EIS area. These include the Colorado squawfish, *Ptychocheilus lucius*; boneytail chub, *Gila elegans*; and the Colorado cutthroat trout, *Salmo clarki pleuriticus*.

The Colorado squawfish is protected as endangered by federal and Colorado laws, and has been collected in the White River on at least two occasions (Everhart and May 1973, U.S. Fish and Wildlife Service 1977). Because of the low incidence of observation, population densities are either low, or use of the river by this species is sporadic.

The boneytail chub, presently proposed for Federal protection as endangered, has been collected in the White River on one occasion (Everhart and May 1973). This observation presents the possibility that a population of this species exists within the EIS area.

TABLE 3-11
GAME FISH HABITAT

Allotment No.	Stream Name	BLM Stream Miles/ Acres	Total Stream Miles	Game Fish Present
6005/6019	Piceance Creek	4.5	42.5	Rainbow Trout, Brown Trout
6019/6021	Trappers Creek	6.0	7.0	Cutthroat Trout
6023	Willow Creek	1.0	9.0	Rainbow Trout, Brook Trout
	Middle Fork Stewart Creek	5.0	7.0	Rainbow Trout, Brook Trout
6024	Fawn Creek	4.0	7.5	Rainbow Trout
	West Fawn Creek	3.5	7.5	Cutthroat Trout
6029	Black Sulfur Creek	11.5	19.0	Rainbow Trout
6324	Divide Creek Reservoir	4 acres	NA	Black Bullhead, Bluegill
6337	Windy Canyon	.5	1.5	Cutthroat Trout
	Bear Park Creek	2.0	4.5	Cutthroat Trout
	East Douglas Creek	5.5	14.5	Cutthroat Trout
6346	West Creek (in Reservoir)	1 acre	NA	Rainbow Trout
6354	Brush Creek	3.0	6.0	Cutthroat Trout
6357	West Evacuation Creek	2.5	8.5	Rainbow Trout
6358	Bitter Creek (in Reservoir)	1 acre	NA	Brook Trout
6367	Lake Creek	7.5	13.5	Cutthroat Trout
	Soldier Creek	3.0	11.0	Cutthroat Trout, Brook Trout
6813	Cow Creek	1.0	4.0	Cutthroat Trout, Rainbow Trout
--	Big Beaver Creek	0.5	5.5	Cutthroat Trout, Rainbow Trout
--	White River	12.0	132.0	Rainbow Trout, Brown Trout, Brook Trout, Cutthroat Trout, Mountain White Fish, Channel Catfish, Black Bullhead
	Totals	73	300.5	

Colorado cutthroat trout populations inhabit three streams within the EIS area. The populations in Lake and Soldier Creeks were examined and confirmed as good phenotypic examples but show evidence of hybridization with rainbow trout. No evidence of hybridization has been found in the population of Trappers Creek which is considered pure (Behnke 1976). Colorado cutthroat trout are protected as a threatened species under Colorado law.

WILD HORSES

The wild horse range in the White River Resource Area consists of 443,979 acres, located in the Piceance Basin and in the vicinity of Douglas Creek (Map 3-11). The current wild horse population is estimated to be 625 head.

Interviews with local residents of the Meeker area indicate that wild horse herds were here when the first settlers arrived in 1882. Many early ranchers released high quality studs into the wild herds that roamed the area. This practice was intended to upgrade wild horses for use in ranch work and for market.

During the depression years, many small ranches and homesteads were abandoned. Domestic horses that were left behind were absorbed into wild horse herds increasing their number and adding new genetic material to the wild horse population.

In August 1974, the Douglas Creek wild horse herd was counted for the first time since the passage of the 1971 law. At that time, the Douglas Creek herd numbered approximately 71 head. The Piceance Basin wild horse herd was counted in August 1975 and numbered approximately 143 head. The current population, based on an April 1977 count adjusted to reflect the 1979 populations, is 175 head for the Douglas Creek herd and 450 head for the Piceance Basin herd. These horses are distributed in 14 livestock allotments (Table 3-12).

Movement of wild horses within their range is influenced greatly by existing fences (Table 3-12). Although horses have become accustomed to the fences, the fences remain a barrier to their free-roaming nature. Wild horses move between allotments that do not have complete boundary fences. Horse migration over the Cathedral Bluffs has been observed allowing for the possibility of breeding between the Douglas Creek herd and the Piceance Basin herd.

Seasonal factors also influence horse movement and areas of concentration within the wild horse range. During periods of deep snow cover, horses tend to concentrate on windswept ridges and southern exposures where forage is more available. During summer and early fall, wild horses are forced to concentrate around water sources as intermittent waters dry up. The more important water sources in the wild horse range are Douglas Creek, Yellow Creek, Boxelder Creek, Corral Gulch, Spring Creek and Stake Springs Draw. There are also approximately 15 developed springs, 15 undeveloped springs, and 70 reservoirs. Many of these creeks, springs, and reservoirs are dry by late summer. Water is more scarce in the Douglas Creek area than in Piceance Basin, therefore, water sources would be expected to have a greater influence on the movement and concentration of horses in the Douglas Creek herd.

Wild horses compete with livestock, elk, and a large herd of mule deer for rangeland resources. In addition, disturbances associated with natural gas and oil shale development have rapidly increased within the wild horse range within the past few years. Increased energy development and the increased forage requirements for wild horses have created an expansion of the wild horse range. Presently, wild horses occur in areas beyond the recognized wild horse range (those areas utilized by wild horses at the passage of the Wild and Free-Roaming Horse and Burro Act of 1971).

CULTURAL RESOURCES

The cultural resources in the EIS area represent a full chronology of habitation dates in surface as well as subsurface deposits. This situation is extremely beneficial when using data accumulated to reconstruct prehistoric and historic lifeways. Cultural resources must be evaluated in terms of their potential to contribute information to a larger data base and, thus, prove useful in answering research questions designed to explain the origins and history of man in northwestern Colorado.

Although only 1.1 percent of the EIS area has been surveyed for cultural resources, to date, 958 archeological and 73 historic sites have been recorded. Based on one site per 58.2 acres (BLM survey data 1977) there could be 25,927 sites in the EIS area. The cultural resource inventory has been stimulated by the intensive energy development activity in the EIS area. Consequently, most survey work has been done on a project specific basis and not as a result of a scientific research design. No additional sampling was done for the preparation of this EIS. All data was taken from previous work done in a support capacity for energy development and range management functions.

TABLE 3-12

POPULATIONS, LAND OWNERSHIP, AND FENCING WITHIN THE WILD HORSE RANGE

Allotment	Present No. of Horses	Land Ownership 1/ Public	Land Ownership 1/ Private	No. of Interior Fences 3/	Boundary Fences 4/
6026 Square S	146	59,761 2/	3,840 2/	2	Yes
6030 Yellow Creek	133	72,485	4,180	3	Yes
6337 Cathedral Bluffs	87	21,859	1,359	0	No
6032 Spring Creek	67	38,884	1,600 2/	1	Yes
6041 Lower Fletcher	6	27,810	1,600 2/	0	Yes
6346 Twin Buttes	72	12,957 2/	1,280 2/	0	No
6354 E. Douglas Creek	11	7,097	0 2/	0	No
6338 Johnson-Trujillo	5	6,250	1,270	0	No
6031 Duck Creek	16	9,687	0 2/	1	Yes
6036 Greasewood	34	8,246	0 2/	2	Yes
6038 Little Spring Creek	16	58,383 2/	1,600 2/	1	Yes
6040 Upper Fletcher	11	21,798	0 2/	1	Yes
6042 Boise Draw	8	88,522 2/	2,880 2/	0	Yes
6039 Hammond Draw	13	10,240 2/	0 2/	0	Yes
Total	625	443,979	19,609		

1/ Land ownership within wildhorse area.
2/ Does not include all acreage in the allotment.
3/ Interior fences restrict wild horse movement within allotments.
4/ Boundary fences restrict wild horse movement between allotments.

Table 3-14 summarizes the types of cultural sites that are found in northwestern Colorado. The occurance of various types of sites is related to topographical and geological conditions. In a discussion of predicted site density, no attempt is made to predict site type or size.

Similar kinds of sites from the same general time period are given a type name and are assigned to a named tradition. In northwestern Colorado the most common traditions are the Llano, Plano, Archaic, Fremont, Protohistoric, and Historic (Table 3-13).

Northwestern Colorado has been occupied by humans for at least 11,000 years. While the humans remained very similar physically, their environment and food sources changed slowly through time, bringing about changes in the behavior of the people involved. These changes were reflected in the debris which they left behind and which has been preserved through time. From this patterned, as opposed to random, distribution and its changes through time, a shadowy and incomplete picture of these people's lifeway can be built up. Data can be retrieved on what natural resources were available and utilized, how many people utilized them, and how they were used. Some data may be gained on what distributions and ranges certain animals and plants had in the past and what the past climate was like for comparison with current data through archeological research.

Work done in the Rangely vicinity indicates a high incidence of prehistoric use. The earliest occupation in this area is represented by Llano and Plano lithic materials in the Skull Creek area (a 52,000 acre area which has had a 3 percent archeological survey). The Archaic tradition is well represented and occurs along the Douglas Creek drainage and in the Skull Creek area. Multiple radiocarbon dates, acquired from subsurface hearths, indicate extensive deposits from this time period.

The Fremont tradition is better represented in the Rangely vicinity than anywhere else in the EIS area. Evidence of the Fremont, a hunting-gathering and maize horticultural people, is seen in the abundance of rock art, masonry granaries, and forts. Interest in the Fremont has been expressed since the late 1920's. Research in the Rangely, Douglas Creek, and Blue Mountain areas was carried out by Smith in the 1930's and G. R. Wenger in the 1950's. Since then, work done in the Douglas Creek drainage has led to the listing of the Canyon Pintado Historic District, which includes 168 recorded archeological sites, on the National Register. Also listed are the Carrot Man Pictographs. The Skull Creek area includes 96 recorded sites. Other major studies have been done by Lischka (1977), Creasman et al. (1977), Chandler and Nickens (1979). and Gordon and Kranzush (1979).

In this area, the Protohistoric period is represented by European trade goods that show evidence of French and English trade networks. Horses and guns are portrayed in the rock art. The Dominguez-Escalante expedition passed through Douglas Creek and what is now Canyon Pintado on September 9, 1776 designating the start of the Historic period. The Utes inhabited this area historically until 1880 when they were relocated into Utah following the Meeker Massacre.

Energy-related surveys in the Piceance Creek Basin have produced data upon which Hurlbett (1976) has based a study on settlement predictability. This study, which serves as a predictive model for site locations, is usable without prehistoric environmental and chronological information. It is not, however, useful in cultural-historical reconstruction. Findings prove that nearness to water was not as much of a determiner of site location in the Piceance (Hurlbett 1976) as it was on Blue Mountain and other locations in the EIS area ("Reports of Examination of Cultural Resources", BLM 1975-1979). Other survey work done for energy projects have located a large number of sites (Jennings 1975, Olson 1976, Jennings and Sullivan 1977, Weber 1977, Gordon and Kranzush 1978, and Price 1978.)

In the Meeker vicinity, three cultural resources surveys have located eleven sites. This limited data base prevents the contstruction of a predictive model.

Historic sites have been recorded as they are encountered during the course of archeological surveys. The first historically recorded inhabitants of the EIS area were the Utes. European contact in 1776 was followed by fur trappers who came after 1800. No historical fur trapping sites have been discovered to date. Explorers entered the area between 1839 and 1869. The expedition routes of John C. Fremont (1844, 1845) and John Wesley Powell (1869) have been identified but no determinations of eligibility for National Register purposes have been made. With the removal of the Utes and the improved rail transportation system, homesteaders moved into the northwestern corner of Colorado. The towns of Meeker and Rangely were founded in 1882. Ranching became a major industry and operating as well as abandoned ranching operations represent the economic development of the region. Homesteads, cabins, and line shacks are visible (Athearn 1977).

TABLE 3-13
Archeological Traditions

TIME	TRADITION	TYPE
1776-50 years ago	Historic	Ute (to 1883); Euro-American
c. 1600-1776	Protohistoric	High Plains; Great Basin
c. 1250-1600	(unnamed)	(unnamed)
c. 900-1250	Fremont	Fremont
c. 2500 BC-AD 900	Archaic	(unnamed)
c. 7000 BC-2500 BC	Plano	Eden; Hellgap; Scottsbluff
c. 10000 BC-7000 BC	Llano	Folsom; Clovis

TABLE 3-14
ARCHEOLOGICAL SITE TYPES

Function/Kind	Characteristics	Traditions
Lithic scatter (open lithic; chippings; chipping station)*	Area where the waste from the manufacture of stone tools or the tools themselves are found.	All
Campsite (habitation; camp; burnt spots; fire pots; hearths)	A lithic scatter with the addition of features connected with fire making; charcoal, ash fire cracked artifacts, fire cracked rocks, or burnt bone.	All
Quarry (chippings; manufacturing areas)	An area containing a natural source of rocks suitable for making tools. Unmodified rock, waste, and tools in all stages of manufacture are found.	All
Kill site (trap; jump)	An area containing stone and/or bone tools in association with the remains of one or more animals.	All, but particularly Llano and Plano
Rock shelter (cave; overhang)	An area protected from the weather by an overhanging rock formation. Usually has a drip line. May or may not have surface material culture.	Plano, Archaic, Fremont
Rock art (petrograph) (a) pictograph (b) petroglyph	Any artistic expression or message on a rock surface. (a) Painted figures of people, animals, plants, letters, numbers or abstracts. (b) Incised figures of people, animals, plants, letters, numbers, or abstracts.	Fremont, Ute, Historic
Burial	Remains of human beings, fragmentary or whole.	Protohistoric/Historic
Tipi rings (stone rings, tipis)	Circular arrangement of spaced rocks, 3 to 15 m in diameter.	Protohistoric/Historic
Wickiups (tipi poles)	Poles or branches of pinyon or juniper laid up against living trees. Interior floored with juniper bark.	Historic
Granary (cist, corn crib)	Mud-mortared sandstone slab structures, usually about 1.5 x 1.5 x 1.5 m. Most often built into sandstone ledges, sometimes mud lined and capped or lidded with a large slab.	Fremont
Rock walls (forts)	Alignments or walls of mud-mortared or dry-laid stone masonry. May be single or multiple. May have "doorway," usually built on ridge.	Fremont

* Words in parentheses are synonyms for that kind of site.

National Register

The Office of the State Archeologist of Colorado, the State Historic Preservation Officer of Colorado, the National Register of Historic Places, and monthly listings in the *Federal Register* through September 1979 were consulted. The following properties are listed on the National Register of Historic Places: Carrot Man Pictograph Site, Canyon Pintado Historic District, Duck Creek pickup Village, and the Fremont Lookout Fortification Site. Nine sites have been nominated and approximately 60 have been determined eligible for inclusion.

VISUAL RESOURCES

The BLM has implemented a visual inventory and analysis process to provide for a systematic and objective approach to management of visual resources. In August 1978, the inventory was completed for the entire EIS area. The criteria used for determining visual impacts were scenic quality, viewer sensitity, and viewing distance. These three criteria were rated and measured throughout the EIS area and the combined effect was determined in order to assign one of five visual management classes to a specific area (map 3-12). The visual management classes are designated to indicate the degree of development (generally man-induced) and consequent visual contrast within each class boundary (Table 3-15).

In the EIS area, scenic quality was rated on criteria developed for the Rocky Mountain Plateau Region. Viewer sensitivity was based on traffic volume, and distance zones were determined by measuring viewing distances from roads.

RECREATION RESOURCES

The land capability classification system for outdoor recreation in the EIS area was adopted from the Canada Land Inventory 1969). This rating system classifies land according to its natural capability to provide opportunities for recreation, and uses a 7-class rating system with "class I" as high. Twenty-five recreational features which represent the major uses of land for recreation purposes as indicated by current popular preference are considered. To determine the classification rating for a given land unit, an assessment is made of the opportunities fof recreation provided by a feature or combination of features, and the quantity of use. Visitor-use surveys are not part of the classification system, thus no visitor-use data has been collected nor known to exist for the EIS area.

The significant recreation resources are the 52,000 acre Skull Creek area and the 29 big game/wild horse hunting/viewing areas (Map 3-13).

Skull Creek

The scenic values in the Skull Creek Area are considered to be the most significant in the EIS area because of numerous examples of exposed sandstone bedding with fractures similar to those found in Zion National Park, highly eroded canyons, and other interesting rock formations. The area has the capability to attract and sustain back country recreation with a highly scenic and solitary quality. A study is currently underway by the University of Arizona Laboratory Tree-Ring Research group to determine the ages of pinyon-juniper trees in the Skull Creek area. It is suspected that some of these trees may be the oldest of their kind in North America.

The recreation capability analysis for the Skull Creek Area identified ten areas with a class III (moderately high) capability for scenic viewing, ten areas with a class III rating capability for hiking and nature study, and three areas with a class III rating capability for wildlife viewing.

A recommendation was made that following completion of all inventories (mineral, archeological, historical, etc.) the Skull Creek Area be considered or administrative withdrawal as the "Skull Creek Recreation Area". In addition, 37,080 acres within the 52,000 acre Skull Creek Area have been recommended as a wilderness study area.

Big Game and Wild Horses

Throughout the EIS area, 27 areas with high quality big game hunting/viewing opportunities, and 2 viewing areas for wild horses have been identified. Most of these concentration areas were given a class IV rating. This implies that these are "areas with exceptional capability for viewing and hunting of upland wildlife in which concentrations of wildlife are known to exist under normal conditions in the recreation season, and in which wildlife is considered to be the dominant recreation attraction" (Canada Land Inventory 1969). The area acreages (both public and private) are as follows:

Wild Horses 77,000 acres

Deer 108,936 acres

Elk 1,555 acres

TABLE 3-15
VISUAL RESOURCE MANAGEMENT CLASSES

Class I	- This class applies only to designated wilderness or natural areas. It allows for natural ecological changes only (there are no such areas in the White River Resource Area).
Class II	- Changes may occur but must not be evident to the casual observer. They should give the appearance of natural occurance.
Class III	- A moderate amount of contrast may occur but must be subordinate to the characteristic landscape.
Class IV	- Contrast may dominate the landscape for the life of the project but must appear natural in the long run.
Class V	- This is an interim classification for developed areas, such as powerline rights-of-way, coal mines, etc., that require rehabilitation.

Antelope 3,499 acres

Total 190,990 acres

It should be noted that these "concentration areas" do not necessarily correspond to the big game or wild horse concentration areas mentioned in the wildlife section, because the recreation capability is influenced by access, terrain, and vegetation cover. This classification is used to indicate the suitability of habitat for, and the probable presence of, reasonable numbers of one or more species of wildlife normally associated with upland areas, which are likely to be of popular interest to hunters or other recreationalists.

The remaining 1,934,685 acres in the EIS area are classified as class V (moderately low) capability for hunting/viewing of big game wildlife and wild horses. The area acreage is as follows:

Wild Horses 367,000 acres

Deer 1,073,285 acres

Elk 385,441 acres

Antelope 108,959 acres

Total 1,934,685 acres

Class V areas are large areas with high capability for viewing or hunting of one or more upland wildlife species, but without other significant recreational capabilities.

The 1978 recreation days capability for big game hunting was determined by multiplying the estimated number of days hunted per animal harvested (CDOW 1974) by the 1978 harvest figures (CDOW 1978). During 1978, 11,221 deer, 319 elk, and 50 antelope were harvested from the EIS area. Applying the predicted number of recreation days per animal harvested, 8.4 for deer, 29.1 for elk, and 3.5 for antelope, it was determined that deer, elk, and antelope hunting provided 94,256, 9,283, and 175 recreation days respectively. The total big game hunting recreation days capability for 1978 was 103,714 days.

ECONOMIC CONDITIONS

The EIS area includes most of Rio Blanco County, a portion of southern Moffat County, and several small portions of northern Garfield County. Some affected ranches have lands extending into Uintah County, Utah. Data for Rio Blanco County are believed to adequately depict conditions in the entire EIS area and will be used for the purposes of exposition and analysis in the following discussion. Slight variations in economic data may exist from the true EIS area.

The economic impacts of livestock grazing on public lands appear relatively small when compared to the total EIS area economy but these impacts are much more important to families holding BLM grazing privileges. Therefore, whenever possible, this economic analysis will concentrate on that subset of the EIS area population which is directly affected by livestock grazing on public lands. The total EIS area economy will be used as a base for relative comparison.

Rio Blanco County

POPULATION

The population of Rio Blanco County was most recently estimated to be 5,100, about 0.2 percent of Colorado's population (Bureau of the Census 1977). Its sparsely populated character is indicated by a population density of 2.9 persons per square mile as compared to a density of 25.3 persons per square mile for the state.

INCOME

There are four areas of economic concern which experience direct income effects from the range livestock grazing program administered by BLM. These areas are range livestock-related income, contract construction-related income, federal government-related income, and recreation-related income. Recreation-related income is included statistically within the trade and services sectors. There are also indirect income effects which result from the spending of direct income within the EIS area by the four direct income recipients listed above.

As a base of reference for relative importance assessments, total Rio Blanco County personal income in 1977 for county residents was $37,285,000 which amounted to 0.2 percent of Colorado's total personal income of $18,767,275,000 (Bureau of Economic Analysis 1977). Rio Blanco County wage and salary income (in thousands of dollars) and percents of total wage and salary income in 1977 for the sectors affected by the range livestock grazing program were: agriculture, 706 (3.0 percent); construction, 3,426 (14.4 percent); trade, 1,770 (7.5 percent); services, 982 (4.1 percent); and Federal Government, 621 (2.6 percent) (Supplemental Report to Northwest Colorado Coal Regional EIS 1978).

The incomes received by each of the sectors that are directly affected by the range livestock grazing program influence business activity within the EIS area in all other sectors of the economy.

Multipliers have been estimated from local economic data which calculate the indirect income effects generated by direct changes in each of the above sectors (Bartlett et al. 1979). The agricultural/livestock income multiplier of 2.611 indicates that an indirect income effect of $1,137,000 resulted from the $706,000 direct agricultural income, to make a total direct and indirect agriculture-related income of $1,843,000. Similarly, the construction multiplier of 1.522 generated a total direct and indirect income of $4,560,000. Equivalent estimates for the other affected sectors are trade (assumed to be mostly retail): multiplier of 1.513, total direct and indirect income of $2,678,000; services: multiplier of 1.379, total direct and indirect income of $1,354,000; and Federal Government: multiplier of 1.327 (Social-Economic Profile, BLM 1976) total direct and indirect income of $824,000.

These multipliers measure the effects of income to individuals and families received from wages and salaries, and net income from ranching and other business sources. Another type of multiplier, the business activity multiplier, applies to the gross revenues of business operations, some of which are spent in the local economy for business supplies and serices. F or the agriculture/livestock sector in the EIS area, the business activity multiplier is estimated to be 1.833 (Bartlett et al. 1979).

EMPLOYMENT

The labor force in Rio Blanco County grew from 1,981 in 1970 to 2,473 in May 1979, an increase of 25 percent (U.S. Census). As of May, 1979, 61 members of the labor force were unemployed, an unemployment rate of 2.5 percent. This is considerably below that of the State of Colorado as a whole, which had an unemployment rate of 4.7 percent for the same time period.

PUBLIC FINANCE AND TAX BASE

The 1977 assessed valuation for Rio Blanco County was $181,419,320 which, when applied to the total average county mill levy of 34.5, produced a total revenue of 6,258,966 (Colorado Department of Local Affairs 1977).

Ranching Operations

POPULATION

The 100 operators who have grazing privileges on public lands and the families dependent on those ranching operations make up an estimated population of 457 people. This group, which is directly affected by livestock grazing on public lands, comprises 9 percent of the 1977 Rio Blanco County population.

INCOME

In 1978, BLM provided about 136,028 AUMs of forage (average active licensed use) to EIS area ranches. This accounted for about 21 percent of the forage base utilized in the EIS area for range livestock income generation. Presently, there are 100 ranches in the EIS area with grazing privileges on public lands. There are 139 families which are dependent to varying degrees on these ranches as their income source. Of the 139 families dependent on the ranches, it is estimated that 116 families (387 people) are dependent on ranching as their primary source of income. This subset of the EIS area population (139 families, 457 people) is expected to be the group most directly affected by the BLM livestock grazing program.

Table 3-16 indicates the size and type categories into which the 100 ranching operations are grouped, average BLM forage use, gross revenue, and net revenue. Eight models representing a size and type category were analyzed to determine the income characteristics resulting from ranch operations (Appendix F). The aggregation of income produced by all 100 ranching operations indicates that these ranches presently account for an estimated $13,798,717 in gross revenue. This level of sales by the livestock ranches influences business activity in economic sectors other than the livestock sector. Applying the agricultural/livestock business activity multiplier of 1.833 to the present $13,798,717 gross revenue indicates that sales by these 100 ranches generate another $11,494,331 of sales in the EIS area economy.

The 100 ranches presently account for $2,631,865 net revenue annually. This is direct personal income for the ranch operators and their families. Applying the agricultural/livestock income multiplier of 2.611 to the direct ranch income results in a total direct plus indirect income effect of $6,871,800, which means that an additional $4,239,935 personal income is generated in the EIS area through the spending of the $2,631,865 direct personal income. The total direct and indirect income of $6,871,800 is 18.4 percent of the 1977 Rio Blanco County personal income.

Table 3-16 also indicates that small cattle ranches (Model 1 and 2 categories), are experiencing negative net revenues. This means that many of these ranch operations are presently being subsidized from other family income sources. Esti-

TABLE 3-16
RANCH SIZE AND INCOME EFFECTS
AFFECTED ENVIRONMENT

Model	Cattle	Sheep	Number of Ranches	Average BLM AUM Use Per Ranch	Gross Revenue 1/ Per Ranch	Gross Revenue 1/ All Ranches	Net Revenue Per Ranch	Net Revenue All Ranches	Hired Employment (Man-years
1	1 - 149		15	172	$ +23,389	$ +350,835	$ -15,819	$ -237,285	+4.52
2	150 - 449		23	667	+53,311	+1,226,153	-4,406	-101,338	+26.40
3	450 - 749		10	2,010	+101,024	+1,010,694	+24,694	+246,940	+7.21
4	750 - 1,999		16	3,563	+232,965	+3,727,440	+15,453	+247,248	+35.42
5	2,000 or more		1	5,744	+691,967	+691,967	+254,572	+254,572	+6.91
6		1 - 6,000	28 2/	821	+148,425	+4,155,900	+52,469	+1,469,132	+75.57
7	1 - 1,399	1 - 1,749	5 2/	922	+231,252	+1,156,260	+45,006	+225,030	+19.00
8	1,400 or more	1,750 or more	2 2/	1,776	+739,734	+1,479,468	+263,783	+527,566	+23.60
		TOTAL	100	15,675		$+13,798,717		$+2,631,865	+198.63

1/ Revenue of ranches with present BLM use levels

2/ Some ranches in these categories do not conform to the size limits established for any of the ranch models. According to the judgment of range specialists and the model developers, placing them in these categories does not create significant errors in the analysis of livestock income effects.

Source: Bartlett, E.T., R.G. Taylor, and J.R. McKean 1979. Impacts of Federal Grazing on the Economy of Colorado. Fort Collins. Colorado State University.
BLM Range Management Automated System, 1979, for ranch size.

mates of non-ranching income are not included in Table 3-16.

Table 3-17 indicates the relative dependency of ranches on public lands as a forage source for their operations. Each ranching operation is affected to varying degrees by its dependency on BLM forage, the season in which the forage is supplied, and the ease with which other forage could be substituted if necessary. These three factors were considered in order to estimate the criticality of BLM-supplied forage to the ranching operations. Table 3-18 indicates the number of ranches which are considered to have a high, medium, or low dependency on BLM forage.

Normally, when a ranch operation is unable to continue in business, it is either sold to another rancher or combined into a larger operation. However, same parts of Rio Blanco County are experiencing changes in land use from ranching to other purposes (principally residential and recreation). Therefore, the possibility exists that some ranch operations might be converted to non-ranching uses if reductions in available AUMs were incurred.

EMPLOYMENT

Ranch-related employment is currently estimated to account for 198.63 man-years of hired employment on the 100 ranches with BLM grazing privileges (Table 3-16).

PUBLIC FINANCE AND TAX BASE

Assessed values of livestock and ranch facilities are the sources of property tax revenues from ranching operations. Various appraisal estimates suggest that an animal unit (12 AUMs) contributes $1,000 to $1,200 to the value of livestock ranches in western Colorado. Based upon the authorized livestock grazing use of 155,984 AUMs or 12,999 animal units, grazing use contributes approximately $12,999,000 to the value of the 100 ranches with BLM grazing privileges in the EIS area.

In Rio Blanco County, agricultural property is assessed at 30 percent of its market value (Rio Blanco County Assessor). The ranch values, attributed to grazing use on public lands, contributes $3,899,700 (assessed valuation) to the tax base, upon which an estimated $134,540 in property taxes are paid to local governments at the present mill levy of 34.5.

Recreation and Wildlife

Income derived from recreation-related activities is generally included in statistics for other economic sectors, primarily trade and services. Tourism and recreation are important to the EIS area economy, but specific data are not available to measure the importance of many recreational activities.

Of all recreational activities in the EIS area, hunting and fishing are the most important in terms of number of people involved and contribution to the local economy. A recent study by Colorado State University estimates that 1973 expenditures by sportsmen in Region 11 (Moffat, Rio Blanco, Garfield, and Mesa Counties) was $34,370,960 (Ross et al. 1975). Allowing for inflation, this value probably amounted to about $45,369,670 in 1977 dollars. These expenditures included access fees charged to hunters for use of ranch lands as well as payments to guides and outfitters. It is possible that about 20 percent of these expenditures resulted in income to Region 11 residents. This $9,073,930 amounted to about 1.4 percent of the 1977 Region 11 personal income. If sportsmen-related income is retained generally in proportion to visitor days of big game hunting, this would mean that about $3,085,140 of Rio Blanco County's 1977 income can be attributed directly to hunting and fishing-related recreation.

Income to the state economy from nonresident big game hunting in the EIS area can be derived by multiplying the number of recreation days (see Recreation section) by the percentage of nonresident hunters (51% for deer and 53% for elk), and subsequently multiplying this figure by the value per nonresident recreation day (Norman et al. 1974). Since 1974 figures were used for the values for nonresident recreation days, an inflation factor of 1.32 was applied to arrive at 1978 values ($193.36 for deer and $545.71 for elk). Income to the state economy for 1978 from big game hunting in the EIS area is estimated at $9,295,009 for deer and $2,684,893 for elk.

Since the above studies focused only on hunting and fishing activities and did not include all recreation and tourism-related income, the real income effect of recreation is considerably larger. With much data available only at the state planning and management region levels, it is difficult to determine what proportion of the income is retained within the EIS area. Expenditures from general recreational activites would provide additional income over the amounts described above.

TABLE 3-17
OPERATOR DEPENDENCY ON BLM GRAZING

Dependency (%)	Number of Ranches
0 - 10	35
11 - 20	14
21 - 30	16
31 - 40	16
41 - 50	8
51 - 60	6
61 - 70	4
71 - 80	0
81 - 90	1
91 - 100	0
Total	100

NOTE: To calculate dependency, estimates of total forage needs of the rancher were made and related to the contribution made to those forage needs by BLM.

TABLE 3-18
CRITICALITY OF RANCHER DEPENDENCY ON BLM GRAZING

Criticality	Number of Ranches	Percent of Total
High	58	58
Medium	20	20
Low	22	22
Total	100	100

NOTE: High means that BLM forage is judged to be an essential element for the survival of the ranching operation. Medium means that BLM forage use may or may not be an essential survival element. Low means that BLM forage use is judged not to be essential to the ranching operation's survival.

A judgmental estimate of the criticality of rancher dependency on public land grazing was made by BLM personnel by applying the following three criteria to each ranching operation:

1. Proportion of forage acquired on public land
2. Season that forage is acquired
3. Ease of acquiring alternate sources of forage

SOCIAL CONDITIONS

The people in the EIS area like the small towns and their appearance, the clean air and water, low population density, lack of noise, safety and low incidence of crime, the solidarity and friendliness, the open space and access to the outdoors during all seasons, the school systems, and the county-owned TV translator system (White River Resource Area Planning Area Analysis, BLM 1978). Characteristics of the area that the public dislikes are the high cost of living, the lack of adequate housing at affordable prices, limited shopping and high prices, poor accessibility to public transportation, the lack of urban-type recreation, and delays to development created by environmental restrictions. However, in the overall, the public in the EIS area indicate that they are satisfied with their quality of life (PAA, BLM 1978).

Since 1960, population change in the EIS area has been generally more negative than positive due to the fact that in two periods there was an out-migration due to loss of jobs. Recently, there has been in-migration due to increased job opportunities; a positive attribute. This puts greater pressure on the inadequacy housing market (PAA, BLM 1978).

Since 1972, the overall employment history of the EIS area has been positive in terms of social well-being. There has been a steady, though fluctuating, upward trend in the number of jobs. However, jobs in agriculture and services have been declining. Mining has shown the greatest gross and percent increase in jobs and is now the major private employer in the county, having passed agriculture in 1976 (PAA, BLM 1978). In May 1979, the unemployment rate in the EIS area was 46.8 percent lower than the state average (2.5 percent compared to 4.7 percent) which is a strong positive index of social well-being (Colorado Manpower Review 1979).

At first glance, it appears that the people in the EIS area are carrying an unbearable property tax burden when compared with the state average. However, 88 percent of the property taxes are paid for by oil companies operating in the county and, therefore, the residents' property tax well-being is quite positive when compared with the rest of the state (PAA, BLM 1978). However, the residents' adjusted gross and per capita income is lower than state and national averages.

The people living in the EIS area can be classified as "rural western". Many of the residents, especially those associated with ranching, trace their ancestry back to the early settlers. They retain a strong attachment to land and traditional uses though many in the Piceance Basin sold their land to the energy companies in the 1950's and have been operating on a lease-back-for -taxes basis in the interim. Nevertheless, their attachment to the land is strong as are their positive attitudes towards self-reliance and hard work. A large majority of the people in the area have a positive attitude toward the work ethic, and only about a third of them has positive feelings toward the speculation ethic (PAA, BLM 1978). Family ties are very strong.

The free enterprise system is held in high regard by the people in the EIS area, but they indicated that profits made from work rank higher in the cultural value hierarchy than do profits made by speculation (PAA, BLM 1978).

The citizens of the area have accepted public planning reluctantly, out of necessity, in order to control growth and prevent chaos. Public planning on a local basis was also accepted to ward off the possibility of the State or Federal Government coming in to do it for them. There is a strong current of alienation in the area toward government of any kind beyond the county level.

The success of the Rio Blanco County Historical Society, one of the largest social organizations in the area, illustrates the importance of tradition and the past to the people. The Rio Blanco Cattlemen's Association and the Rio Blanco Sheepmen's Association are dedicated to maintaining their respective industries not only as businesses but as ways of life.

The residents are conservative politically and economically. These positions prevail regardless of political party affiliation and are illustrated by their anti-planning and pro-free enterprise attitudes.

LAND USES

Livestock Grazing

Total livestock forage production in the EIS area from state, private, and public lands contribute 31 percent of the total regional (Rio Blanco, Routt and Moffat Counties) livestock feed requirements, 1.6 percent of Colorado's and 0.25 percent of the eleven western states (Socio-Economic Profile, BLM 1976). Total livestock forage produced on public land in the EIS area contributes 7.0, 0.4, and 0.05 percent of the livestock forage needs for the region, state, and eleven western states respectively.

Public land in the EIS area provides 22 percent (136,028 AUMs) of the total EIS area livestock forage requirements of 621,732 AUMs. Livestock numbers in the EIS area are approximately 34,821 cattle, 84,950 sheep, and 110 horses whose annual forage requirements amount to 417,852, 203,880, and 1,320 AUMs respectively.

Livestock grazing on public lands in the EIS area involve 100 livestock operations on 139 allotments ranging in size from 309 to 156,091 acres. Eighty-nine are cattle allotments, 47 are sheep, and one is a horse allotment. Four operations run both cattle and sheep.

At present, 6 (cattle) allotments are intensively managed under Allotment Management Plans (AMP) and cover approximately 10 percent of the area, utilizing approximately 10 percent (12,946 AUMs) of the total AUMs of active use in the EIS area. The remaining allotments are less intensively managed and are grazed by all classes of livestock.

Periods of use on public lands (Map 3-14) are variable depending on elevation, water availability, and allotment size. Generally, the lower elevations are used for winter range, the mid-elevation zones for spring/fall range, and the high elevation zones for summer/fall range. Some allotments support year-round operations while others are used only seasonally.

The earliest that grazing is allowed in the spring is March 1 but can be as late as June 20 depending on elevation. When available livestock forage or water is depleted, grazing use ceases and livestock are then removed from the allotment or moved to higher elevational rangeland.

The majority of the public lands in the EIS area (79 percent) are grazed by cattle with nearly equal amounts used in the spring, summer, fall, and sometimes in winter (Table 3-19). Approximately 90 percent of this use occurs on allotments having continous cattle use from spring through fall and those having yearlong use.

Sheep grazing occurs on 19 percent of the public lands in the EIS area with 80 percent of the use occurring on spring, fall, and/or winter ranges. Spring and winter ranges each contribute approximately 18 percent of the total area used. Sheep operations generally involve winter through spring grazing on BLM lands with sheep being moved to higher elevations, BLM, or Forest Service lands for summer grazing. Sheep are again moved from summer ranges to lower elevation ranges in the fall to complete the yearly cycle. Lambing normally occurs on public and private land while winter feeding, when necessary, occurs on private or state land with some supplemental or emergency winter feeding occurring on public lands.

Grazing by domestic horses occurs on 149 acres of the EIS area in spring, summer, and fall. Allotments grazed by both cattle and sheep total 2 percent of the area.

Presently, livestock trailing occurs along the White River (State Highway 64), Dragon Road, Staley Mine Road, and Victory (U.S. Highway 40) stock trails and on the Yellowjacket Pass and Flag Creek stock driveways. The White River trail including Dragon Road and Staley Mine Road contains 5,440 acres of public land with an average licensed trailing use of 2,144 AUMs. The Victory trail contains 3,520 acres on public land with an average licensed trailing use of 1,394 AUMs. The Yellowjacket Pass and Flag Creek stock driveways each contain 320 acres of public land with 106 AUMs of trailing use each.

The stock trails are used to move livestock (sheep) to and from winter and spring ranges near Rangely including winter/spring ranges in Utah. The stock driveways are used as overnight stops for livestock being trailed to and from the White River National Forest.

Livestock operations have evolved around the use of public lands (BLM) and intermingled private and state lands for the base of a range livestock operation. Hay is produced on private lands providing feed during periods (winter) when livestock are not on public land. Winter feeding is normally carried out from November through April.

Amounts of grazing use varies among permittees with some permittees utilizing all animal unit months authorized while some do not utilize their full authorized use. Average active livestock use in the EIS area normally amounts to 132,278 AUMs (based on a five year average excluding trailing use of 3,750 AUMs) which is 23,706 AUMs below maximum authorized use of 155,984 AUMs. The 23,706 AUM difference is primarily the voluntary non-utilization of authorized use by livestock permittees. Present authorized and active livestock use in Table 3-19 summarizes total livestock use available by period of use (See Appendix B for use by allotment).

Range suitability is a major problem in the EIS area. Livestock distribution is severely hampered by steep, rugged terrain, most of which lies along the major tributaries draining the area. Based on BLM suitability guidelines, which take into account degree of slope, erosion susceptibility of soils, vegetation cover, and water availability, 621,945 acres are suitable for livestock grazing while 678,306 acres are unsuitable. The remaining 220,555 acres are considered potentially suitable. Potentially suitable ranges are areas that have adequate forage but lack water or access necessary to manage livestock effectively. When range improvements are developed in these areas, potentially

TABLE 3-19
EXISTING LIVESTOCK GRAZING USE

Kind of Livestock & Period of Use	No. of Allot-ments	Acres Public land	Acres Other Owner-ship	Present Authorized Livestock Use (AUMs)	Active Licensed Livestock Use
EXISTING INTENSIVE MANAGEMENT AREAS					
Cattle Spring/Summer/Fall	2	23,359	2,806	3,879	2,923
Cattle Spring/Summer/Fall/Winter	4	133,112	23,883	10,241	10,023
Total	6	156,471	26,689	14,120	12,946
EXISTING LESS INTENSIVE MANAGEMENT AREAS					
Cattle Spring	6	51,208	10,680	3,413	2,271
Cattle Spring/Summer	10	16,315	23,231	2,149	1,967
Cattle Spring/Summer/Fall	35	151,798	86,732	19,369	17,868
Cattle Spring/Summer/Fall/Winter	15	729,515	161,422	66,592	59,453
Cattle Spring/Fall/Winter	7	55,866	20,168	4,887	4,255
Cattle Summer/Fall	6	19,999	9,742	3,281	2,778
Cattle Fall/Winter	2	9,443	1,416	805	807
Total	81	1,034,144	313,391	100,496	89,399
Sheep Spring	1	9,070	720	758	451
Sheep Spring/Summer	2	1,152	2,560	298	298
Sheep Spring/Summer/Fall	11	8,301	41,565	2,533	2,450
Sheep Spring/Summer/Fall/Winter	4	5,742	18,726	1,557	1,558
Sheep Summer/Fall	1	450	1,760	113	113
Sheep Spring/Fall/Winter	7	46,818	11,356	5,588	4,184
Sheep Spring/Winter	17	201,671	33,734	25,111	16,096
Sheep Winter	4	11,314	2,152	1,017	907
Total	47	284,518	112,573	36,975	26,057
Cattle & Sheep Spring/Summer/Fall	3	19,584	14,234	2,746	2,310
Cattle & Sheep Spring/Summer/Fall/Winter	1	14,100	456	1,622	1,541
Horses Spring/Summer/Fall	1	149	160	25	25
Total	5	33,833	14,850	4,393	3,876
Total Less Intensive	133	1,352,495	440,814	141,864	119,332
Stock Driveways	--	9,600	--	3,750	3,750
Unallotted	--	3,240	--	0	0
EIS Area Total	139	1,521,806	467,503	159,734	136,028

suitable range would become suitable for livestock grazing.

Water availability, like topography, is a major problem affecting livestock grazing in the EIS area. Lack of water limits use periods and distribution of livestock and lowers carrying capacity of the range. Lack of access, associated with rough terrain and lack of fencing, are problems associated with lack of water which lower the productivity of the rangeland resource along with livestock production.

Agriculture

Agriculture in the EIS area has been a major income of private landowners in the past, however, energy development is becoming increasingly important. Currently there are 36,000 acres of irrigated and 25,000 acres of nonirrigated farmlands. An additional 48,000 acres are in irrigated pasture and hay production and 10,000 acres of non-irrigated pasture and hay production. Cash values of cultivated crops vary from $500 to $1,500 per acre. The majority of crop production is on bottomlands where irrigation water is available.

Forestry and Forest Products

Pinyon-juniper stands that are suitable for management for wood products occur on 266,250 acres throughout the EIS area and support an average of eight cords of wood products per acre. These occur on slopes of 25 percent or less and are often the same areas recommended for conversion to grassland. Demand for pinyon and juniper includes firewood, posts and poles, and Christmas trees. Average annual utilization of pinyon and juniper for firewood from 1973-1977 was 493,000 board feet. Demand for pinyon is generally five times greater than for juniper.

Wilderness

The Federal Land Policy and Management Act of 1976 (FLPMA) requires BLM to review all public lands to determine areas with wilderness characteristics as described in the Wilderness Act of 1964 and to recommend these areas to Congress as suitable or nonsuitable for preservation as wilderness. Congress and the President make final wilderness designations.

BLM's wilderness inventory involves several phases. After an inventory of all roadless lands of 5,000 acres or more, areas identified as having wilderness characteristics are designated as proposed Wilderness Study Areas (PWSAS). Wilderness Study Areas (WSAs) are designated by the BLM State Director after public meetings and a comment period. Each WSA is then evaluated to identify areas to be recommended to Congress.

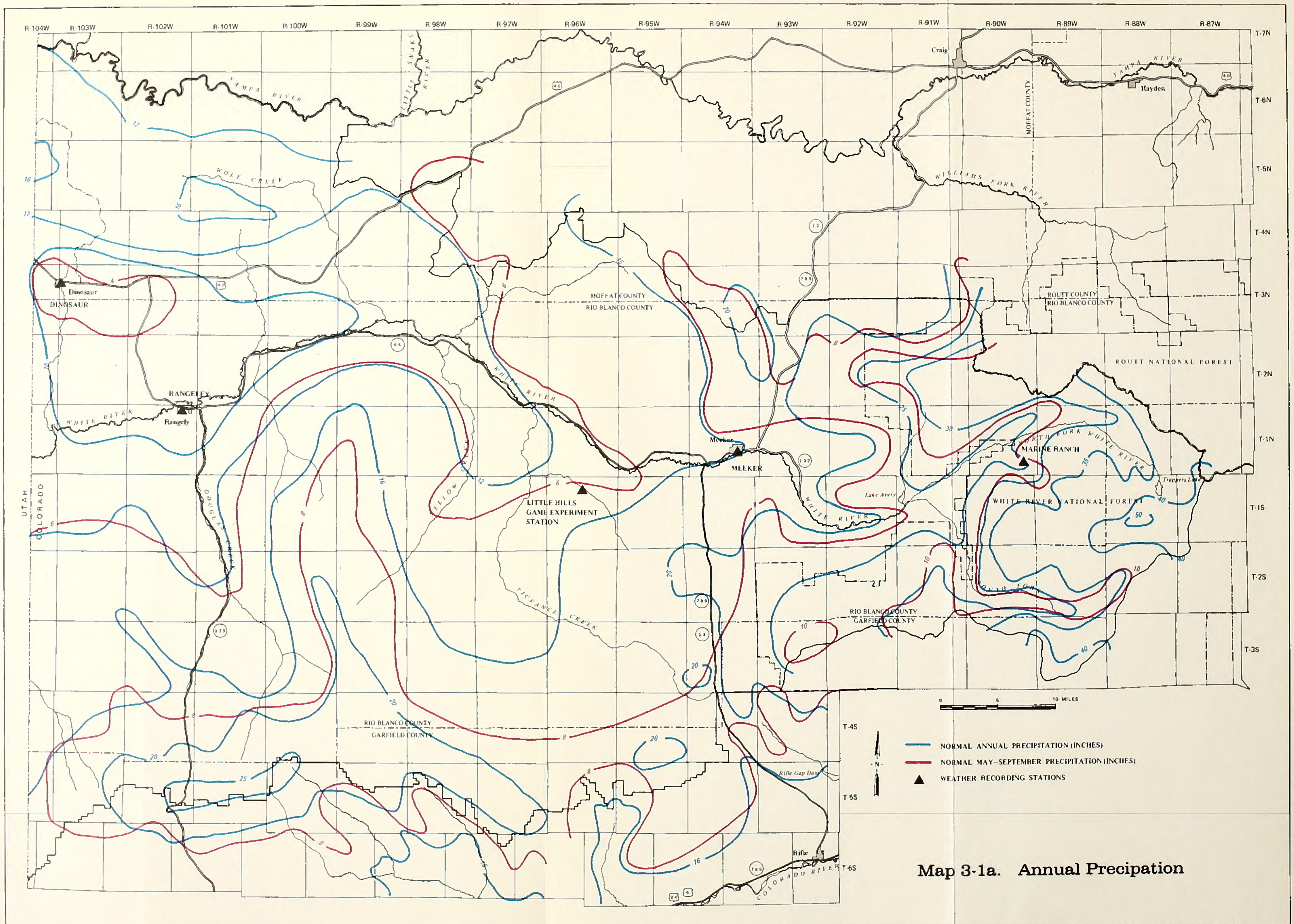
Six wilderness study areas totaling 74,616 acres have been recommended for intensive inventory (Map 3-15). Table 3-20 shows the livestock allotments within the WSAs. Supporting documentation and procedures for the BLM wilderness inventory are on file in the BLM Craig District Office.

Until Congress acts on an area that has been recommended for wilderness designation existing multiple-use activities, including grazing and supporting activities, will continue. New uses or expanded existing uses will be allowed if the impacts will not impair the suitability of the area for wilderness.

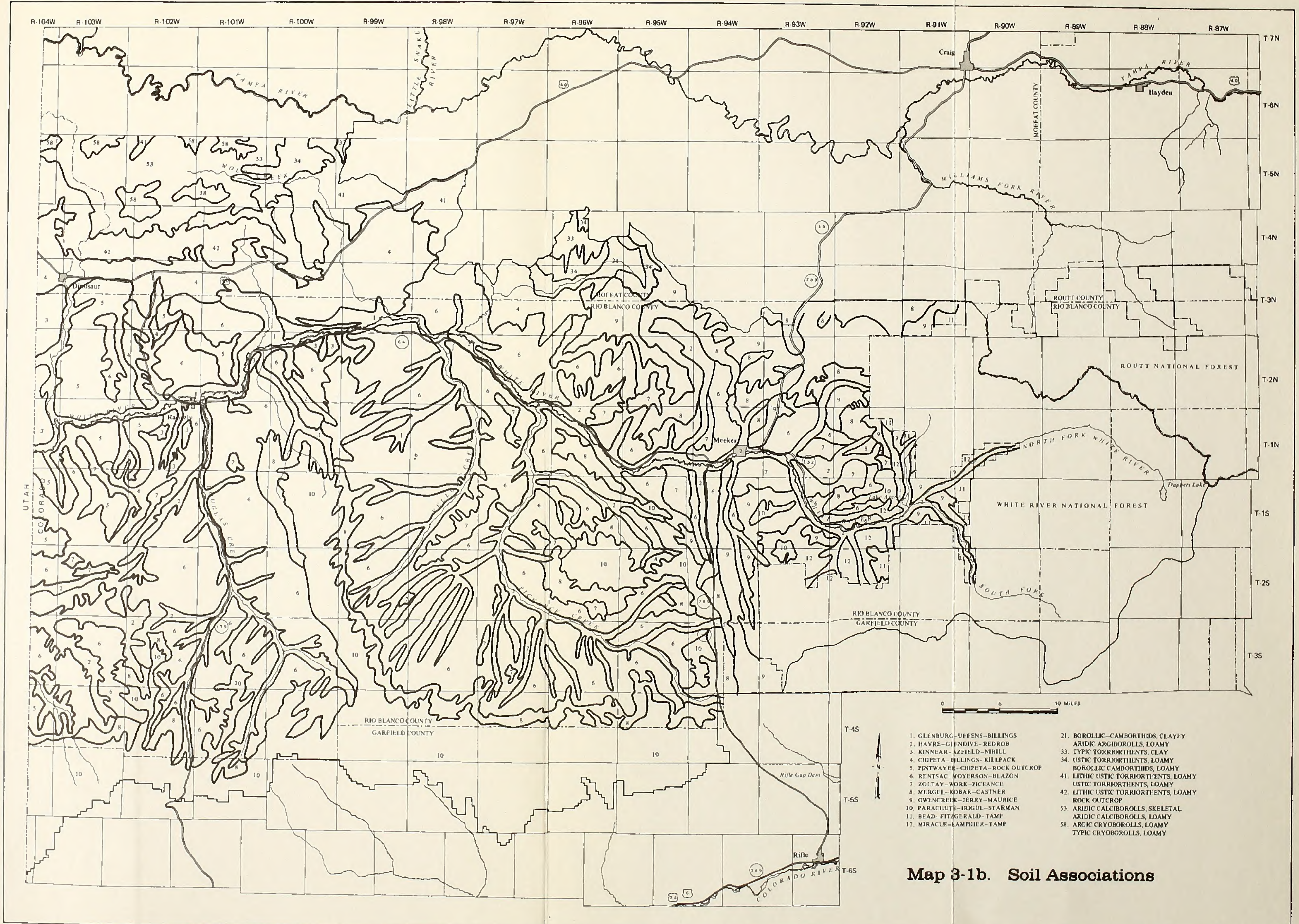
The key factors used to identify wilderness values were size (at least 5,000 contiguous roadless acres), naturalness, and the outstanding opportunity for solitude or for a primitive and unconfined type of recreation.

TABLE 3-20
ALLOTMENTS IN WILDERNESS STUDY AREAS (WSAs)

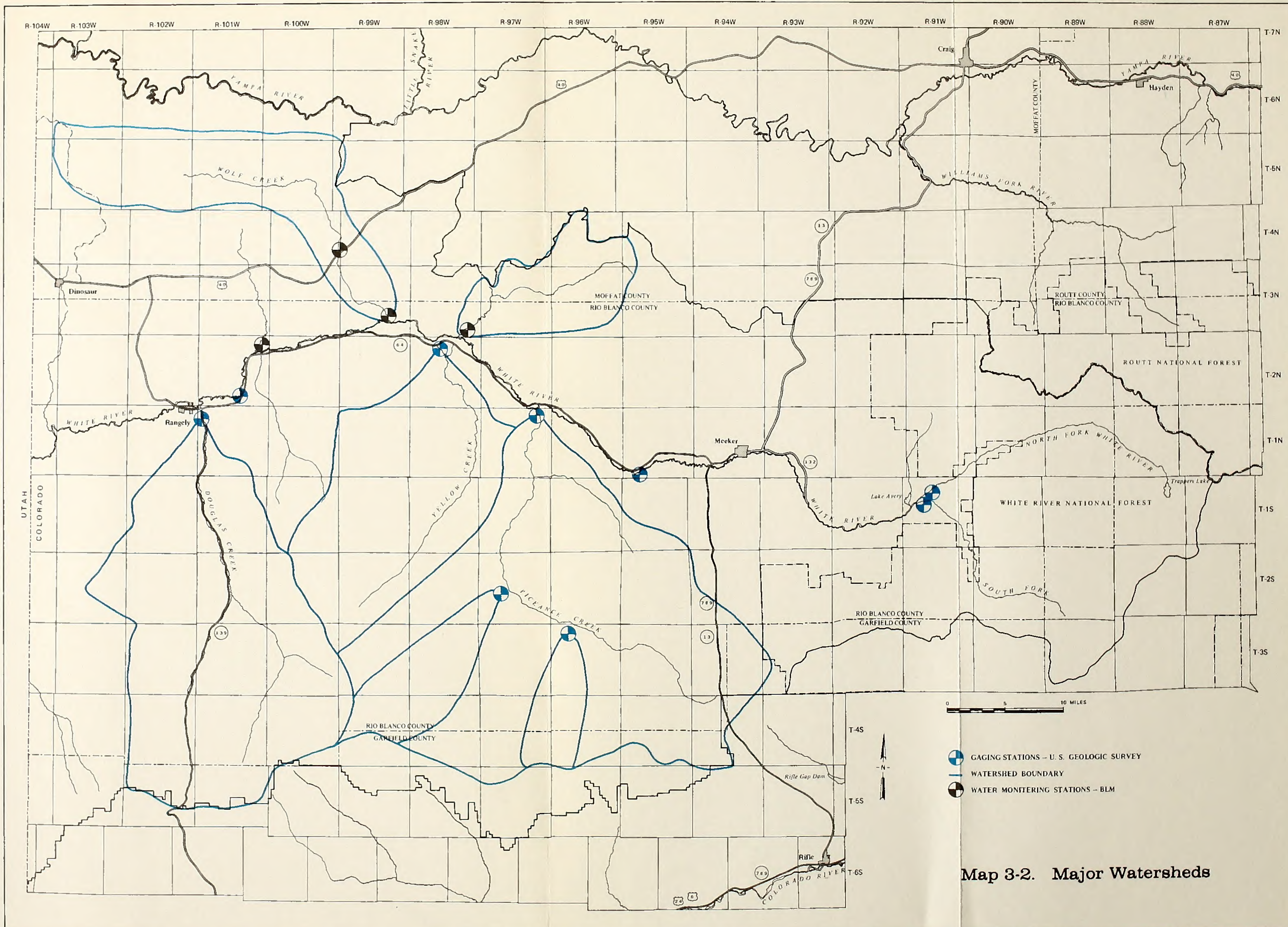
WSA No.	WSA Name	Public Land Acreage	ALLOTMENT No.	ALLOTMENT Name
1	Bull Canyon	11,777	6304	Basin Springs
			6307	K Ranch
2	Willow Creek	14,008	6307	K Ranch
			6308	Artesia
			6323	Wolf Creek
3	Skull Creek	13,740	6308	Artesia
			6322	Skull Creek
			6323	Wolf Creek
7a	Black Mountain	5,077	6612	Black's Gulch
			6613	Upper Smith Gulch
			6621	Lower Smith Gulch
7c	Windy Gulch	12,274	6613	Upper Smith Gulch
			6614	West Strawberry
			6615	Strawberry Peak
			6619	Villa Individual
			6620	Jordan Gulch
			6623	Anderson Individual
46	Oil Spring Mountain	17,740	6346	Twin Buttes
			6357	Evacuation Creek
	Total	74,616		



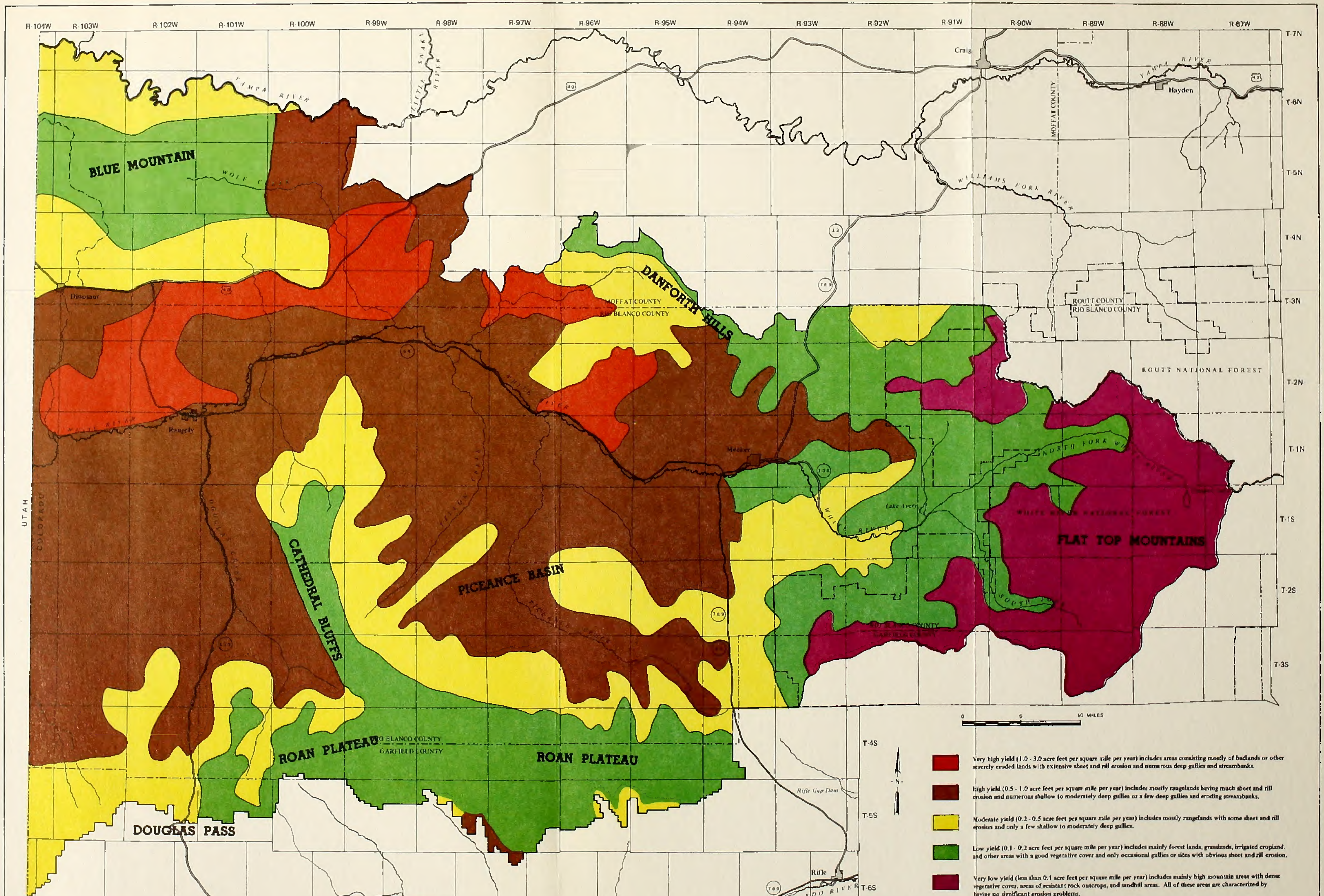
Map 3-1a. Annual Precipation



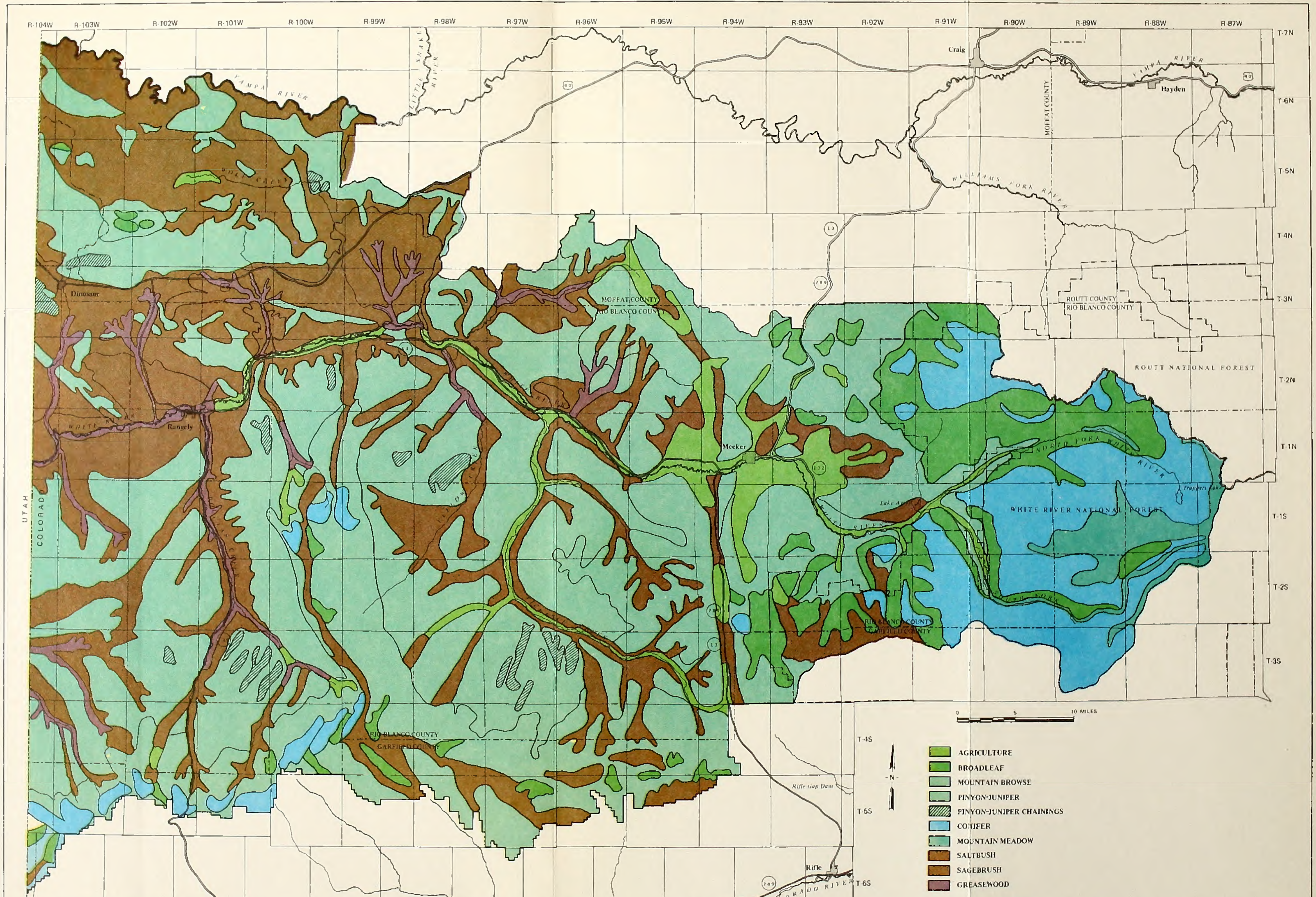
Map 3-1b. Soil Associations



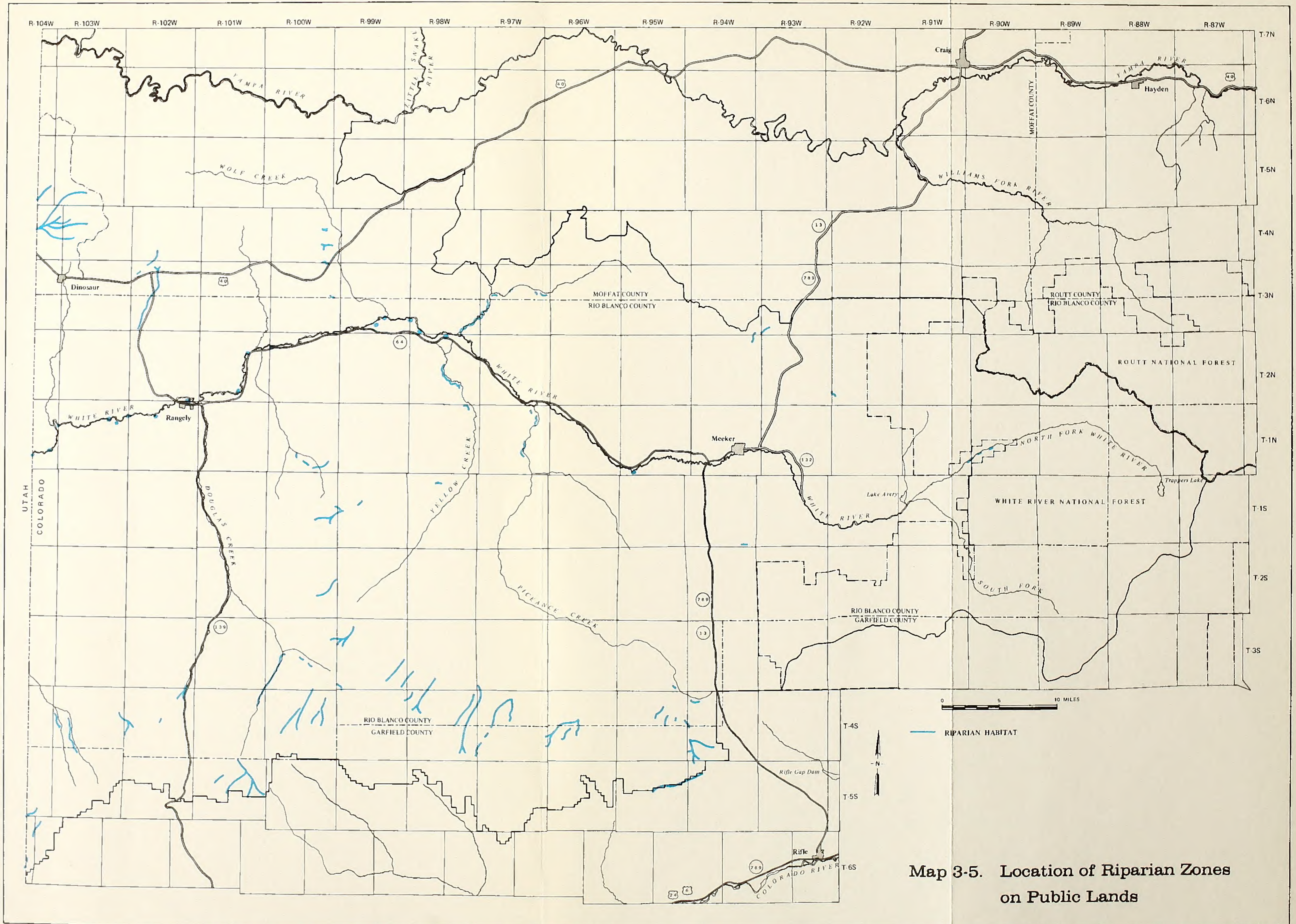
Map 3-2. Major Watersheds



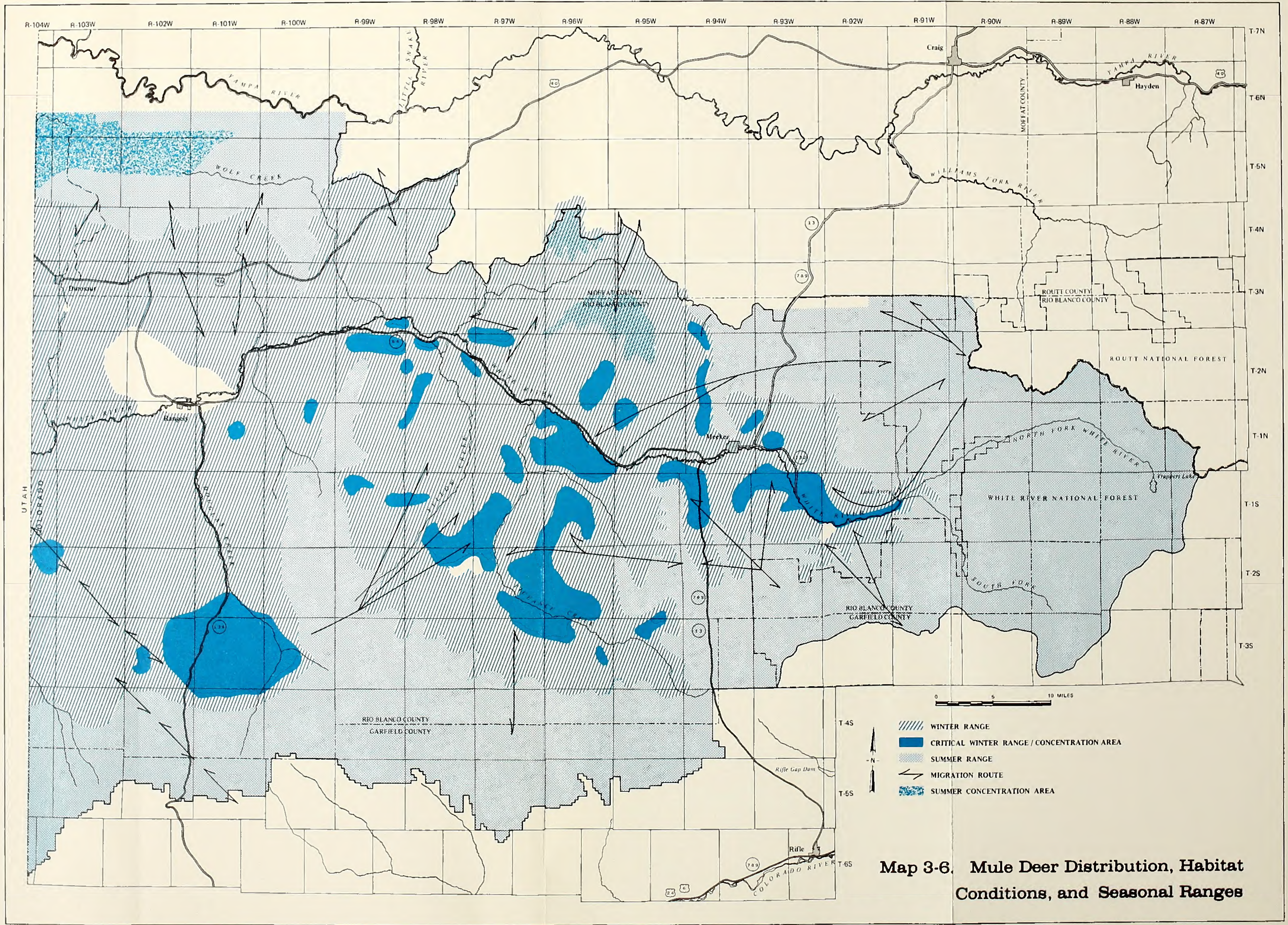
Map 3-3. Sediment Yields



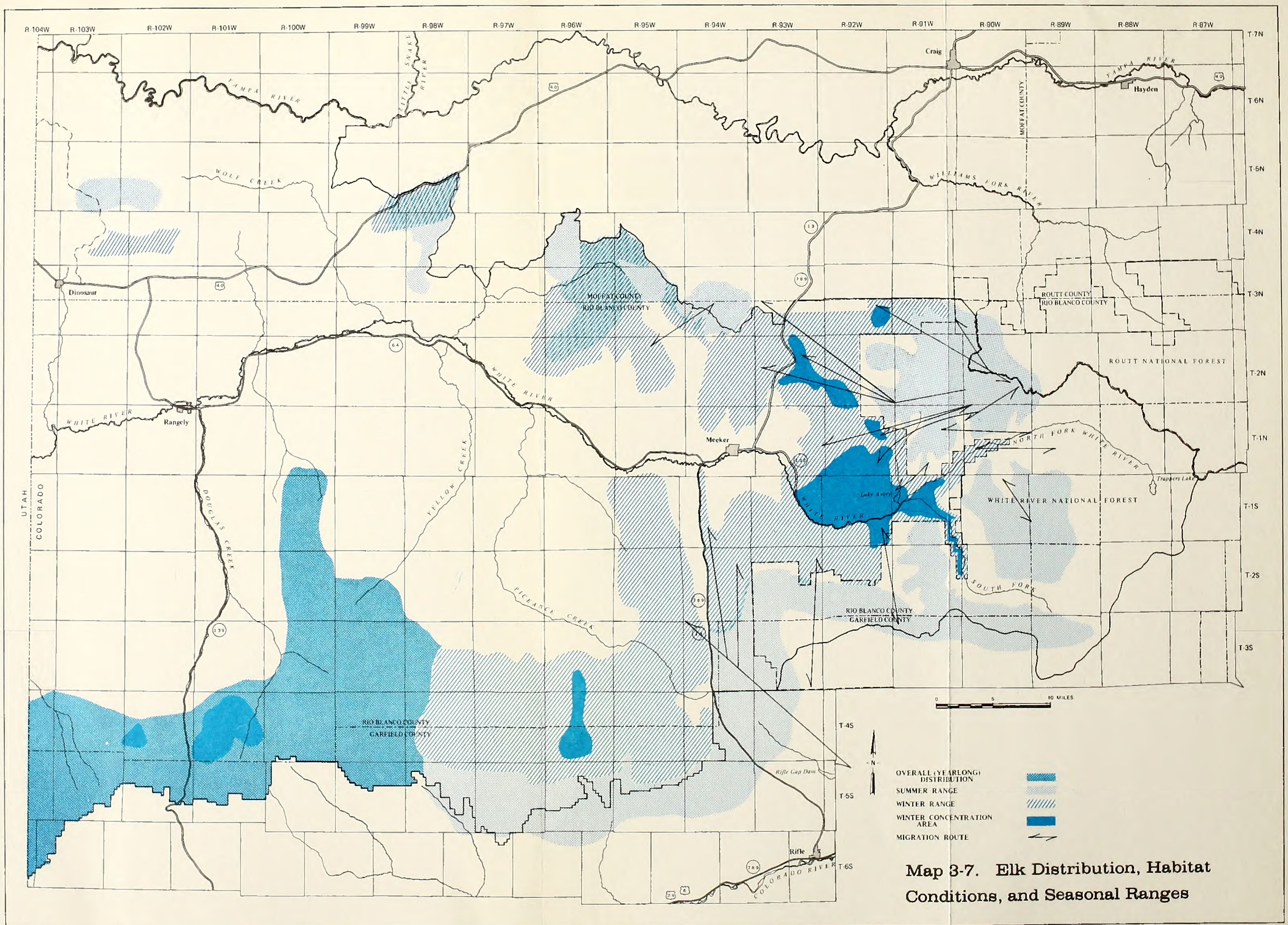
Map 3-4. Vegetation Types



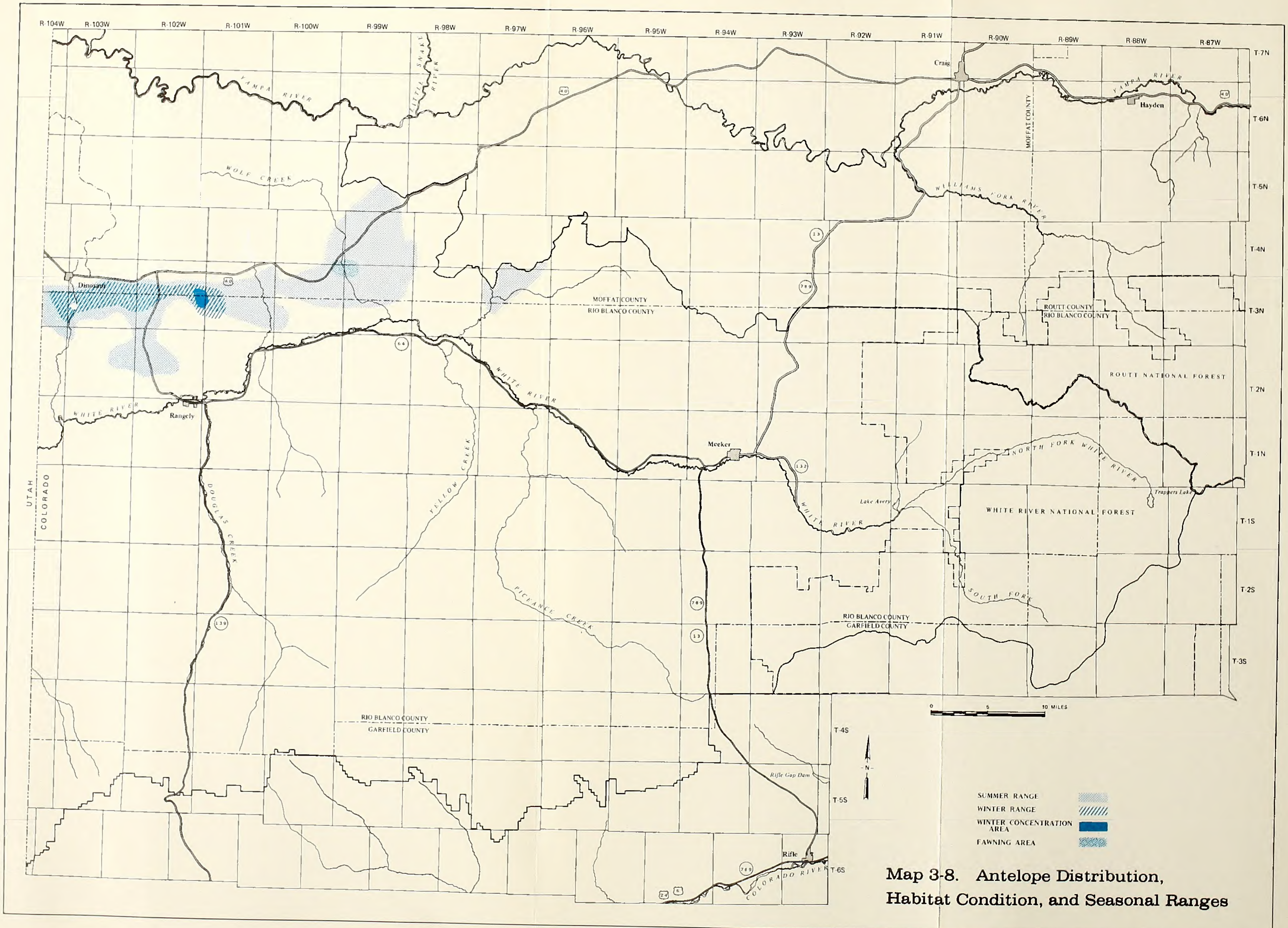
Map 3-5. Location of Riparian Zones on Public Lands



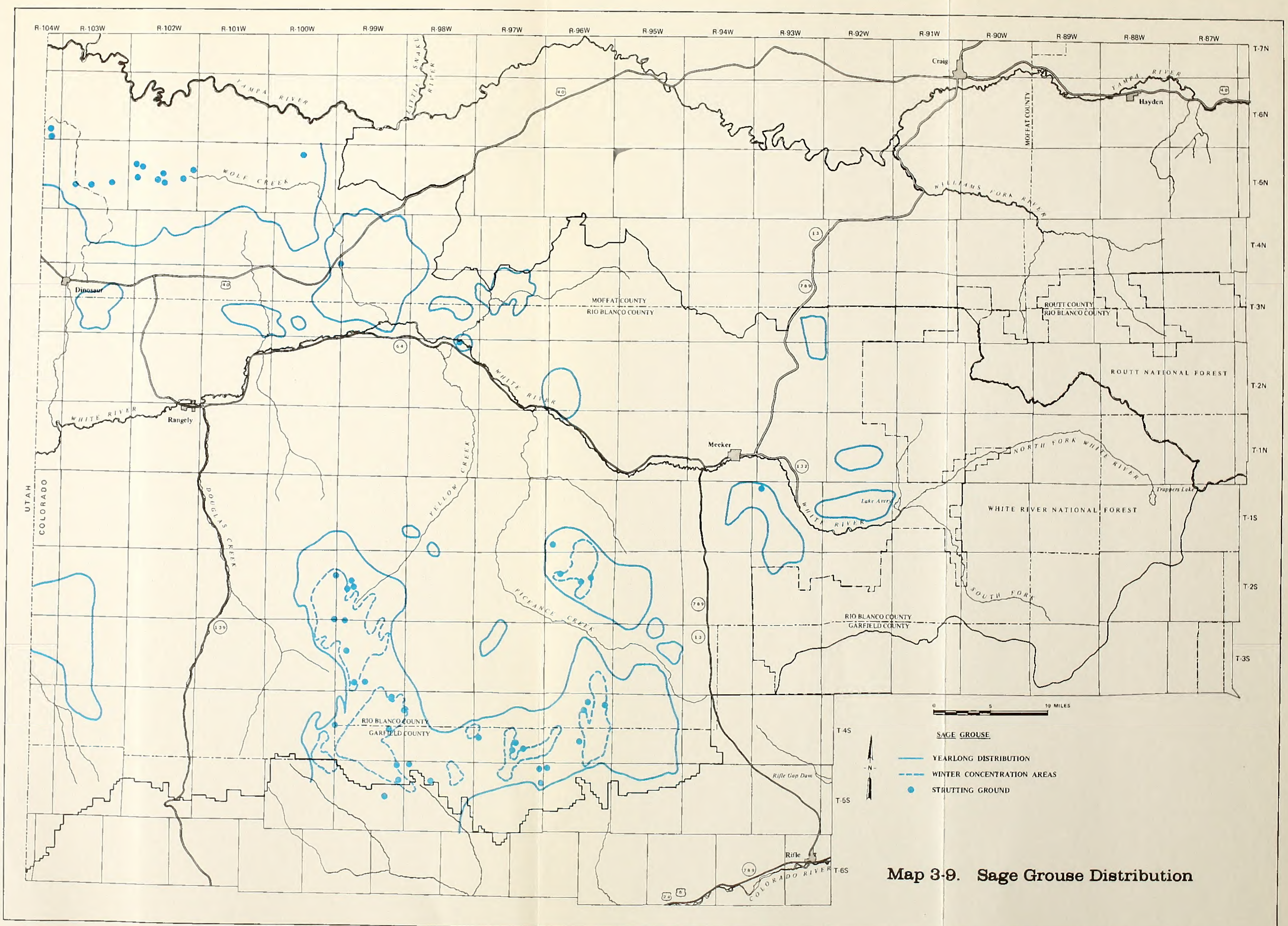
Map 3-6. Mule Deer Distribution, Habitat Conditions, and Seasonal Ranges



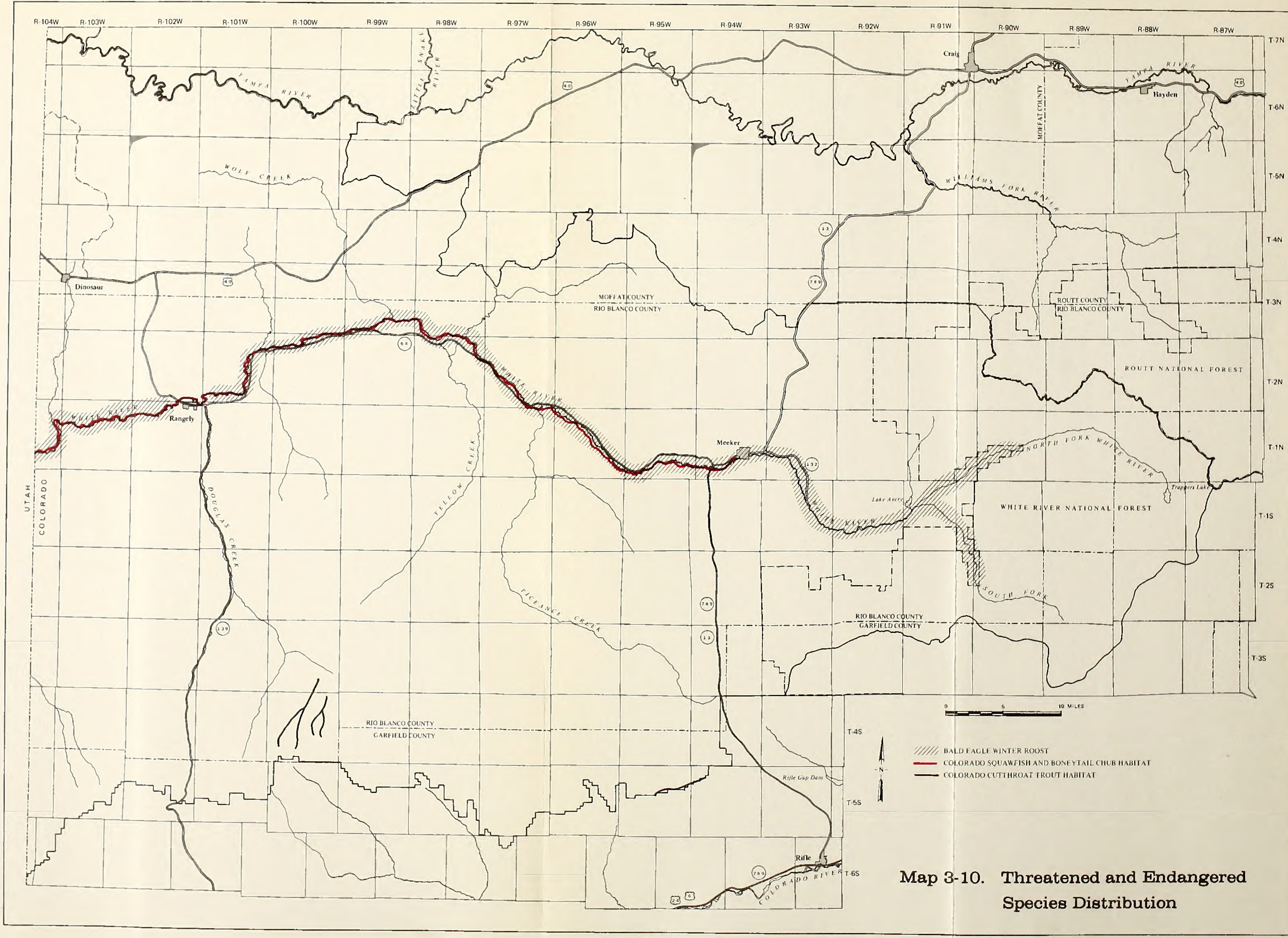
Map 3-7. Elk Distribution, Habitat Conditions, and Seasonal Ranges



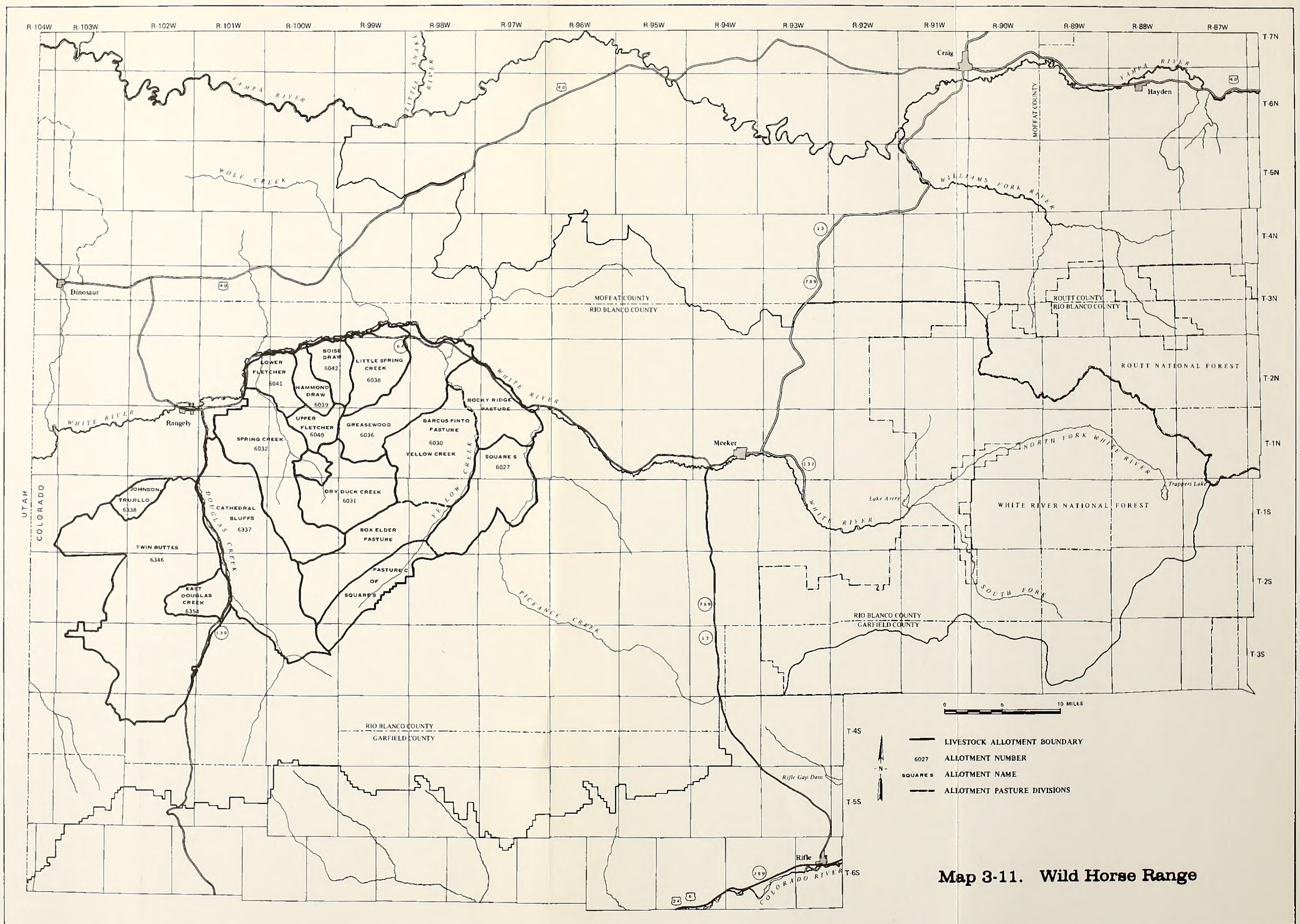
Map 3-8. Antelope Distribution, Habitat Condition, and Seasonal Ranges



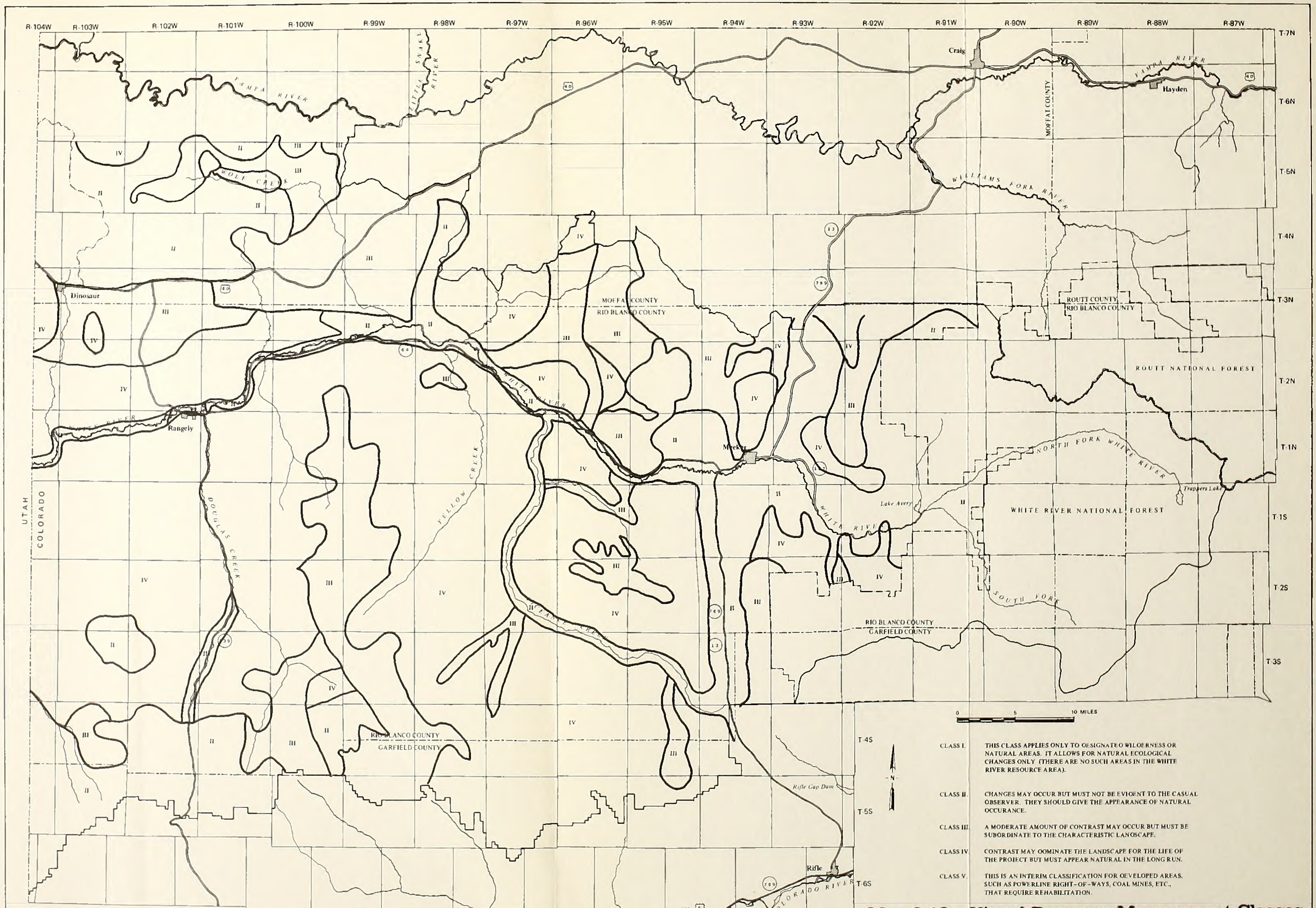
Map 3-9. Sage Grouse Distribution



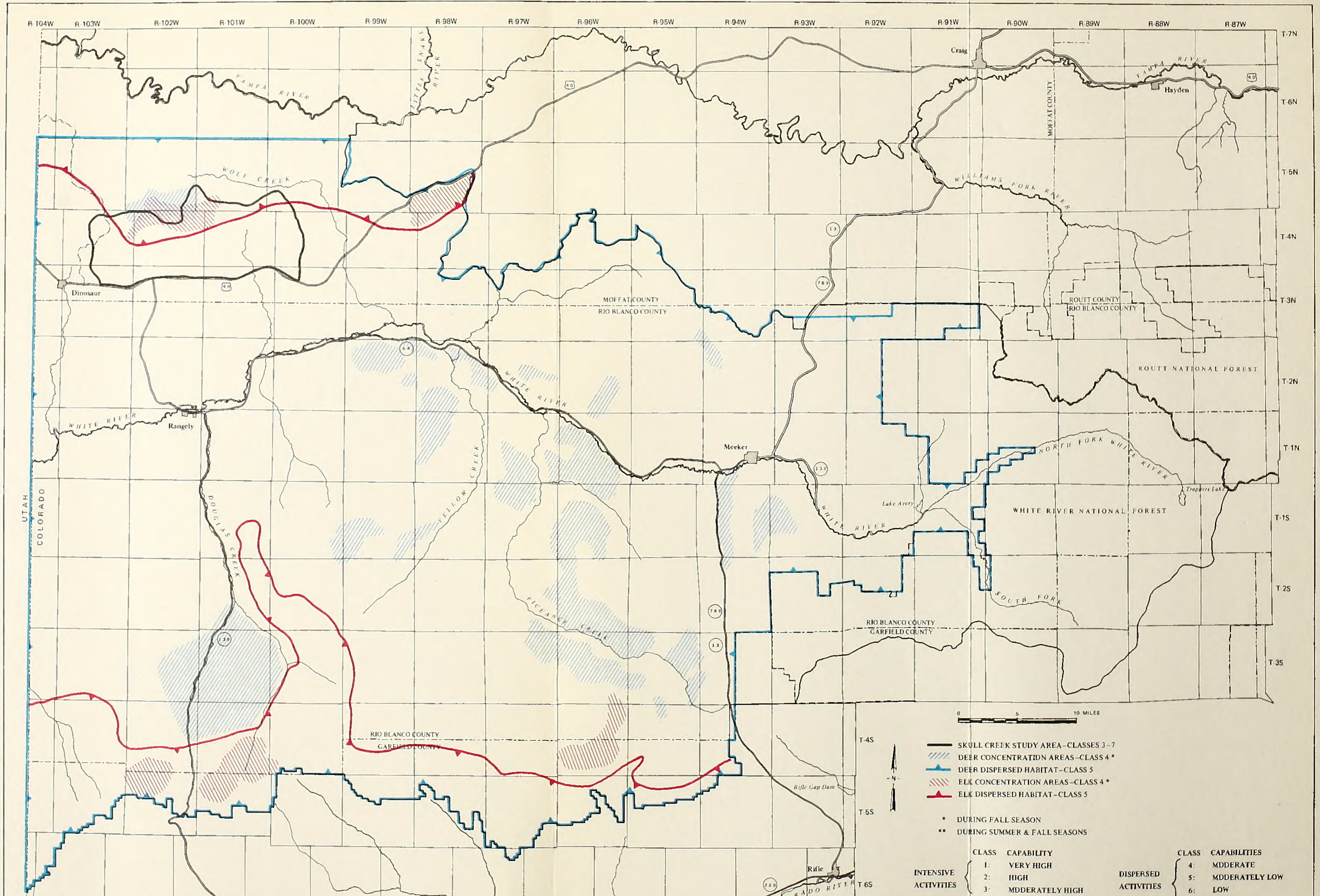
Map 3-10. Threatened and Endangered Species Distribution



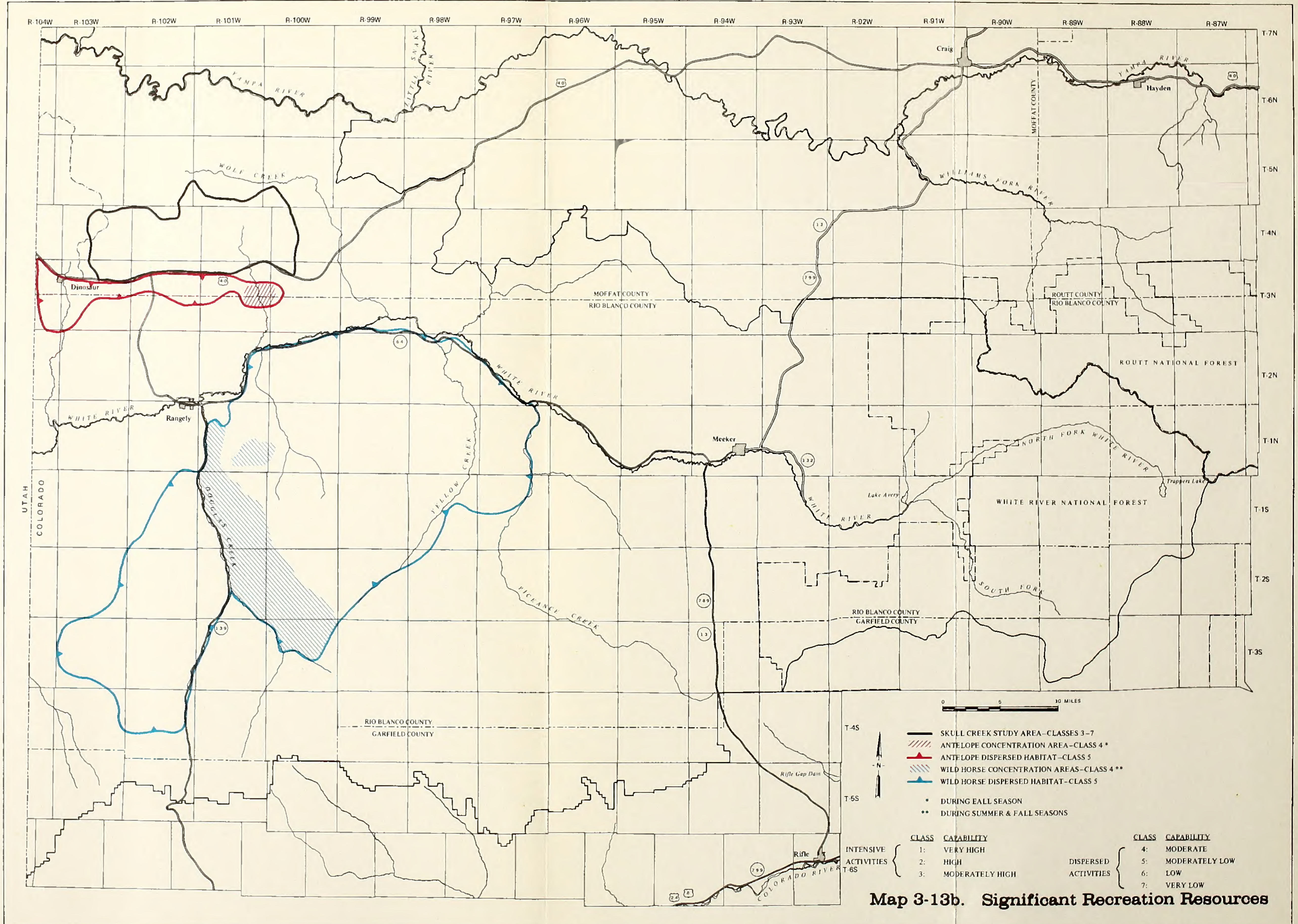
Map 3-11. Wild Horse Range



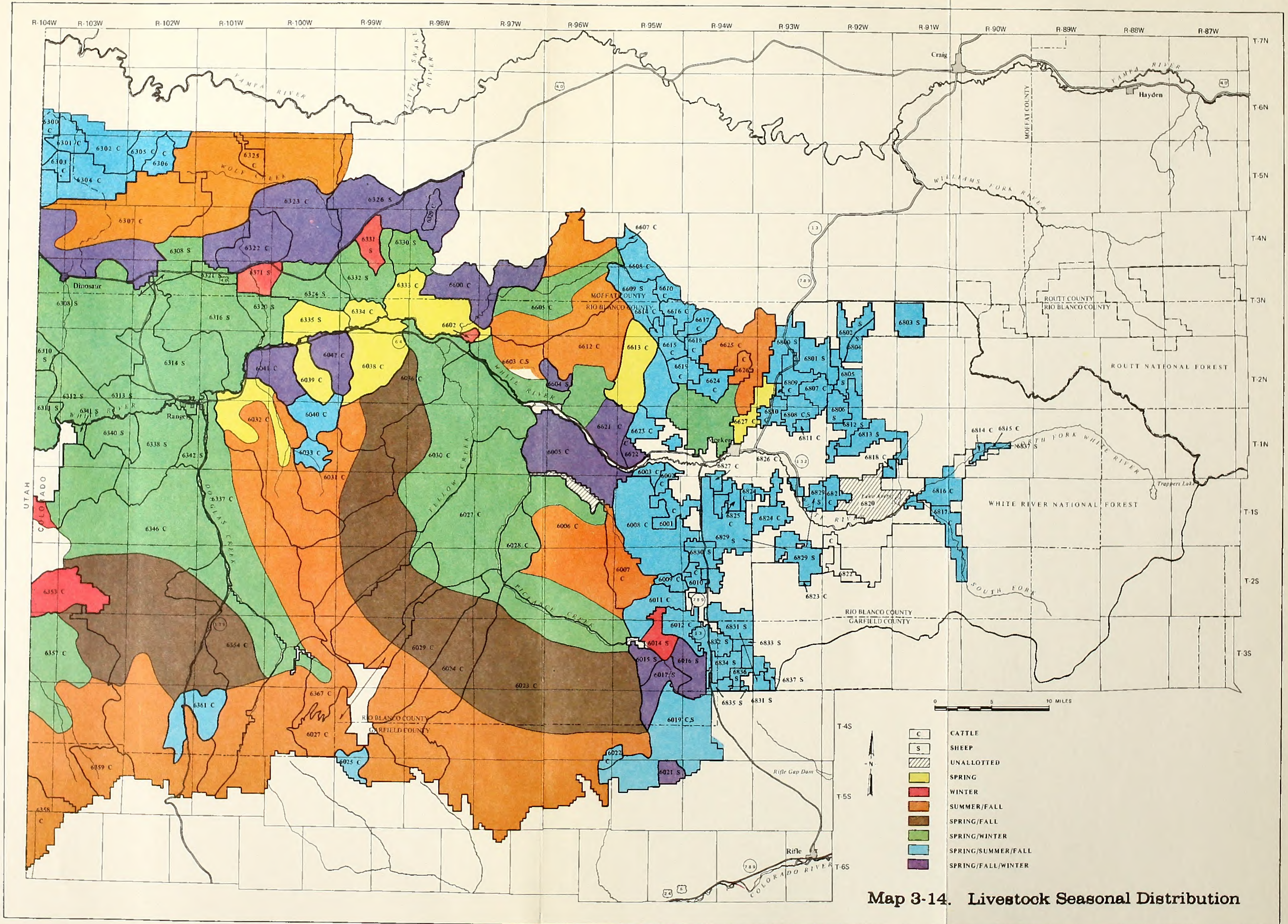
Map 3-12. Visual Resource Management Classes



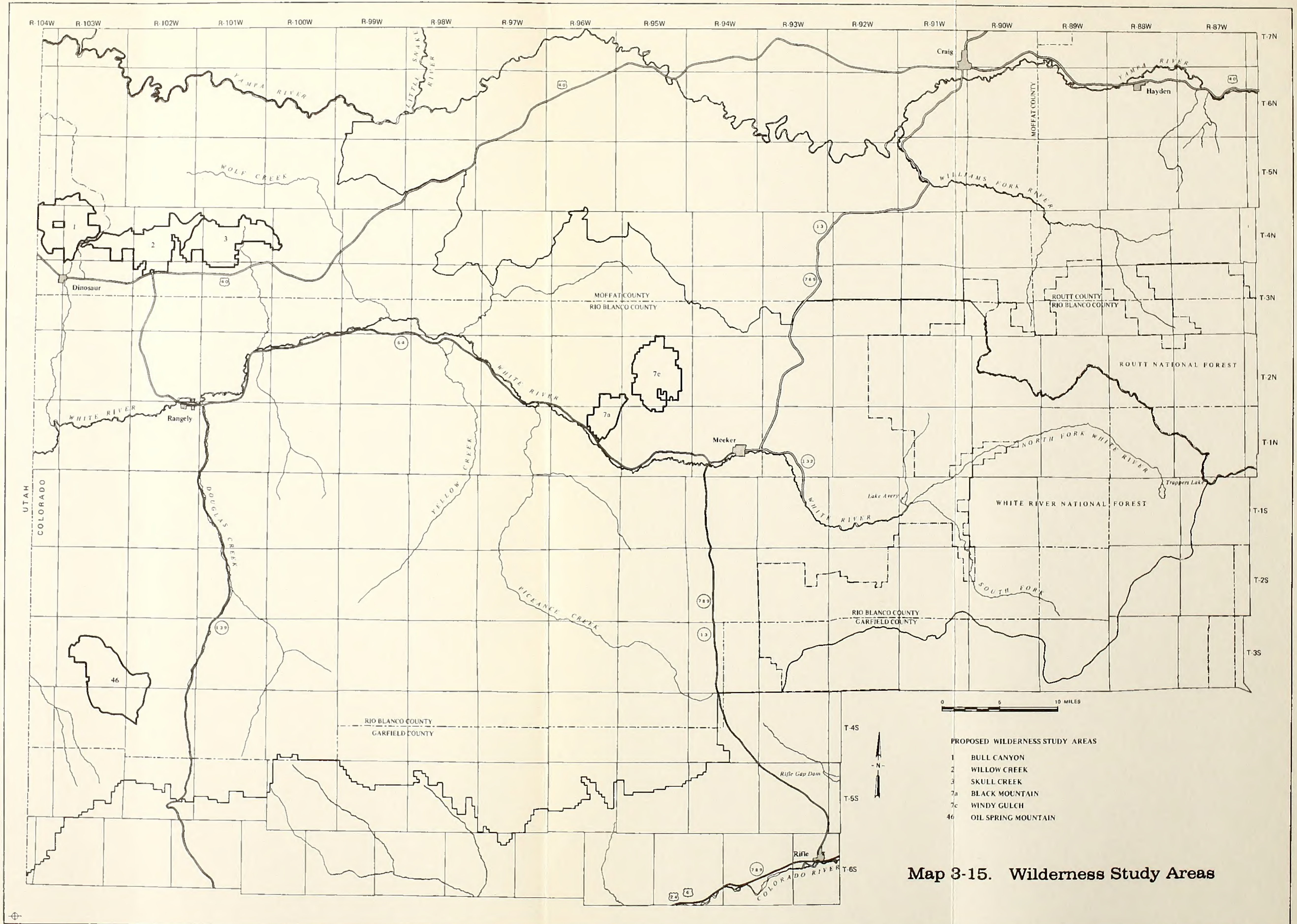
Map 3-13a. Significant Recreation Resources



Map 3-13b. Significant Recreation Resources



Map 3-14. Livestock Seasonal Distribution



Map 3-15. Wilderness Study Areas

Section 4

ENVIRONMENTAL CONSEQUENCES

SECTION 4

ENVIRONMENTAL CONSEQUENCES

Section 4 analyzes the environmental consequences of the six alternatives described in Section 2.

Through analysis of each alternative, impacts to several resources and resource uses were identified as being insignificant. These resources include (1) climate, (2) topography, (3) geology, (4) mineral development, (5) paleontological resources, (6) transportation or the transportation network, and (7) human settlement. These resources or uses will not be discussed further.

ASSUMPTION AND ANALYSIS GUIDELINES

In order to facilitate analysis of impacts and establish various bases from which all alternatives can be judged equally, essential assumptions and guidelines were developed as follows:

1. Short term impacts are those which would occur during the 8 year implementation period and long term impacts are those occurring in 20 years when objectives are expected to be realized.

2. Implementation would occur over an 8 year period except for Alternative B (No Action) in which the present management program would continue and for Alternative C (Elimination of Livestock Grazing) which would take place over a 3 year period.

3. BLM would have the necessary funding and manpower required to implement the alternative selected as the grazing management program for the EIS area.

4. BLM would receive sufficient funding to maintain new and existing improvements, and to make revisions in AMPs as necessary.

5. Allotment management plans (AMPs) would be prepared and implemented over a 5 year period (1980-1985) following completion of the final EIS.

6. All range improvements, support facilities, and vegetation manipulations would be implemented within 8 years of approval of the final EIS.

7. Standard operating procedures discussed in Section 2 and design restrictions discussed in Appendix A would be incorporated into the design and implementation of range improvements.

8. BLM would verify the level of impacts and monitor the AMPs for the purpose of making necessary adjustments in those plans which are not meeting the desired multiple use objectives.

9. Wild horse removal and management plans would be prepared within 3 years to meet the management levels of the various alternatives. An Environmental Assessment would be prepared on these removal plans.

10. Colorado Division of Wildlife would properly manage wildlife populations to not exceed the habitat carrying capacity.

11. Due to the difficulty of predicting future livestock market conditions, an assumption that current market conditions would prevail is necessary for the economic analysis. Any future changes in livestock market conditions would be a result of variables outside the alternatives discussed in this statement.

12. The base data for determining vegetation condition, trend, and production is the most reliable data presently available. Available data were used whenever applicable and extrapolated to areas for which no data were available.

ALTERNATIVE A - ACTION PROPOSAL

Impacts on Air Quality

Implementation of Alternative A would result in short term adverse impacts and long term beneficial impacts to air quality. The adverse impacts would come about through the burning and chemical treatments proposed for the various vegetation types and through wind erosion following surface disturbances caused by the mechanical treatments on vegetation, and construction of fences and water facilities. The beneficial impacts would result largely from revegetation on the treated areas.

Impacts from these prescribed burns would result in the release of heat, particulate matter, and gases. Gases released would be comprised primarily of carbon monoxide, nitrogen and sulfur oxides, and hydrocarbons. The major atmospheric problem would be a reduction in visibility caused by condensed vapor and particulates which combine to form smoke. Particulates and carbon monoxide would pose a health problem in the immediate area of the burn but would be a matter of concern only for those persons working near the fire (Martin and Dell 1978).

Hydrocarbons, nitrogen oxides, and sulfur oxides would be present in minute quantities and would not pose a health problem. Impacts would generally be felt over the immediate area of the treatment and would decrease rapidly with distance. Dispersion of pollutants associated with the prescribed burning treatments could be slowed due to the inversions which occur normally in the EIS area. Impacts following a prescribed burn are generally short lived, however, it might take several days for the pollutants to completely disperse in areas where the topography is suited for inversions, and horizontal dispersion is blocked.

Without information to make quantitative predictions for emissions of prescribed burns, it would be presumptive to state that federal and state air quality standards would not be violated (U.S. Forest Service 1979). The probability of violations would be averted, however, by complying with BLM design restrictions and the "Memorandum of Intent" agreed upon by the BLM and the Colorado Air Pollution Control Division. Compliance with these takes into account both meteorologic and topographic factors. Consideration for federal Class I areas would also be a factor. Prior to any prescribed burn, a site specific environmental assessment would be made to insure compliance with state and federal standards.

The proposed chemical treatment calls for the use of 2, 4-D applied aerially. Since wind conditions must be very light to spray aerially, dispersion of 2, 4-D to areas outside the treated area would be negligible. Impacts to air quality would occur during the period immediately following the application, but would be reduced as the spray settles out. Impacts from the amount of 2, 4-D that remains airborne would be negligible.

CONCLUSION OF IMPACTS ON AIR QUALITY

Minimal impacts to air quality would occur following the proposed land treatments. Adverse impacts would consist of introduction of gases and particulates into the atmosphere immediately following a prescribed burn, and introduction of dust particles through wind erosion on disturbed areas. Night inversions would prevent immediate dispersal of pollutants where topography restricts horizontal dispersion. Impacts from applications of 2, 4-D by aerial spraying would be minimal. All of these impacts would be temporary, with the most severe case lasting several days at most.

Impacts on Soils

Soil productivity, the ability of the soil to produce vegetation, is expected to improve as vegetation condition improves. Since vegetation production is expected to increase over the long term by 20 percent, soil productivity would increase by a similar amount. Approximately 53 percent of the EIS area soils are of medium to high potential productivity with 47 percent having low potential productivity.

The Musgrave equation was used to show the change in on-site erosion (Appendix D, Table D-1). Soil movement on public lands is approximately 0.18 in/yr (31.8 tons/acre/year) and is due to rainfall characteristics, the erodibility of the soil, and vegetation cover which would be modified by the grazing treatments, level of grazing management, period of use, utilization levels, and vegetation manipulations.

The intensive land management practices proposed would reduce soil stability by an unquantifiable amount in the short term. However, improved vegetation conditions resulting from the minimum rest requirements and reduction in spring grazing is expected to reduce on-site erosion by an average of 1.6 tons/acre/year (Appendix D, Table D-1) in the long term. Increased vegetation cover during the first 20 years (Reardon and Merrill 1976) would decrease soil compaction from livestock grazing.

Pinyon-juniper and sagebrush treatments are suitable for certain soils. Hessary and Gifford (l979) found approximately 50 percent of the sagebrush treatments studied show increases in annual vegetation production on loam soils. Public land in the EIS area contains approximately 2ll,300 acres of soils with loam surface textures. Data on soil surface textures for the impacted area are found in soil interpretations records on file with the Soil Conservation Service or the BLM.

Short term erosion conditions would remain essentially the same using chemical treatments because vegetation cover and litter would not be disturbed. Meeuwig (1970) found differences in vegetation and litter cover could account for 76 percent of the variance in rates of soil erosion. Erosion over the long term is expected to decrease due to increased herbaceous understory production and organic matter on the soil surface.

A short term impact lasting two to four weeks could be expected from 2, 4-D herbicide applications. Once chemical substances enter the soil they become part of a cycle that affects all forms of life (Brady 1974).

Prescribed burning on sagebrush, pinyon-juniper, and existing pinyon-juniper chainings would reduce vegetation cover in the short term, resulting in higher compaction rates, lower water infiltration rates, and higher sediment production (Buckhouse and Gifford 1976) for the 48 allotments affected. Short term soil erosion rates could increase by 1.1 to 7.6 times that of present conditions (Roundy et al. 1978). Measured infiltration rates have indicated that soils in unburned areas absorbed water at a rate nearly three times faster than soils in burned areas (Dyrness 1976). These conditions would decrease the soils' productivity potential in the short term by an unquantifiable amount.

Soil temperatures for up to three months following burning are generally higher on burned surfaces, decreasing seedling establishment and increasing soil erosion conditions (Nimir and Payne 1978). Burning during cool and wet seasons of the year would reduce loss of litter, and therefore, maintain higher infiltration rates (Debano, Savage and Hamilton 1976) and lower sheet erosion rates (Roundy et al. 1978).

CONCLUSION OF IMPACTS TO SOILS

On a long term basis, the action proposal would result in a reduction of present on-site erosion by an average of 1.6 tons/acre/year in the EIS area. Increased vegetation cover during the first 20 years would decrease soil compaction from livestock grazing. Soil compaction conditions would stabilize after this period of time.

Soil disturbances such as chaining, prescribed burning, disc plowing, installation of cattle guards, and pipelines would reduce vegetation cover in the short term and have an adverse impact on soil erosion rates. Soil erosion rates could increase by 1.1 to 7.6 times that of present conditions in the short term. Localized exposed surface areas subject to wind and water erosion would cause soil productivity to decline by an unquantifiable amount in the short term. In the long term, however, soil productivity would improve by an average of 20 percent as range conditions improve and disturbed areas are revegetated.

Chemical land treatments would improve soil erosion conditions over the short term as a result of vegetation cover being maintained on the soil surface after treatment and over the long term as a result of increased ground cover.

Impacts on Water Resources

IMPACTS ON SURFACE WATER

The Soil Conservation Service curve number methodology was used with the adaption of a simulation model developed by Gifford et al. (1975) as a basis for comparing changes in present and future runoff due to the various components of the action proposal (Appendix D).

Runoff is primarily affected by rainfall, vegetation cover, infiltration rate of the soil, and the size of the watershed. The level of grazing management, the grazing treatments, period of use, utilization levels, and vegetation manipulations would impact the vegetation cover, which has major secondary impacts on the quantity of runoff. Runoff is predicted to decrease by 4 percent to average 0.43 inches from high intensity storms (Appendix D). Runoff during a normal year is not expected to change significantly.

The action proposal would also affect the rate of infiltration by an unknown amount for most soils and thus affect available water for runoff. The short term change in runoff cannot be quantified because the vegetation manipulations and range improvements have not yet been located in the field and surveyed for watershed characteristics. Range improvement facilities would modify vegetation cover by disturbing the surface in localized areas (Table 4-1). As shown in Appendix D, Table D-2, most allotments would have a change of runoff due to the grazing treatments of the action proposal.

Construction of the 510 reservoirs and 21 check dams would decrease peak flows (floods) and increase base flows by an unquantifiable amount. Conflicts over water rights arising from development of water facilities would be resolved before project implementation.

Annual water consumption by wildlife and livestock under the action proposal is expected to increase from 272 to 301 acre feet per year over the long term, amounting to only 0.05 percent of the annual discharge of the White River.

Different physical and chemical factors of water quality would be affected to some degree by the proposal but studies are lacking to quantify the changes which would be expected. Examples of these unknown changes would be temperature changes in reservoirs compared to free flowing streams, and/or salinity concentrations in streams due to changes in sedimentation (USDI 1978).

On-site erosion is discussed in the Soils section, while sediment yield is discussed in this section. On-site erosion is considered to be actual soil movement at a specific place in the watershed

TABLE 4-1
PROJECT DISTURBANCE TOTALS
ALTERNATIVE A - ACTION PROPOSAL

PROJECT	PROJECT TOTAL	TOTAL ACRES DISTURBED 1/ SHORT TERM	LONG TERM 2/
Mechanical (sagebrush/Mtn. browse)	6,628 ac.	6,628	0
Chemical (sagebrush/Mtn. browse)	27,747 ac.	27,747	0
Prescribed burning (sagebrush/ Mtn. browse)	76,762 ac.	76,762	0
Mechanical followed by burning (pinyon/juniper)	37,619 ac.	37,619	0
Prescribed burning (pinyon/juniper)	5,104 ac.	5,104	0
Prescribed burning (existing p/j chaining)	16,760 ac.	16,760	0
Mechanical followed by chemical (greasewood)	9,110 ac.	9,110	0
Other treatments	6,580 ac.	6.580	0
Sub Total		186,310	
Reservoirs	510 ea.	510	525
Water catchments	39 ea.	195	98
Fences	212 mi.	212	43
Wells	44 ea.	44	10
Springs	85 ea.	22	8
Troughs	219 ea.	*	*
Storage tanks	83 ea.	50	25
Pipelines	65 mi.	65	13
Check dams	21 ea.	11	3
Sub Total		1,109	725
TOTALS		187,419	725

* Insignificant amount.
1/ Disturbance is defined as the interruption of the land's production of vegetation.
2/ Revegetation percentages, based on BLM estimates, are as follows = reservoirs, 20%; water catchments, 20%; spring developments, 65%; wells, 70%; pipelines, 90%; roads and trails, 35%; all others, 100%.

while sediment yield is eroded soil carried to or within stream channels. Sediment yield includes both surface and channel erosion. Sediment yields from channel erosion is generally much greater than the sediment yield contribution from on-site erosion in the EIS area. The sediment yield rates (Appendix D, Table D-4) were taken from the Sediment Yield Map for Colorado, published by the Colorado Land Use Commission (1974).

For this alternative, sediment yields would average 2.28 tons/acre/year or a long term reduction of 5 percent from the present condition which is not expected to affect the water quality classifications of any stream within the EIS area.

Vegetation treatments are expected to increase vegetation cover over the long term and provide better infiltration and less runoff by an unknown amount. Thus, less erosion would occur with resulting improvement in water quality. Gifford (1975) found that chaining on slopes less than 20 percent did not increase sediment discharges when debris is left in place. Following burning treatments, calcium, magnesium, potassium, and nitrogen compounds could be expected to increase up to fifteen fold in a flushing-type action during the first post-fire runoff event. These concentrations would decrease rapidly as the watershed conditions become stabilized. The long term impact on water quantity and water quality would be negligible (Gifford and Hawkins 1976).

Salinity changes in the Colorado River due to increased use of water and soil disturbance resulting from the action proposal are unknown due to lack of data but changes are expected to be minimal.

IMPACTS ON GROUND WATER

In most areas of the EIS area, impacts of grazing on ground water recharge would be insignificant during a normal year. Increased infiltration rates should increase the water available for recharge, but the extent to which this additional recharge potential is overcome by higher rates of evapotranspiration created by additional plant cover is not known. Decreased runoff from large storms would reduce the amount of water recharging into the alluvial deposits along stream channels. However, this would be reversed by an unknown quantity when the range facilities (reservoirs and retention dams) are implemented. The 44 proposed wells for stock watering purposes would have an expected yield of 10 gallons a minute each or a total of 710 acre feet per year. This may be compared to an estimate of ground water recharge on public lands in the EIS area of 62,750 acre feet per year (Weeks 1974). Ground water quality is not expected to be impacted by this alternative.

CONCLUSION OF IMPACTS ON WATER RESOURCES

Implementation of the alternative would decrease runoff by 4 percent to an average of 0.43 inches from high intensity storms. Runoff from a normal year is not expected to change. In addition, sediment yields would be reduced by 5 percent from present levels to an average prediction of 2.28 tons/acre/year. Salinity changes in the Colorado River are expected to be minimal. Impacts to ground water recharge are not expected to be significant. Ground water quality would not be impacted.

Impacts on Terrestrial Vegetation

Impacts resulting from the implementation of the action proposal would primarily affect vegetation composition, cover production, and condition and trend. Impacts have been assessed using available data, research results from comparable areas, and professional judgement.

IMPACTS ON VEGETATION COMPOSITION

This section will cover the expected changes in vegetation composition as the result of the interacting influences of vegetation allocation, minimum rest requirement, and range improvements. Composition will be discussed in terms of the changes in the amounts of desirable plant species within the plant community.

Vegetation allocation and minimum rest periods are expected to increase desirable species in the vegetation composition. The allocation process would insure proper utilization levels of current annual growth while the minimum rest requirement would allow undisturbed growth and development during critical growth periods. As a result, plants would exhibit increased vegetation production, have an opportunity to increase in vigor, produce seed, accumulate litter and provide for seedling establishment (Stoddard and Smith 1955, Laycock 1961, and Reardon and Merrill 1976). Improved vigor and reproduction in desirable species are expected to enable them to compete more favorably with less desirable species. By deferring or delaying the grazing period through the spring and summer, it has generally been found that better forage plants (perennial grasses and forbs) show greatest improvement (Martin 1973, Reardon and Merrill 1976). Continued use of these two management tools should maintain desirable species in a healthy, vigorous condition and provide valuable forage on a sustained yield basis.

Desirable perennial grasses and forbs could have a competitive advantage over undersirable shrub and annual forb species in many areas as the result of these proposals. Depending on the management goals and techniques used, varying degrees of control of undesirable species can be achieved. Spring deferment and heavy fall grazing by sheep was found to increase grasses and forbs but decreased sagebrush (Laycock 1961). However, more desirable shrubs such as bitterbrush can be maintained by terminating livestock use before July 1 since most of the annual twig growth occurs after that date and forage production is affected little by grazing (Smith and Doell 1968).

Shrub reproduction may be curtailed in some areas due to shrub seedling competition with perennial grasses and grazing pressure by livestock and wildlife, especially on winter ranges where livestock and wildlife use results in heavy dependence on browse (Cook 1971a). Long term results could be a shift from shrub-grass associations to a grass dominated one, especially on sagebrush ranges.

Increases of desirable species would generally improve range condition and effect an upward trend. In the EIS area, desirable species abundance by vegetation type by condition class becomes greater the higher the range condition class, based on livestock forage condition and vegetation inventory data accumulated in 1976-1977 (Table 4-2).

Similar changes in desirable species are expected over the long term as range condition changes from one class to another. Hughes (1979) found desirable perennial grass abundance increased over a 10 year period as range condition improved from poor to good condition as a result of the benefical effects of rest rotation grazing. These changes in the EIS area do not reflect increases in desirable species resulting from vegetation manipulation. The magnitude of change cannot be individually attributed to any one of the three components of the action proposal since each component interacts with the others to form a final positive effect on vegetation composition. An overall effect can be predicted on changes in range condition as the result of the action proposal.

The magnitude of change expected for a given allotment can be predicted by knowing the amounts and types of vegetation on the allotment, its present condition, and expected potential range condition. For example, the Keystone allotment (6605) has approximately 8,863 acres of sagebrush range in fair condition with approximately 19 percent of the composition consisting of desirable species. Based on the potential of the sagebrush type on the Keystone allotment, 2,012 acres of the fair condition range are expected to improve to good condition. Since there is a 27 percent increase in desirable species occurring when sagebrush range improves from fair to good condition (Table 4-2), the 2,012 acres are expected to realize a 27 percent increase in desirable species.

The remaining 6,851 acres would remain stable and in fair condition with no significant change in desirable species. The entire sagebrush type would, however, realize an average overall 7 percent increase in desirable species due to the 27 percent contribution of the 2,012 acres improving from fair to good condition. The 7 percent figure was determined by dividing the 27 percent increase by four since the 2,012 acres represents approximately one fourth of the entire sagebrush type on the Keystone allotment. By calculating changes in all vegetation types on an allotment using the aforementioned method and vegetation survey data, an overall change in desirable species can be predicted.

Range improvement facilities and vegetation manipulations would facilitate handling of livestock, increase quality and quantity of forage and control noxious plants at acceptable levels (Vallentine 1974). This would result in a more uniform use of forage and complement the effects of vegetation allocation and minimum rest requirements.

Initial construction of range improvement facilities would cause a short term removal of vegetation on 1,109 acres. Following revegetation (1 to 2 years after construction) 654 acres would be returned to production leaving 455 acres occupied by improvement facilities or ground bare of cover (Table 4-1).

Acres other than those covered by the facilities, remaining barren, would be due primarily to livestock and wildlife trampling and grazing on areas directly adjacent to water developments. New facilities, especially water developments, would have effects on vegetation in areas that were previously unavailable to livestock and perhaps wildlife. Also, new facilities would relieve grazing pressure around existing waters resulting in more uniform use over an entire allotment. More uniform use would help prevent overgrazing which results in losses of desirable species from the vegetation composition. Over the long term, better distribution (along with new forage sources provided through vegetation manipulation) is expected to lead to improved range condition with vegetation compositions containing more desirable species.

Vegetation manipulation proposed on 186,419 acres in four vegetation types (Table 4-1), is proposed to provide new and increased forage production on areas presently producing forage at levels below site potential.

Vegetation manipulation alternatives include burning, chemical spraying, mechanical manipulation, (i.e. chaining, beating, etc.), or a combination of treatments. Appendix A, Table A-2 identifies acreages by vegetation type and methods of treatment tentatively proposed for each type.

Total shifts in vegetation composition to primarily grass and forb dominated types would be a temporary result on post-treatment sites where woody species dominated before treatment. Reburning existing pinyon-juniper chainings would be a clean-up of debris to maintain understory herbaceous productivity. Tausch and Tueller (1977) found understory production began to decline 5 to 8 years after initial pinyon-juniper chaining thus indicating the need for follow-up treatment.

IMPACTS ON FORAGE PRODUCTION

Forage production estimates are based on data from recently revised range surveys which were conducted from 1940 to 1973 within the EIS area. After analyzing survey data, estimates of production and carrying capacity were determined for the present and future. Future estimates were derived from comparisions made between allotments at varying production levels but with similar soils, elevations, topography, and precipitation. Present and future forage allocations based on expected production is outlined in Table 2-1. Vegetation allocation is expressed in AUMs (animal unit month), the amount of forage required to support a cow for one month. Other livestock and wildlife species require lesser amounts of forage with sheep requiring 0.20 AUM, deer 0.18 AUM, elk 0.35 AUM, and pronghorn 0.08 AUM. Wild horses, however, require 1.25 AUM.

Forage production (50 percent of current annual growth) as the result of the action proposal (Appendix C) is expected to increase from 182,888 AUMs to 229,758 AUMs. Predicted increases in production includes the benefit of vegetation manipulation.

When and where vegetation manipulation is carried out would determine its contribution to overall production on a given area. Levels of increases in production would vary for given vegetation types and treatment methods.

Pinyon-juniper ranges can be expected to produce an average of 200 pounds of forage per acre before treatment and an average of 700 pounds per acre after being cleared and seeded (Arnold et al. 1964). Poor condition sagebrush ranges have forage production levels similar to pinyon-juniper ranges before treatment (McKell and Goodin 1973). Soil Conservation Service estimates of production show a production range of 600 to 2,000 pounds per acre for sagebrush-mountain shrub ranges after treatment.

A dramatic increase in production, grazing capacity, and forage availability can be expected using prescribed fire as a treatment method on sagebrush range. Pechanec and Stewart (1954) found grazing capacity increased by 69 percent, perennial grass production doubled, perennial forbs increased by 25 percent, and a 64 to 93 percent increase in forage availability occurred following burning sagebrush range in southeastern Idaho. Prescribed fire is a preferred treatment method on sagebrush range when environmentally practical. Less dramatic production response and treatment longevity can be realized from mechanical methods such as chaining or beating.

Burning existing pinyon-juniper chainings as a clean up treatment can be expected to increase or maintain forage production significantly by removing pinyon-juniper debris and killing reestablished pinyon-juniper seedlings. Tausch and Tueller (1977) found a steady reduction in understory cover and production 5 to 8 years after chaining.

Chemical treatment is another possible alternative with production results similar to those experienced following burning of sagebrush. Sagebrush flats in Wyoming sprayed with 2, 4-D responded with a three fold increase in grass production and decreased big sagebrush by 75 percent (Wilbert 1963).

Production increases as the result of vegetation manipulation are expected to make a significant contribution to overall allotment production. The magnitude of increase would depend on amounts and types of vegetation manipulated and the productive potential of soils in treated areas.

IMPACTS ON PLANT COVER

Future ground cover increases are expected to be small in most cases. Cover increases of all plant species are not expected to exceed 2 percent based on predictions drawn from existing data within the EIS area. This can be attributed to the fact that existing plant species utilize almost all available soil moisture and any increase in one species would cause a similar decrease in another with overall cover remaining essentially the same (West et al. 1979). However, cover increases of desirable species are expected to be higher since action proposal objectives are directed at increasing these species.

Amounts of desirable species vary by vegetation type and by existing condition, therefore, amounts of cover attributions to desirable species would also vary by similar amounts. Table 4-2 identifies expected changes in desirable species abundance by condition class. Similar changes in cover of desirable species by vegetation type are predicated for the future.

Area wide cover increases of desirable species are expected to increase from 24 to 41 percent on 164,529 acres improving from fair to good condition and remain the same at 24 percent and 7 percent respectively on 855,945 acres of fair condition range and 422,323 acres of poor condition range (Table 4-3).

IMPACTS ON RANGE CONDITION AND TREND

A main objective of the action proposal is to improve range condition and produce an upward or improving range trend. Present livestock range condition and trend evaluations are based on the best available data within the EIS area and professional judgement. Future condition and trend predictions are based on range site and vegetation type potential as influenced by present range condition and trend, forage allocation, miniumum rest requirements, and range improvements. Methodology for predicting future condition and trend is summarized in Appendix E. Vegetation treatments were excluded as an influencing factor in this analysis because the variability involved in implementation, size, and exact location of treatment would make time-scaled predictions of condition and trend changes difficult. Effects of vegetation treatments have been discussed under the Range Improvements section.

Changes in condition and trend would take place over varying periods of time depending on site potential, present vegetation cover, natural seed sources, extend of range improvements, and climatic conditions. Areas with high productive potential should show signs of improvement in a few years while less productive areas may require the entire long term period of twenty years or more to show any improvement. Hughes (1979) found mountain shrub-aspen range improved from poor to good condition in 10 years under rest-rotation grazing in western Colorado, however, McLean and Tisdale (1972) found that it took 40 years for range to improve from poor to good condition in the absence of livestock grazing in roughfescue and ponderosa pine zones in British Columbia. Some areas, however, are expected to show no change and remain as they presently are.

As a result of Alternative A, range condition is expected to remain stable or improve with trend remaining static or improving (Table 4-3). Poor and fair condition range acreage is expected to decrease by 23,732 acres (2 percent) and 140,797 acres (9 percent) respectively with 164,529 acres (11 percent) improving to good condition. Trend would improve on an additional 416,787 acres (27 percent) while acres in static trend would decrease by 218,533 acres (14 percent). Declining trends would stop and remain stable on 198,254 acres (13 percent).

Major changes in condition and trend, based on vegetation inventory data and professional judgement, (Table 4-4), are expected to occur in the sagebrush, mountain shrub, and grassland vegetation types where good condition range acreage is expected to increase by 16 (73,111 acres), 30 (69,761 acres), and 30 (14,657 acres) percent respectively. The pinyon-juniper vegetation type while comprising approximately 33 percent (495,081 acres) of the EIS area is expected to realize only a 5 percent (24,088 acres) increase in good condition range acreage with an overall average change in all condition categories of 2 percent.

The most significant changes in trend would also occur in sagebrush, mountain shrub, and grassland vegetation types where improving trend acres would increase by 35 (166,336 acres), 49 (110,415 acres), and 35 (17,082 acres) percent respectively. Pinyon-juniper ranges would show the smallest increase (21 percent) in improving trend acres of the major vegetation types. Those small changes in range condition and trend reflect a need for vegetation manipulation to improve the productivity of the pinyon-juniper type. The sagebrush type with only a 16 percent predicated increase in good condition range also reflects the need for vegetation manipulations.

CONCLUSION OF IMPACTS ON TERRESTRIAL VEGETATION

The three action proposal components, vegetation allocation, minimum rest requirement, and range improvements, would have the combined effect of increasing the amounts of desirable species in the vegetation composition with subsequent increases in cover and production. Desirable species increases would average 17 percent of 243,538 acres. Over the long term, proper use of grass species by livestock (cattle) would improve the overall competitiveness of grass and could have a negative effect on reproduction of shrub species. At the same time, wildlife use of shrubs could reduce the vigor of existing shrub species. The overall effect could be a shift from a shrub-grass association to a grass dominated situation.

Cover of desirable species is expected to increase by a similar amount while cover of all species, both desirable and undesirable, are not ex-

TABLE 4-2
DESIRABLE SPECIES COMPOSITION (%) BY VEGETATION TYPE
BY RANGE CONDITION CLASS

Vegetation Type	Range Condition Class Poor	Fair	Good
Sagebrush	8	19	46
Pinyon-Juniper	11	33	44
Mountain Shrub	4	18	39
Grassland	12	29	55
Saltbush	6	30	39
Greasewood	3	12	25
Average	7	24	41
Average percent change per condition class	17	17	

TABLE 4-3
PRESENT AND FUTURE CONDITION AND TREND (acres)
ON THE WHITE RIVER RESOURCE AREA

Condition	Present	Future	Trend	Present	Future
Poor	446,055	422,323	Declining	198,254	-
Fair	996,742	855,945	Static	1,291,854	1,073,321
Good	79,009	243,538	Improving	31,698	448,485
Total	1,521,806	1,521,806		1,521,806	1,521,806

pected to increase more than 2 percent in the long term.

Condition and trend would either remain stable or improve (Table 4-3). Good condition range would increase by 11 percent (164,529 acres) with decreases of 2 percent in poor condition range and 9 percent in fair condition range in the long term. Trend would improve on 416,787 acres (27 percent) while 218,533 acres (14 percent), presently in a declining trend, would stabilize and become static in the long term.

Long term forage production is expected to increase by 20 percent (46,870 AUMs) as the result of the action proposal. Vegetation manipulation would increase production of desirable species by 40 to 60 percent on treated sites.

Impacts of Riparian Vegetation

This section discusses the expected changes in riparian vegetation caused by the action proposal. Conclusions were based on subjective analyses of the impacts of vegetation allocation, grazing management, and range improvements proposed for each allotment on the vegetation composition, condition and trend, and vegetation ground cover of the riparian communities presently existing in each allotment.

Support for the conclusions presented here were based to a large extent on professional judgement, and to a smaller degree on inferences drawn from research and professional papers. This was the primarily to the paucity of research publications which concern cause and effect relationships between grazing management and riparian vegetation. A summary of impacts is presented in Appendix E.

IMPACTS ON VEGETATION COMPOSITION

Impacts of vegetation allocation on riparian vegetation composition were analyzed on the basis of grazing pressure resulting from reductions or increases in allocated AUMs on the allotment in which the riparian zone is located. It was assumed that impacts resulting from reducing livestock grazing would be of little benefit unless the reduction was substantial because cattle tend to congregate along stream bottoms. With this tendency, grazing in riparian zones would continue to be heavier than in upland zones as long as suitable forage and access to it were available. Substantial reductions (greater than 30 to 50 percent), would probably lead to moderate to light grazing pressure on riparian types.

Heavy grazing would affect vegetation composition of riparian communities by altering both species and age composition. Age composition would be altered where trampling and close grazing would damage seedlings or sprouts, resulting in a poor representation or absence of age classes (Davis 1977). This would be especially true of desirable woody species such as willows and cottonwoods. Heavy grazing on a mature plant would reduce its ability to produce flowers and fruits, thus reducing its reproductive capacity, and may eventually kill the plant by removing stems. Where grazing of desirable herbaceous species would be moderate or light, food reserves needed to maintain plant health would be replenished and desirable species would remain vigorous (Stoddart et al. 1975). This would increases forage production, but decrease long term reproductive capacity since increased twig growth reduces the deveopment of flowers and fruits.

Impacts from wildlife vegetation allocations would be neglible. Deer and elk may frequent watering sites and browse on local vegetation, however, the tendency to move about and not congregate reduces the threat to riparian vegetation. No critical deer winter concentration areas, and only one critical elk winter concentration area, Missouri Creek, are associated with riparian areas. No detrimental impact is expected from elk in this area.

Impacts from wild horses would vary by season. During the spring and early summer, horses will trail a considerable distance to water and stay only a short time. During late summer as water sources dry up, wild horses would concentrate around the periphery of remaining water sources and creat a heavy degree of use on associated range areas. Perennial grasses, especially bluegrass, would receive heavy grazing use from wild horses in riparian zones.

Impacts on vegetation composition from grazing management would occur from the combined effects of minimum rest requirements, period of use, and kind of livestock. Minimum rest requirements were designed to meet the minimum physiological requirements of the primary forage species in restoring plant vigor. Spring rest periods followed by 1 to 3 years of use periods are projected for each allotment. The effects of a variety of spring rest treatments have been studied with some results showing no significant difference from yearlong grazing (Martin 1973, Martin and Ward 1976). Thus, it can be inferred that spring rests alone could have little or no beneficial impact especially in riparian areas where livestock tend to congregate. The beneficial impacts achieved during a spring rest period could be nullified by forage removal when grazing resumes.

TABLE 4-4
PRESENT AND FUTURE CONDITION AND TREND (acres)
BY MAJOR VEGETATION TYPE IN THE WHITE RIVER RESOURCE AREA

Condition	Present	Future	Trend	Present	Future
Sagebrush					
Poor	48,027	33,540	Declining	73,073	0
Fair	387,907	329,283	Static	392,235	298,972
Good	37,798	110,909	Improving	8,424	174,760
Total	473,732	473,732	Total	473,732	473,732
Mountain Shrub					
Poor	6,643	8,160	Declining	30,848	0
Fair	210,590	139,312	Static	178,259	98,692
Good	8,813	78,574	Improving	16,939	127,354
Total	226,046	226,046	Total	226,046	226,046
Grassland					
Poor	0	0	Declining	1,104	0
Fair	36,496	21,839	Static	43,933	27,955
Good	11,810	26,467	Improving	3,269	20,351
Total	48,306	48,306	Total	48,306	48,306
Pinyon-Juniper					
Poor	199,341	169,367	Declining	76,971	0
Fair	286,410	292,296	Static	416,763	381,460
Good	9,330	33,418	Improving	1,347	103,621
Total	495,081	495,081	Total	495,081	495,081
Saltbrush					
Poor	25,019	24,943	Declining	7,141	0
Fair	29,454	29,170	Static	53,300	28,830
Good	6,646	7,006	Improving	678	32,288
Total	61,119	61,119	Total	61,119	61,119
Greasewood					
Poor	35,974	33,404	Declining	4,933	0
Fair	8,793	11,363	Static	38,793	36,390
Good	0	0	Improving	1,041	8,377
Total	44,767	44,767	Total	44,767	44,767

TABLE 4-5
RIPARIAN VEGETATION CONDITION

	Present (Acres)	Future (Acres)
Poor	53	35
Fair	206	154
Good	38	108
	297	297

Where range improvements have improved livestock distribution and reduced grazing pressure substantially in riparian zones, beneficial impacts from spring rests would occur, especially where spring rests of 1 in 2 years or better take place. Spring growth is critical to the perennial grasses and forbs dominating the understory of most riparian zones. A spring rest followed by light to moderate grazing would increase the percent composition of perennial grasses from their present status.

Impacts of period of use on riparian vegetation composition vary by season. Spring use on grasses has already been discussed. Normally, livestock prefer grasses during this period. After grasses mature, in summer and fall, utilization or shrubs would increase (Vavra and Sneva 1978). In most cases, willows and other shrubs are in limited numbers already, and heavy grazing during these periods would result in a loss of food reserves and eventual decline of these plants. In those allotments where grazing pressure would be relieved by range improvements, woody species would suffer only from reduced reproductive potential.

Kind of livestock would impact vegetation composition due to individual perferences. Since sheep show a greater perference for browse forage (Stoddart and Smith 1955), heavier use of woody types in the sheep allotments which contain riparian vegetation would be likely. Cattle tend to follow a more seasonal preference as mentioned above.

The most significant beneficial impacts on riparian vegetation composition under this alternative would come about as the result of the various ranger improvements. The importance of the construction of water facilities and vegetation manipulations depends to a large extent on their proximity to the riparian zone being impacted. The object of these range improvements would be to provide for better livestock distribution by creating additional, well-spaced water sources, and increasing the amount of desirable forage. The improvement in distribution would reduce grazing pressure in those riparian areas in the same proximity as the range improvement. Impacts on vegetation composition from range improvements would result in an increase or maintenance of the desirable forage species that occur in the riparian communities.

A minimum of 2 years of no grazing use would take place on those pastures or allotments receiving vegeation manipulations. Riparian vegetation in those allotments would improve considerably before grazing resumes.

Fencing of the riparian zones along Trappers, Lake, and Soldier Creeks would completely eliminate grazing. The result would be an overall improvement in vegetation. In the long term, willows would increase and dominate the overstory. Bluegrass would dominate the understory along with a healthy complement of forbs. An additional increase in overall riparian vegetation would occur from the construction and fencing of stock ponds, reservoirs, and spring developments.

Reductions in grazing pressure would come about as the result of the cummulative impacts of vegetation allocation, grazing management, and range improvements, which in turn would produce an overall improvement of desirable species composition in riparian vegetation. Livestock grazing reductions due to minimum rest requirements alone would not produce lasting results unless accompanied by those range improvements that would render a more even distribution of livestock, or unless 30 to 50 percent reductions in livestock use occur. These cumulative effects would improve the composition of desirable herbaceous species on 168 acres of riparian vegetation throughout the resource area, 122 acres would not change significantly, and only 7 acres would have a decrease on the percent composition of desirable species. Woody species would improve on 93 acres and decline on 42 acres, while 162 acres would remain unchanged. An unquantifiable gain in desirable species would occur from the construction of fencing of stock ponds, reservoirs, and spring developments.

IMPACTS ON CONDITION AND TREND

The combined effects of the action proposal (vegetation allocation, grazing management, and range improvements) would produce an upward trend in the riparian vegetation communities. The amount of improvement would be dependent on the present condition and trend of the riparian zone, and the degree to which the action proposal would reduce livestock grazing pressure in these areas.

Appendix E, Table E-3 shows the predicted future condition (long term) of riparian communities by allotment and stream following the implementation of the action proposal. Table 4-5, comparing present conditions with future conditions, shows a net improvement.

A total of 221 acres would not change appreciably, 21 acres would improve from poor to fair, 5 acres would improve from poor to good, 63 acres would improve from fair to good, and only 7 acres would decline from fair to poor. This would be a net overall improvement of 82 acres out of the 297 acre total. These improvements would be attributed to the cumulative effects of range improvements, minimum rest, and vegetation allocations.

The fencing projects for Trappers, Lake, and Soldier Creeks would improve 35 acres from fair to good. An excellent rating would not be expected because the rocky soil existing in these areas would not be conducive to extensive vegetation growth.

IMPACTS ON VEGETATION GROUND COVER

Ground cover plays the important role in riparian communities of stabilizing stream banks and slowing the erosion process. Livestock grazing directly impacts vegetation ground cover by either grazing or trampling. Therefore, any reduction in grazing pressure would lead to either a maintenance of the present situation or an increase in vegetation ground cover. Impacts resulting from the causal agents under this alternative (vegetation allocation, grazing management, and range improvements) would be similar to those found under the Vegetation Composition section. One exception prevails, however, in that an increase (or decrease) in desirable forage species may only serve to decrease (or increase) the undesirable types without a net gain in ground cover.

Vegetation ground cover is also a factor in determining condition and trend of a riparian community. An increase in vegetation ground cover would be viewed as an improvement, but would not necessarily change the overall condition rating of the community.

The cumulative effects of the actions proposed would produce an overall increase in vegetation ground cover on riparian areas throughout the EIS area. The amount of improvement could not be quantified due to an absence of supporting literature or research in this area. Predictions were based, however, on the ability of each proposed AMP to control grazing pressure in the riparian zone. Results of these predictions show that vegetation ground cover would increase on 200 acres of riparian vegetation, remain stable on 65 acres, and decrease on 7 acres. An additional increase in cover would occur from construction and fencing of stockponds, reservoirs, and spring developments.

CONCLUSION OF IMPACTS ON RIPARIAN VEGETATION

Impacts caused by the action proposal would result in a general improvement in riparian vegetation. These improvements, however, would not be far-reaching, because riparian communities would remain as one of the most desirable grazing areas on the range. The cumulative effects of all of the causal agents (vegetation allocation, grazing management, and range improvements) would cause a reduction in grazing pressure in these areas, either directly by reducing numbers or indirectly by improving distribution. This would lead to increased vigor and reproduction of those species preferred by livestock, an increase in cover, and an overall improvement in condition and trend. In addition, water developments proposed would create an added unknown amount of riparian vegetation. Condition ratings would not change on 201 acres, improve from poor to fair on 21 acres, improve from poor to good on 5 acres, improve from fair to good on 63 acres, and decline on 7 acres. This would yield a net overall improvement on 82 acres out of the 297 acre total.

Impacts on Threatened and Endangered Plant Species

The specialization of many threatened and endangered (T/E) plant species to unusual soil situations is an advantage in that they often occupy the habitat free from competition with other plants. However, the species may become so highly adapted to the unique habitat that it does not have the genetic ability to occupy new habitats. Consequently, the species may have a very restricted range, and may be "doomed" if small changes occur in the environment to which it is so highly adapted (Ratzloff 1978).

Chemical treatments would most likely affect T/E plant species (particularly the forbs), depending on the season of treatment. Burning may result in disruption of critical populations, again depending on the season of treatment. Chaining and disc plowing may alter a particular critical habitat to the extent that continuation of a species would be threatened. In areas where grazing would be increased, heavy use and trampling may become a problem.

One area of major concern is Raven Ridge, just northwest of Rangely. This particular outcrop of the Green River Formation harbors many T/E plant species. Among these are *Eriogonum ephedroides, Astragalus detritalis, Parthenium ligulatum, Penstemon grahamii*, and *Cryptantha rollinsii*. Any disruption of habitat may result in the discontinuation of these species.

Impacts on Terrestrial Wildlife

IMPACTS ON MULE DEER

Mule deer would be allocated 59,577 AUMs in the short term, which would support the existing population of 45,394 deer on public lands in the EIS area (Appendix B, Table B-1). The long term allocation would increase 11 percent (to 66,388 AUMs) which could support 51,526 deer. Proposed levels of livestock use would directly affect forage availability to deer and indirectly affect habitat quality and quantity (as livestock use would influence long term patterns in plant succession, i.e. changes in herbaceous understory versus shrub composition and density).

The proposed reduction of 27,025 AUMs in livestock grazing use would increase forage availability and reduce livestock-deer dietary competition, resulting in long term beneficial impacts on both deer winter nutrition and carrying capacities. All forage, not only browse, is important to deer winter nutrition and carrying capacities (Wallmo 1973, Wallmo et al. 1977, Carpenter et al. 1979, Smith et al. 1979). These studies quantify and lend support to the fact that deer are facultative browsers (are not always dependent on browse) (Young et al. 1976). Local Colorado Division of Wildlife (CDOW) information (personal communication) shows that winter deer dietary selection is often more diverse than has generally been given credit in the past. The importance of herbaceous species to deer winter nutrition (including energy requirements) is a function of higher average digestibility and related metabolizable energy of herbs than shrubs. Availability of herbaceous forage takes on added importance when considering that dietary consumption of sagebrush in excess of 20 percent appears to impair digestive efficiency and results in critical weight loss when sagebrush approaches 30 percent of the diet (Wallmo et al. 1977).

The reduction of 14,039 AUMs in spring livestock use would increase abundance and availability of grasses and forbs throughout the year but would benefit deer the most in late fall, late winter and early spring, when their diets comprise large fractions of herbaceous forage (Dietz et al. 1962, Willms et al. 1978). Habitat improvement and decreased dietary competition would be most important on critical winter ranges (about 152,200 acres) and early spring migration routes, which roughly coincide with low elevation spring-fall livestock range. Livestock minimum rest requirements in the spring may also increase production of mountain mahogany and bitterbrush (McKean and Bartmann 1971).

Fall-winter livestock grazing would have little or no impact on fair to good condition deer winter range. However, late season livestock use combined with heavy deer use, could inhibit the improvement of browse conditions on some of the 277,600 acres of poor condition winter range (Table 4-6 and Table 4-7), which supports about 20,350 deer (41 percent of the wintering deer in the EIS area).

Livestock consumption of browse is highly variable, but sometimes exceeds 20 percent of dietary composition or 30 percent utilization of annual plant growth (Julander 1955, Tueller and Monroe nd., McKean and Bartmann 1971, Stuth and Winward 1977, BLM White River Resource Area URA) on poor condition ranges, after grasses have cured, or when snow accumulation limits herbaceous forage availability. Sagebrush dominates many poor condition deer winter ranges where desirable shrub production is typically low. Since sagebrush is unpalatable to cattle, desirable shrubs are selectively utilized. Where deer use alone already exerts heavy browsing pressure (much of the acreage in Table 4-6), late season dual use would in some instances, preclude the improvement of poor browse conditions. However, the proposed reductions in livestock AUMs, spring minimum rest requirements, and improved livestock distribution would all increase herbaceous forage production, which would alleviate livestock browsing. Problems would still exist on some poor condition winter ranges (Table 4-6 and Table 4-7), probably including the River (6602), Little Tom's Draw (6603), Keystone (6605), Black's Gulch (6612), North Fork Price Creek (6607), and South Fork Price Creek (6608) allotments. Proposed monitoring studies would identify specific problem areas and identify necessary livestock or mule deer use adjustments.

The proposed water and fence development would improve livestock distribution patterns and increase herbaceous understory production, thereby, reducing livestock use of browse, and lessening livestock-deer dietary competition. Facilities development would enable the implementation of minimum rest requirements and would uniformly distribute late season livestock use, the net result being an overall improvement in deer forage conditions on all seasonal ranges (Table 4-7). Improved water distribution on summer range could expand the limits of usable deer habitat, increase herbaceous production and availability and, therefore, increase summer range carrying capacities.

Although fence construction would aid in improving forage conditions for deer, it would increase deer winter mortality. About 125 miles and 28 miles of fence would be constructed on deer winter range and critical winter range respectively. Fencing on winter range where deer densities are low (1-30 per square mile) would result in winter losses of a relatively low magnitude. The 19 miles of proposed fence on the Little Hills (6006) allotment, which supports one of the highest winter deer populations in the EIS area, would result in an indeterminable increase in deer mortality. Fences would restrict deer in search of food and would entangle deer in weakened conditions.

TABLE 4-6
POOR CONDITION WINTER RANGE ON WHICH LONG TERM
CARRYING CAPACITIES WOULD NOT INCREASE

Allotment	Acres: Winter Range	Acres: Critical Winter Range
WHITE RIVER DEER HERD		
6005 North Dry Fork	3,129	8,974
6006 Little Hills	30,027	26,028
6023 Piceance Mountain	30,222	6,205
6024 Fawn Creek	8,394	630
6028 Hatch Gulch	7,469	1,112
6029 Black Sulfur	10,636	--
6033 East Fork Spring Creek	1,375	--
6039 Hammond Draw	6,998	100
6040 Upper Fletcher Draw	3,793	1,975
6042 Boise Draw	7,778	469
6602 River	790	69
6603 Little Tom's Draw	11,572	2,528
6605 Keystone	22,612	1,184
6607 North Fork Price Creek	750	--
6608 South Fork Price Creek	2,266	--
6610 Gower Gulch	1,903	--
6612 Blacks Gulch	13,461	7,467
6616 Goff Camp Gulch	1,206	464
6617 Cave Gulch	396	437
6621 Lower Smith Gulch	6,631	1,939
6622 Windy Gulch	2,279	88
6624 Willow Springs	387	278
6625 Smith-Crawford	3,773	2,291
6627 Ryan Draw	404	--
Total	178,251	62,238
RANGELY DEER HERDS		
6313 Coal Oil	3,538	--
6321 Rock Wall Draw	1,160	--
6330 Upper Coal Creek	5,142	--
6331 Baking Powder	3,460	--
6332 Horse Draw	11,690	--
6340 Shavetail	7,073	--
6341 Banta	573	--
6367 Cathedral Creek	3,087	1,385
Total	35,723	1,385

TABLE 4-7
MULE DEER HABITAT CONDITION AND TREND ON PUBLIC LANDS (acres)
ALTERNATIVE A - ACTION PROPOSAL

	Winter Range		Critical Winter Range		Summer Range		Total	
	Present (%)	Long Term (%)	Present (%)	Long Term (%)	Present (%)	Long Term (%)	Present (%)	Long Term (%)
CONDITION CLASS								
Good	3,500 1/	13,700 (1)	700 1/	700 1/	21,000 (7)	69,500 (22)	25,200 (2)	83,900 (6)
Fair	610,000 (66)	685,100 (74)	96,900 (63)	96,900 (64)	218,600 (69)	232,000 (73)	925,500 (66)	1,014,000 (72)
Poor	318,100 (34)	232,800 (25)	54,600 (36)	54,600 (36)	77,700 (24)	15,800 (5)	450,400 (32)	303,200 (22)
Total	931,600 (100)	931,600 (100)	152,200 (100)	152,200 (100)	317,300 (100)	317,300 (100)	1,401,100 (100)	1,401,100 (100)
TREND								
Improving	0 (0)	188,800 (20)	0 (0)	42,800 (28)	0 (0)	94,200 (30)	0 (0)	325,800 (23)
Static	691,600 (74)	660,200 (71)	117,700 (77)	99,500 (65)	232,200 (73)	220,100 (69)	1,041,500 (74)	979,800 (70)
Declining	240,000 (26)	82,600 (9)	34,500 (23)	9,900 (7)	85,100 (27)	3,000 (1)	359,600 (26)	95,000 (7)
Total	931,600 (100)	931,600 (100)	152,200 (100)	152,200 (100)	317,300 (100)	317,300 (100)	1,401,100 (100)	1,401,100 (100)

1/ less than 1 percent

About 8 miles of the proposed 19 miles of fence on the Little Hills (6006) and 10 miles of proposed fence on the Thirteen Mile (6011) and Lower Fourteen Mile (6014) allotments would be situated in and lie perpendicular to major deer spring-fall migration routes. Although fencing would be constructed in accordance with BLM Big Game Fence Manual 1737, mortality could be excessive if fences are not properly located in relation to slope, aspect, drifting snow, etc.

Vegetation manipulation on summer ranges of the White River deer herd would not affect yearlong populations because winter range carrying capacity limits summer populations. Manipulations on the summer ranges of the Rangely deer herds would affect yearlong populations because winter range does not appear to limit deer numbers. Hot burning prescribed fires and spraying with 2, 4-D could result in high mortality rates of forbs and both resprouting and nonsprouting shrubs if conducted during the active growing season. Cool burning fires during plant dormancy or when soil moisture conditions are high would generally promote successful stand renewal. Spraying to achieve selective kills early in the growing season before rapid growth, could release forbs and key browse from sagebrush competition. Long term impacts would benefit deer nutrition and carrying capacities.

The proposed vegetation manipulation of 123,800 acres on deer winter ranges would exert far greater influences on short and long term carrying capacities than manipulations on summer ranges. Understory production would increase on the proposed 65,000 acres of manipulated winter range sagebrush and greasewood stands, regardless of the treatment method. Impacts on desirable browse would be variable, largely depending on pretreatment seed sources. The same impacts discussed above, concerning treatment methods, would also hold true on winter ranges.

The conversion of dominant sagebrush stands to sagebrush-grassland mosaics would improve deer winter habitat and nutrition. Increased plant and habitat diversity would improve nutritional values of the total forage base. Improved herbaceous plant availability would enhance deer use of sagebrush (Urness 1979) and would serve in a "shrub sparing" capacity, particularly in late winter and early spring. Although sagebrush availability is not a limiting factor on winter deer populations in the EIS area, it provides important forage on most winter ranges, especially when intermixed with more desirable forage plants. It is most important and heavily used along perimeters of pinyon-juniper woodlands since deer use of openings increases with proximity to cover (Tueller and Monroe nd). Manipulation of either sagebrush or pinyon-juniper along these "edges" could lower winter range carrying capacities by excessively reducing browse availability.

Approximately 39,400 acres of pinyon-juniper winter range is proposed for manipulation. An important attribute of pinyon-juniper woodlands is the production of desirable browse, however, production is sometimes limited by competition with trees. Manipulations would release shrubs from tree competition, thus stimulating increased shrub production.

Manipulation on allotments with currently fair browse conditions would successfully regenerate browse production. The proposed manipulation of 42,200 acres of poor condition winter range would improve nutritional levels for existing numbers of deer but would not improve enough to support populations above 1978 levels.

Deer populations could suffer short term reductions in browse availability where large scale vegetation manipulations would be implemented concurrently on allotments within the same deer winter ranges. Increased deer mortality rates could occur on the following groups of allotments which are scheduled for treatment within 1 to 4 year periods:

1. North Dry Fork (6005), Little Hills (6006), Main Dry Fork (6007), Segar Gulch (6008), and Hatch Gulch (6028) with 12,200 acres of treatment proposed.
2. Piceance Mountain (6023) and Fawn Creek (6024) with 19,400 acres of treatment proposed.
3. Square S (6027), Yellow Creek (6030), Greasewood (6036), and Little Spring Creek (6038) with 22,100 acres of treatment proposed.
4. Cathedral Bluffs (6337), Twin Buttes (6346), and East Douglas Creek (6354) with 21,400 acres of treatment proposed.
5. Black's Gulch (6612), Keystone (6605), Lower Smith (6612), and Little Tom's Draw (6603) with 9,400 acres of treatment proposed.

Vegetation manipulations would affect deer cover requirements on winter range but not on summer range. Thermal protection is critical during winter since deer reduce forage intake rates and their diet largely consists of high fiber browse that is relatively low in metabolizable energy. Thus, given a limited ability to consume and convert forage into calories, they may not be able to metabolize browse rapidly enough to maintain body temperature in cold weather (Short 1966).

Pinyon-juniper manipulation in areas where cover is currently marginal or where it would be limiting after manipulation could reduce the acreage of usuable deer winter range on the Shavetail (6340), Douglas Creek (6342), Keystone (6605), and Black's Gulch (6612) allotments. Various studies have shown that deer use of feeding areas decreases with distance from suitable cover. The treatment of pinyon-juniper stands along ridgetops adjacent to critical feeding areas on southern exposures could reduce both food and cover values of these critical use areas.

In summary, cumulative impacts resulting from the action proposal would increase forage availability to deer and reduce levels of dietary competition between deer and livestock. The most evident improvement would involve increased herbaceous plant availability on winter ranges. Dietary energy deficits of deer would be reduced which would improve nutritional levels of "maintenance" winter diets. Deer would be able to make more effective use of sagebrush without inhibiting digestive efficiency. Animal and herd productivity could increase.

Forage availability and quality on winter range would remain a limiting factor to about 88 percent of the deer in the EIS area. Winter range carrying capacities would increase on 73 percent of all winter range if vegetation manipulations adequately provide for deer forage requirements (i.e. successful stand renewal and establishment of desirable browse production). Poor condition winter range (27 percent of all winter range) would improve to the extent of elevating nutritional planes for existing deer numbers but not necessarily increasing carrying capacities.

IMPACTS ON ELK

Elk would be allocated 4,745 AUMs on public lands in the short term and 5,004 AUMs in the long term (Appendix B, Table B-1). This would support potential short and long term populations of 1,783 and 1,926 elk, respectively. A long term 8 percent population increase would be realistic, in view of the fact that, forage production would increase under the action proposal, and that the White River elk herd has been steadily expanding in recent years.

In the short term, actual livestock use would be reduced 13,222 AUMs within elk range, which would contribute an additional 7,933 competitive AUMs above the exisiting level that would be potentially usable to elk. Proposed minimum rest requirements and levels of utilization would benefit elk populations and habitat conditions (Table 4-8) in the EIS area. Grazing management proposals would be designed to increase understory production which would directly complement elk grazing habits.

About 47,800 acres of vegetation manipulation are proposed on elk range in the EIS area. Manipulations would increase diversity and production of preferred elk forage if treatments provide for elk forage requirements (impacts would be the same as those discussed above under Mule Deer).

Lack of forage on winter range is not believed to limit elk populations. The manipulation of 26,300 acres of winter habitat would increase forage availability but would not necessarily contribute to increased populations, since elk have been steadily increasing in recent years.

The development of 206 waters and 93 miles of fence in elk range would improve livestock distribution, which would improve forage conditions for elk. Although livestock would use previously ungrazed areas, the development of 94 waters on elk summer range could also expand elk distribution. Cumulative adverse and beneficial impacts would be largely compensatory in the long term. The current population expansion would continue until unknown future limiting factors or CDOW and Piceance Basin Habitat Management Plan management goals would exert an influence.

IMPACTS ON ANTELOPE (PRONGHORN)

Vegetation (199 AUMs) would be allocated to about 219 antelope throughout the year (Appendix B, Table B-1). The impact of vegetation allocation on antelope populations could be important on all seasonal ranges since herds are yearlong residents and limiting factors are unknown. Livestock actual use would be reduced about 3,500 AUMs on allotments supporting antelope. Dietary competition would be reduced, probably allowing a long term 2 percent population increase (CDOW long term management goals) in response to long term increases in vegetation production. The long term allocation and population would be about 207 AUMs and 224 antelope, respectively.

About 75 percent of the allotments supporting antelope populations are grazed by sheep. Since antelope and sheep compete directly for forage, especially on winter and poor condition range (Hoover et al. 1959, Wallmo 1973), reduced sheep use would increase forage abundance for antelope. Improved forage availability would allow antelope greater freedom in dietary selection, which could improve nutrition and herd productivity.

Proposed minimum rest requirements would favor increased production of preferred grasses, forbs, and shrubs (winterfat, budsage, and saltbush species). Annual spring use by livestock, more than any other factor, has contributed to the depleted condition of about 76 percent of the current antelope range. The combination of minimum rest re-

TABLE 4-8
ELK HABITAT CONDITION AND TREND ON PUBLIC LANDS (acres)
ALTERNATIVE A - ACTION PROPOSAL

	Winter Range		Critical Winter Range		Summer Range		Yearlong Range		Total	
	Present (%)	Long Term (%)	Present (%)	Long Term (%)	Present (%)	Long Term (%)	Present (%)	Long Term (%)	Present (%)	Long Term (%)
Condition Class										
Good	1,500 1/	10,600 (5)	100 (2)	100 (2)	0 (0)	49,500 (44)	0 (0)	4,000 (15)	1,600 1/	64,200 (18)
Fair	116,000 (55)	138,100 (67)	4,000 (87)	4,000 (87)	86,000 (77)	52,800 (48)	16,300 (62)	20,400 (78)	222,300 (63)	215,300 (61)
Poor	91,600 (44)	60,400 (28)	500 (11)	500 (11)	25,600 (23)	9,300 (8)	9,900 (38)	1,800 (7)	127,600 (36)	72,000 (21)
Total	209,100 (100)	209,100 (100)	4,600 (100)	4,600 (100)	111,600 (100)	111,600 (100)	26,200 (100)	26,200 (100)	351,500 (100)	351,500 (100)
Trend										
Improving	0 (0)	92,000 (44)	0 (0)	4,500 (98)	0 (0)	26,800 (24)	0 (0)	10,200 (39)	0 (0)	133,500 (38)
Static	95,900 (46)	95,600 (46)	4,100 (89)	100 (2)	69,300 (62)	82,900 (74)	16,300 (62)	16,000 (61)	185,600 (53)	194,600 (55)
Declining	113,200 (54)	21,500 (10)	500 (11)	0 (0)	42,300 (38)	1,900 (2)	9,900 (38)	0 (0)	165,900 (47)	23,400 (7)
Total	209,100 (100)	209,100 (100)	4,600 (100)	4,600 (100)	111,600 (100)	111,600 (100)	26,200 (100)	26,200 (100)	351,500 (100)	351,500 (100)

TABLE 4-9
ANTELOPE HABITAT CONDITION AND TREND ON PUBLIC LAND (acres)
ALTERNATIVE A - ACTION PROPOSAL

	Winter Range		Critical Winter Range		Summer Range		Yearlong Range		Total	
	Present (%)	Long Term (%)	Present (%)	Long Term (%)	Present (%)	Long Term (%)	Present (%)	Long Term (%)	Present (%)	Long Term (%)
Condition Class										
Good	0 (0)	2,300 (13)	0 (0)	0 (0)	0 (0)	8,000 (9)	0 (0)	0 (0)	0 (0)	10,300 (9)
Fair	0 (0)	4,400 (26)	0 (0)	700 (20)	26,400 (31)	27,000 (32)	400 (6)	3,400 (50)	26,800 (24)	35,500 (32)
Poor	17,300 (100)	10,600 (61)	3,500 (100)	2,800 (80)	58,500 (69)	49,900 (59)	6,400 (94)	3,400 (50)	85,700 (76)	66,700 (59)
Total	17,300 (100)	17,300 (100)	3,500 (100)	3,500 (100)	84,900 (100)	84,900 (100)	6,800 (100)	6,800 (100)	112,500 (100)	112,500 (100)
Trend										
Improving	0 (0)	7,600 (44)	0 (0)	2,800 (80)	0 (0)	47,700 (56)	0 (0)	5,200 (76)	0 (0)	63,300 (57)
Static	10,800 (62)	8,700 (50)	0 (0)	700 (20)	63,100 (74)	31,000 (37)	4,000 (59)	1,600 (24)	77,900 (69)	42,000 (37)
Declining	6,500 (38)	1,000 (6)	3,500 (100)	0 (0)	21,800 (26)	6,200 (7)	2,800 (41)	0 (0)	34,600 (31)	7,200 (6)
Total	17,300 (100)	17,300 (100)	3,500 (100)	3,500 (100)	84,900 (100)	84,900 (100)	6,800 (100)	6,800 (100)	112,500 (100)	112,500 (100)

1/ less than 1 percent

quirements and livestock reductions would help improve habitat conditions (Table 4-9).

Summer livestock use would not occur on antelope range. Fall and winter sheep use would occur within portions of both antelope summer and winter range. Winter sheep use on antelope winter range leads to the highest seasonal dietary competition between the two species (Taylor 1975). Since forage availability is reduced by snow cover, opportunities for selective feeding are reduced and both animals are largely restricted to use of browse. Taylor (1975) found that "competition was direct and could be serious". During "average" winters, both sheep and antelope would disperse over large areas and forage competition would be insignificant. However, during severe winters, antelope would be concentrated into less suitable habitat, which would sometimes coincide with areas into which sheep are also restricted. Livestock-antelope conflicts (forage competition, behavioral interactions, spatial interference) would still exist, however, its intensity would be significantly reduced.

Mechanical treatments and prescribed burning are the primary methods of manipulation proposed on antelope range. Over 13,000 acres of antelope habitat could be treated. Desirable understory production would increase upon release from shrub and annual weed competition. Dominant sagebrush and greasewood stands, which are seldom used by antelope, would be the target areas for treatment. Manipulation would transform these decadent, low producing sites into more natural and productive plant communities. Increased plant and habitat diversity would broaden and improve nutritional values of the total forage resource.

A high percent kill of big sagebrush could occur on manipulated areas which would have adverse impacts on winter range if treated areas are too large (Yoakum 1978). Loss of big sagebrush on winter range would be insignificant compared with its overall abundance if treatments are restricted in size. Big sagebrush mortality would be compensated to some degree by improved forage conditions on spring through fall habitats within yearlong range. About 6,000 acres of manipulated poor condition summer range would change to fair and good condition classes (Table 4-9). About 7,000 acres of manipulated poor condition winter range would improve similarly.

About 98 check dams and reservoirs are proposed on antelope range. If winter range is not a limiting factor in the EIS area, increased summer range carrying capacities (in response to water development) could increase yearlong antelope populations. No fences are proposed on antelope range.

IMPACTS ON SAGE GROUSE

Sage grouse were not directly allocated vegetation, however, they would indirectly benefit from increased understory production resulting from livestock reductions. Their seasonal preference for herbaceous plants is well documented in the literature.

The action proposal would increase herbaceous production and leave 50 percent of current annual growth ungrazed. Both increased understory abundance and residual cover would improve nesting, brooding, and adult summer habitats. Increased insect and forb abundance would especially benefit young birds and could improve population productivity.

Krager (1977) estimated peak of the hatch occurring about June 10 in the Piceance Basin. Since this is about the average livestock turn out date under proposed minimum rest cycles, nest disturbance from livestock grazing would be significantly alleviated compared with the present situation.

About 41,000 acres of sage grouse habitat would be manipulated. Most of the sage grouse range in the EIS area supports yearlong populations. Given a lack of specific information on seasonal movements and activity use areas, all vegetation manipulation could be detrimental if the most critical life function requirements (nesting, brooding, and winter habitats) are not provided for on each treated site. Thus, where winter range overlaps brood range, small created openings could benefit brood range but lower the quality of winter range.

Spraying (2, 4-D) projects would result in high forb mortality if conducted after snowmelt when forbs are beginning spring growth. Kills of greater than 40 to 60 percent on sagebrush would reduce habitat quality by eliminating effective cover and reducing forb abundance (Krager 1977). The thinning of dense stands to 20 to 40 percent canopy cover could provide increased acreage of nesting habitat.

In general, short and long term impacts would largely benefit sage grouse and their habitat if sagebrush manipulations are limited in size and percent kill and irregularly shaped. Seasonally differing habitat requirements would be fulfilled by creating interspersed stands of varying vegetation age class structure, density, and composition. Brood habitat possesses the greatest potential and need for improvement and could be accomplished by careful design and implementation of proposed manipulations.

Water development on summer range could increase the acreage of usable summer habitat and improve habitat quality through more uniform livestock distribution.

IMPACTS ON WATERFOWL

About 531 check dams or reservoirs are proposed for development. Quality habitat could occur where the dams would hold water throughout the summer and where suitable nesting cover might be provided (fenced enclosures would be constructed where feasible). However, current nesting populations (mallard and green-winged teal) are extremely limited on public lands in the EIS area; future increases are expected to be insignificant.

IMPACTS ON NONGAME BIRDS

Birds with grassland and shrub affinities would generally benefit from the proposed vegetation allocation, minimum rest requirements, levels of utilization, etc. These proposals are designed to increase understory production and would leave about 50 percent of current annual growth ungrazed. Understory complexity would increase, leading to improved nesting cover and more abundant seed and insect food sources. Since overall shrub abundance would remain static, habitat values of shrub dependent species would be maintained. In general, moderate livestock grazing tends to develop small scale environmental heterogeneity (Weins and Dyer 1975) in terms of plant density, composition, height, litter, etc., which may benefit bird species diversity.

The 297 acres of riparian habitat in the EIS area, given their extremely small size and current vegetation characteristics, are essentially unsuitable for occupation by riparian species. These areas lack both the vertical and horizontal vegetation structuring required by "true" riparian species. Long term habitat improvement (discussed in the Riparian Vegetation section) would benefit generalist species but not riparian species.

About 42,700 acres of pinyon-juniper habitat are proposed for manipulation. Proposed methods of manipulation (mechanical and prescribed burning) would exert abrupt, long term habitat alterations.

O'Meara (1978) and BLM (data on file) studied the effects of chaining pinyon-juniper in the Piceance Basin by comparing breeding bird densities and diversity of native stands with chained areas. These studies concluded that a major impact involved the destruction of preferred nesting and foraging site requirements of forest adapted species. The number of species and densities of breeding birds in chained areas were both less than half that in unchained plots, and no breeding birds were common to both habitats (O'Meara 1978). BLM data (on file) indicated that chaining benefitted 4 species but decreased abundance or made occupation unsuitable for 23 species. Carothers and Johnson (1975) reported similar findings on chainings in Arizona.

Birds which occupy chainings are typically generalists which occur in many habitats throughout the EIS area. However, the overall shape and size of pinyon-juniper manipulations would affect habitat suitability for these species. Miller (1946) found that Brewer's sparrow seemed to be limited to sagebrush openings at least 100 yards in diameter. Other shrub or grassland associated birds typical of large, open expanses (i.e. horned lark, loggerhead shrike, sage thrasher) probably have similar requirements, suggesting that they would not normally breed or forage in small created openings. Insular effects (discussed in BLM data on file) would limit occupation by species, even though they are adapted to and would prefer these newly created environments. In the EIS area, there appears to be few if any, species that are directly associated with edge affect.

The conversion of about 111,000 acres of sagebrush habitat to dominant grasslands would eliminate shrub nesting species such as Brewer's sparrow and sage thrasher. Ground nesters that do not require a shrub overstory would be favored.

IMPACTS ON SMALL MAMMALS

Proposed vegetation allocation, levels of utilization, minimum rest requirements, etc., are all designed to increase understory production. Increased understory complexity would benefit most small mammals. Habitat changes would be subtle and gradual but carrying capacities for most species would increase area-wide in the long term.

The fencing of water developments would create small scale favorable environments that could increase small mammal abundance and diversity.

Proposed vegetation manipulations would have both beneficial and adverse impacts on small mammals, depending on their habitat requirements in relation to post-manipulation habitat conditions. Net environmental impacts on the group as a whole are expected to be beneficial but largely compensatory in the long term.

Species dependent on climax pinyon-juniper communities would be expected to decrease after manipulation. In the Piceance Basin, O'Meara (1978) found desert and bushy-tailed woodrats and pinyon mice to occur in lesser numbers in chainings than in native stands. He also found rodent species diversity lower in chainings than in native stands. Desert cottontails (a habitat generalist) were reported to be less abundant in chainings where slash was removed than where it was not (literature cited in Zarn 1977). O'Meara (1978) also found that chainings can increase rodent populations by 200 to 300 percent. Most of the increase was due to chipmunk and deer mouse population expansions, although golden-mantled ground squirrels and Apache pocket mice also increased. Baker and Frischknecht (1973) found that deer mice, long-tailed voles, and Great Basin pocket mice increased on pinyon-juniper conversions. The deer mice and pocket mice increased greatly the first 2 years after treatment but then declined sharply to a level which was still above that before treatment. They also found that older chainings had similar numbers of small mammals as untreated juniper.

Vegetation manipulations in sagebrush habitats would probably decrease populations in the short term until understory production responded to provide food and cover requirements. In the long term, improved habitat diversity could promote increased small mammal populations and species diversity.

IMPACTS ON PREDATORS

Grazing management proposals and vegetation manipulations would, in the long term, slightly increase the prey base of predators in general. Omnivores, such as the coyote and black bear, would also benefit from increases in desirable herb and shrub production. Anticipated insect population increases could broaden and increase the prey base of predators which select insects, such as owls and kestrels. Short term reductions in prey populations on vegetation manipulations could incur insignificant impacts on localized areas. Accipiters would find reduced prey (birds) abundance in pinyon-juniper manipulations.

IMPACTS ON THREATENED AND ENDANGERED SPECIES

Four federally listed endangered species (peregrine falcon, bald eagle, whooping crane, and black-footed ferret) and one state listed endangered species (greater sandhill crane) have been documented as occurring in the EIS area. Only the bald eagle occurs regularly. The action proposal would not affect any threatened or endangered species in the EIS area.

CONCLUSION OF IMPACTS ON TERRESTRIAL WILDLIFE

Allotment carrying capacities for mule deer would increase, ranging from 5 to 23 percent on 78 percent of the mule deer range. No long term increase would occur on 22 percent of their range. In the long term, deer carrying capacities EIS area-wide could increase about 11 percent above 1978 levels (71,599 AUMs would be allocated to support about 51,526 deer).

Carrying capacities would increase about 23 percent on most summer ranges of the Rangely deer herds. Yearlong populations would increase if winter range is not a limiting factor to these herds. Summer population increases in the White River deer herd would be limited to the capacity of their winter range.

Poor condition winter and critical winter ranges (27 percent of all winter range), which support 41 percent of the winter deer population in the EIS area, would not sustain populations above 1978 levels.

Winter carrying capacities could decline if pinyon-juniper manipulation excessively reduces the size of effective cover zones.

Proposed fencing on critical winter ranges and major spring-fall migration routes would increase deer mortality rates, although this would be offset to some degree by improved forage conditions resulting from improved livestock distribution.

Yearlong elk habitat conditions would improve, increasing carrying capacities by 8 percent. The current population of 1,783 elk could increase to about 1,926 elk. Currently poor condition range would be reduced from 36 percent to 21 percent of all elk range in the long term, while good condition range would increase from less than 1 percent to 18 percent. Renewed understory production would account for these major habitat improvements.

Cumulative impacts of the proposals discussed above would result in improved antelope habitat condition. Although 59 percent of antelope range would remain in poor condition in the long term, there would be a 17 percent increase in acreage of fair and good condition habitat. Current declining trends on poor condition range would largely change to improving trends. Overall change in habitat condition would be slow, except on the 13,000 acres of vegetation manipulation where improvement would be evident within the short term. Antelope carrying capacities could increase by about 2 percent, resulting in a population increase from the existing 219 antelope to 224 antelope.

Sage grouse populations would be benefitted under this alternative if vegetation manipulations adequately provide for habitat requirements on nesting, brooding and winter ranges.

Most nongame birds, small mammals, and predators would benefit from grazing management proposals. Pinyon-juniper manipulations would reduce bird species diversity and abundance over the long term. Sagebrush manipulations would reduce bird species diversity and abundance over the short term. Manipulations would reduce small mammal species diversity but increase overall abundance over the short term. Long term abundance would be similar to pretreatment levels. Obvious changes in predator populations would not be expected in either the short or long terms.

Threatened and endangered species would not be affected by the action proposal.

Impacts on Aquatic Wildlife

Impacts on aquatic life following the implementation of the action proposalwould generally be classified as beneficial. This would result from improvements in both watershed and riparian vegetation conditions, which would improve the quality of the aquatic habitat of the perennial streams in the EIS area. Watershed improvements would be exhibited by increased vegetation cover and improved soil stability, thereby lessening the impacts of soil erosion to the aquatic habitat. Improvements in riparian vegetation would be exhibited by an increase in vegetation cover along streambanks which would tend to stabilize streambanks, retard erosion, and reshape the stream channel. Improvements in riparian vegetation would also serve to regulate the energy base of the aquatic ecosystem by shading and supplying plant and animal detritus to the stream.

IMPACTS ON AQUATIC INVERTEBRATES

Beneficial impacts to aquatic invertebrates would be exhibited by increases in the number of species (species diversity) and the number of individual organisms (biomass) inhabiting a particular stream. This would be accomplished through decreased siltation, the introduction of organic detritus, and the introduction of large organic debris in the form of limbs, twigs, and logs. By decreasing siltation, the smothering effect on the gill breathing larvae of several families of aquatic insects would be decreased. Through a gradual process, stream flows would continue to scour stream beds, remove sediment depositions, and expose rock and rubble, which is suitable as habitat for many aquatic invertebrates. The addition of large organic debris to a stream would also increase the amount of available substrate suitable for the attachment of aquatic invertebrates. The introduction of plant and animal detritus to a stream would enhance invertebrate populations by directly providing food, or by stimulating microbial action through decomposition and indirectly providing food.

Changes in invertebrate species diversity and biomass cannot be predicted because data on existing populations is sparse to nonexistent. It can be stated, however, that there would be a general improvement in aquatic invertebrate populations in those streams associated with improving riparian conditions, and a general decline in those streams associated with declining riparian conditions (Table 4-5). No change would occur in those streams maintaining the same or similar riparian vegetation conditions.

IMPACTS ON FISH

Impacts on fish habitat, especially trout habitat would also improve as a result of changes in riparian vegetation. Increases in riparian vegetation ground cover along streambanks would enhance streambank stability, reshape channel morphology, provide protective cover, decrease sedimentation, increase the food supply, and regulate water temperatures through shading. By improving bank stability, less caving, sloughing, and soil erosion would occur. This would result in less stream siltation, which would reduce or eliminate the smothering effect on eggs, sensitive young fish, and aquatic insects which serve as fish food. The reshaping of channel morphology would be exhibited by undercut banks, providing excellent trout habitat, and by improved pool and riffle areas. Pools and riffles would be enhanced by the introduction of large organic debris, such as logs, limbs, and stems, which collect in jams and pockets, and change flow patterns. Increased flow patterns would scour streambeds to provide spawning sites or dig holes to provide resting areas. Overhanging vegetation would provide protective cover, regulate water temperatures for spawning and incubation of eggs, and provide food through falling insects.

Table 4-10 indicates long term trends on game fish habitat for streams and reservoirs within the EIS area. Improvement in fish habitat would occur on approximately 45 miles of stream flowing through public lands largely as the result of improvements in riparian vegetation. It should be noted, however, that the resultant improvements in fish populations would be marginal at best. The limiting factor which would inhibit a major improvement in numbers of fish would be stream size (width and depth) which restricts carrying capacities. The potential for angling use would not be increased.

The fencing of 12.5 miles of stream along Trappers, Lake, and Soldier Creeks would provide for the greatest improvement in fish habitat by completely protecting the riparian communities. This action would greatly enhance the survivability of the Colorado cutthroat trout populations inhabiting these three streams.

Table 4-10
LONG TERM TRENDS IN FISH HABITAT
Alternative A - Action Proposal

Allotment No.	Stream Name	Trend
6005/6019	Piceance Creek	No Change
6019/6021	Trappers Creek	Improve
6023	Willow Creek	No Change
	Middle Fork Stewart Creek	No Change
6024	Fawn Creek	Improve
	West Fawn Creek	Improve
6029	Black Sulfur Creek	Improve
6324	Divide Creek Reservoir	No Change
6337	Windy Canyon	Improve
	Bear Park Creek	Improve
	East Douglas Creek	Improve
6346	West Creek (in Reservoir)	No Change
6345	Brush Creek	Decline
6357	West Evacuation Creek	Improve
6358	Bitter Creek (in Reservoirs)	No Change
6367	Lake Creek	Improve
	Soldier Creek	Improve
6813	Cow Creek	No Change
	Big Beaver Creek	No Change
	White River	No Change

No change in fish habitat would occur along 26 miles of public stream. Included here are 12 miles along the White River and 4.5 miles along Piceance Creek. Improved watershed conditions would decrease the sediment loads in these streams, however, these changes would not be substantial enough to improve fish habitat. Public segments of these streams are generally short and intermittent along the entire length separated by long stretches of private or state owned stream. Public portions comprise less than 10 percent of both streams. For this reason, impacts resulting from activities on public owned stream frontage would be neglible.

Fish habitat in Divide Creek reservoir, and the reservoirs on West and Bitter Creeks would not change substantially. Divide Creek reservoir has been previously fenced. Livestock reductions would not be sufficient to reduce the impacts on bottom disturbance by wading livestock in the reservoirs on West and Bitter Creeks.

A decline in the fish habitat along the 3 miles of Brush Creek would occur as a result of the declining riparian conditions, causing a loss in cover, increase in siltation, and a decrease in available food organisms.

THREATENED AND ENDANGERED FISH SPECIES

There would be no impacts as a result of the action proposal on either of the endangered fish species, Colorado squawfish and boneytail chub, which occur in the White River. Both species are either presently existing at low population levels, or use the river only sporadically. Such conditions would not be expected to change from impacts associated with this alternative.

The Colorado cutthroat trout populations in Trappers, Lake, and Soldier Creeks would improve due to improved habitat conditions following the fencing along all three streams.

CONCLUSION OF IMPACTS ON AQUATIC WILDLIFE

Implementation of the action proposal would result in an overall improvement in habitat for both aquatic invertebrates and fish. Improvements in fish populations would be marginal due to the limited carrying capacities of most streams in the EIS area. On streams where public ownership comprises only a small percentage of the total stream length, impacts to aquatic life would be negligible. Fish habitat would improve along 45 miles of stream, remain the same on 25 miles, and decline along 3 miles.

Impacts on Wild Horses

The initial allocation of vegetation in the action proposal would result in a 8,014 AUM reduction in wild horse use. The 8,014 AUM reduction would decrease the wild horse population from 366 to 90 (75 percent) in the Yellow Creek, Cathedral Bluffs, and Square S allotments and decrease the remainder of the existing wild horse range (Map 2-1) by 100 percent (259) horses). Total wild horse reductions would be 86 percent (535 horses) of the present wild horse herd of 625.

The action proposal recommends total removal of wild horses outside the proposed 107,000 acre wild horse area. Total removal would cause short term periods of stress by removing horses from their natural environment. During a recent total removal operation on Douglas Mountain in northwest Colorado, most of the remaining 10 percent of the herd had to be removed with a capture gun resulting in a 3 percent death loss. Death losses in the EIS area could be expected to exceed this figure because the wild horses are scattered over a larger area which includes more fences and rougher terrain.

The 75 percent reduction of wild horse use in the proposed 107,000 acre wild horse management area should not have a significant impact on range condition for the first one to two years after the reductions have been made. However, the wild horse reduction should have a beneficial effect on forage production during the spring growing season with improved plant composition, density and cover occuring 3 years after wild horse reductions are completed. This reduction would decrease the competition between horses for forage, water, and living space during the short term which, according to Dasmann (1964), would increase annual forage production because the density of the population is below the carrying capacity of the environment.

The reduction of 276 wild horses from the proposed wild horse management area would only leave an average of 30 wild horses in each of the three allotments. Herds of 30 wild horses could be susceptible to total elimination during severe winters. For example, a local rancher reported observing 20 winter-killed wild horses in pasture C (Square S allotment) in the early summer of 1979. According to local CDOW information (personal communication), a large percentage of the animals that die in a wildlife population are not ususally observed. This could indicate that the number of horses dying in pasture C exceeded the 20 that were observed during the 1978-1979 winter which was one of the severest winters in the last several years.

Also, wild horses in small herds of 30 animals may not have enough genetic variation to prohibit inbreeding. However, wild horses naturally roam in bands of 5 to 15 horses which predisposes the band to a certain level of inbreeding. In a period of 10 to 15 years, inbreeding would produce recessive characteristics that would reduce survival and produce undesirable conformation. The undesirable conformation characteristics could affect the situation of adopting excess horses through the BLM Adopt-A-Horse program.

The three allotments within the proposed 107,000 acre wild horse range contain enough boundary fences and natural barriers to contain cattle. However, interchange of wild horses between the three allotments is possible and has been observed along the Cathedral Bluffs, the point at which all three allotments meet. No new fencing has been proposed which would preclude interchange of wild horses along the Cathedral Bluffs, nor has any interior fencing within any of the three allotments been proposed which would prevent wild horse movement to lower elevations during severe winters.

Most of the proposed range improvements (manipulation of sagebrush and pinyon-juniper, and development of new waters) would have beneficial impacts to wild horses by providing a better quality of forage and improved distribution. The increase in quantity and quality of forage would be benefical to wild horses in the long term because of improved nutrition due to improved quality and diversity of their yearlong diet. This, in turn, would enable the horses to fully realize their genetic growth potential.

As vegetation conditions improve, the long term allocation of vegetation would provide a 56 percent increase in the forage available to wild horses from the initial level of 1,350 AUMs to 2,101 AUMs. The increased forage would provide an increase in the wild horse population from the initial level of 90 horses to 140 horses.

CONCLUSIONS OF IMPACTS ON WILD HORSES

Implementation of this alternative would reduce the wild horse numbers from the present 625 horses to 90 horses (86 percent) and reduce the size of the wild horse range from the present 443,979 acres to 107,000 acres. Forage for wild horses would improve, benefitting wild horses because of improved nutrition. Long term vegetation allocations would provide a 56 percent increase from the initial population of 90 horses to 140 horses.

A reduction of herd sizes to 30 horses in each of the three allotments could cause a lack of sufficient variation due to inbreeding, some of which would occur naturally. However, interchange of wild horses among the three allotments would still be possible.

Small herds of horses have been lost in the past and could continue to be lost during severe winter storms. Improved forage quantity and quality plus no new interior fences to impede horse movements could lessen the chances of winter losses.

Adverse impacts would occur to wild horses during removal operations. The horses removed would suffer short term stress and possible death.

Impacts on Cultural Resources

Due to the lack of adequate survey data, cultural site prediction can be attempted with only varying degrees of accuracy. An incidence of 1 site per 58.2 acres has been estimated in the EIS area based on 1977 BLM survey data. This figure does not attempt to predict size or significance of sites and does not account for variations in topography. A figure of 1 site per 79 acres has been determined for the Canyon Pintado Historic District based on a 100 percent survey. This lower site density may be due, in part, to the comparatively large size of sites found in the historic district. Thus far, 958 archeological and 73 historic sites have been recorded in the EIS area. On a project specific basis, 1.1 percent of the total EIS area has been surveyed for cultural resources.

The effects of trampling on sites varies with season of year, condition of soil, presence of surface features and structures, and animal density. Increased grazing use is proposed on 18 allotments.

Table 4-11 shows the number of proposed range facilities and the estimated number of acres which would be disturbed on an initial (short term) basis. A very limited prediction of site occurance can be made according to type of range facility based on surveys done by BLM archeologists for project specific clearances ("Report of Examination of Cultural Resources", BLM 1975-1979). This prediction is based on previous survey work done in the EIS area.

Grazing during the late fall and winter seasons would minimize surface disturbance due to the harder or frozen condition of the soil. Summer or spring use would cause greater horizontal and vertical displacement of artifacts and strata due to trampling on softer soil. Severe mixing of horizontal layers can occur around springs and other water developments. Roney (1977) has found that cattle produce significant physical damage to lithic artifacts and vertical movement occurs which can significantly reduce visibility of a site.

Litzinger (1975) attributes soil erosion to grazing as a result of hard packed areas of soil due to trampling by sheep. Soil erosion is accelerated along trails, near water developments, and near fences. Where soil stability is poor and secondary geologic processes can take place, erosion would occur exposing archeological sites and causing eventual destruction.

Surface features such as granaries, fortifications, wickiups, and cabins could be damaged or completely destroyed by trampling and rubbing. The San Luis Resource Area, Canyon City District, Colorado Grazing EIS adequately documents the effects of livestock rubbing on standing structures (pp. III-83 to III-85).

Mechanical vegetation manipulation would be proposed for a total of 37,619 acres of pinyon-juniper and would impact an estimated 136 archeological sites ("Report of Examination of Cultural Resources", BLM 1975-1979). In a study on the impact of pinyon-juniper chaining on archeological sites (DeBloois et al. 1975), one half of the test artifacts were impacted with 19 percent missing and 31 percent displaced. Since 50 percent random disturbance of materials on the surface of a site may totally eliminate the possibilities of doing adequate studies, it may actually be accurate to estimate the adverse effects from chaining as nearly 100 percent. This study does not take into account any measure of subsurface disturbance.

Burning is proposed on 5,104 acres of pinyon-juniper. Lithic sites may be adversely impacted since fire would damage lithic materials. Carbon-14 samples could be contaminated by modern carbon deposits making this dating method useless for surface archeological sites.

Brush beating and disc plowing would adversely impact sites by disturbing horizontal and vertical distribution of soil layers and artifacts. Some damage to artifacts would also occur. Broadcast seeding would reduce erosion by stabilizing the soil, thus having a beneficial impact on archeological sites.

Although vandalism cannot be directly related to the action proposal, it can be considered an indirect adverse impact. Increased access to range users, construction crews, and the general public would increase the amount of unrestrained damage which would be done to archeological and historic sites. Due to inadequate federal surveillance (resulting from lack of personnel and funds) pothunters are virtually unrestricted in their theft of artifacts on public lands. Immovable rock art is frequently damaged by bullets or graffiti (Williams 1977).

CONCLUSION OF IMPACTS ON CULTURAL RESOURCES

The proposed range facilities and vegetation manipulation would involve the disturbance of over 187,419 acres. This would impact an anticipated 3,220 archeological and historic sites. Adverse impacts could destroy a finite number of cultural resources; a nonrenewable resource.

The improved distribution of livestock and increased vegetation cover would positively impact cultural resources by reducing the potential for erosion which can cause the destruction of sites.

Impacts on Visual Resources

Any removal of vegetation, disturbance of soil, or construction of facilities would cause a visual impact. The degree of impact would depend upon the amount of visual constrast created between the activity and the existing landscape.

The exact amount of visual impact from range improvements would be determined from a site specific analysis prior to project development. However, certain generalizations may be drawn indicating which actions, under the proposal, would most likely have discordant impacts in the respective Visual Resource Management (VRM) Class (Table 4-12).

The vegetation manipulations would modify the basic elements of form, line, color, and texture from the time of the initial action during and after revegetation. The visual contrast would be most obvious immediately following treatment due to the replacement of shrubland and pinyon-juniper type with charred or dead vegetation. These contrasts would decrease over time as grasses, forbs, and shrubs become established. However, contrast would still be evident during the long term.

Windrows created in chaining areas would create highly visible lines which would contrast until the piles are burned five years later. At that time, another contrast would be created by the burning of the piles. Table 4-13 shows allotments where adverse visual impacts would occur through the long term.

TABLE 4-11
PREDICTED ARCHEOLOGICAL SITES PER ACRES DISTURBED
ACCORDING TO RANGE FACILITY
ALTERNATIVE A - ACTION PROPOSAL

Type of Proposed Facility	Units	Short Term Acres Disturbed	No. of Predicted Archeological sites 1/
Reservoir	510	510	194
Water Catchment	39	195	3
Well	44	44	1
Spring	85	22	39
Pipeline	65	65	1
Fence	212	212	45
Storage Tank	83	50	1
Check Dam	21	11	1

1/ Where project specific data was not available, the general figure of 1 site per 58.2 acres was used. In cases where site prediction was less than one, one site was predicted.

TABLE 4-12
IMPACTS TO VISUAL RESOURCES AS A RESULT OF RANGE IMPROVEMENTS
ALTERNATIVE A - ACTION PROPOSAL

		V R M Classes					
		Class II		Class III		Class IV	
Project	Units	Project Amount	Impact	Project Amount	Impact	Project Amount	Impact
Spring Developments	No.	19	No	37	No	29	No
Reservoirs	No.	100	No	113	No	297	No
Check Dams	No.	0	No	0	No	21	No
Wells	No.	1	Yes	9	No	34	No
Water Catchments	No.	3	Yes	12	No	24	No
Pipelines	Mile	6	No	26	No	33	No
Fences	Mile	27	No	89	No	96	No
Vegetation Manipulations	Acres	20,995	Yes	71,708	Yes	93,607	No

TABLE 4-13
PROBABLE ADVERSE VISUAL IMPACTS BY ALLOTMENT
ALTERNATIVE A - ACTION PROPOSAL

ALLOTMENT	ACTION	ACRES
6322	Burn - P/J	1,200
6361	Mech - P/J	320
6357	Mech - P/J	2,390
6032	Mech - P/J	1,752
6622	Mech - P/J	400
6612	Mech - P/J	528
Total		6,590

TABLE 4-14
RECREATIONAL HUNTING OPPORTUNITIES RESULTING FROM
EXPECTED INCREASES IN BIG GAME POPULATIONS
ALTERNATIVE A - ACTION PROPOSAL

	Population		Harvest		Recreation Days per Animals Harvested	Increased Animals Harvested (yr. 2000)	Increased Recreation days (yr. 2000)
	Present	yr. 2000	Present	yr. 2000			
Deer	45,394	51,526	11,221	12,887	8.4	1,666	13,948
Elk	1,783	1,926	319	482	29.1	163	4,729
Antelope	219	224	50	52	3.5	2	7

Impacts on Recreation Resources

IMPACTS ON SKULL CREEK

The proposed reduction in livestock grazing would have a beneficial impact upon the Skull Creek Study Area by increasing the rate of vegetation recovery and, thus, preserving the area's naturalness. The proposed burning of 1,200 acres of pinyon-juniper trees could have an adverse impact on the naturalness values of the area.

A study conducted by the University of Arizona Laboratory Tree-Ring Research group indicates that some trees found in the Skull Creek Study Area may be among the oldest of their kind in North America. These trees normally occur on shallow, rocky sites which are not normally susceptable to fire and, thus, not suitable for prescribed burning. If vegetation manipulation results in the destruction of these relic trees, a loss of educational interpretation possibilities would occur.

IMPACTS ON BIG GAME HUNTING

As a result of the proposed vegetation allocation, forage competition between livestock and big game wildlife would decrease. This would have a long term beneficial effect resulting in increased big game populations and hunter/viewing recreational days.

Under the action proposal, deer populations would increase by 11 percent, elk by 8 percent, and antelope by 2 percent. By applying the 25 percent maximum harvest of total population formula (CDOW 1978), a corresponding increase in harvest capabilities can be shown (Table 4-14). The recreation days capabilities determined by multiplying the increased population figures by the projected days hunted per animal harvested for the year 2000 (CDOW 1974), would total an additional 18,684 days. This represents an 18 percent increase in hunter/viewing recreational use over the total of 103,714 recreation days experienced in the four game units within the EIS area in 1978.

Assuming that the full hunter capacity is realized and the amount of BLM land remains constant, the hunter density would also increase. The increased hunter density would result in a decrease in individual hunter success. This would be a marginal adverse impact which would be outweighed by the benefits of the increased number of recreational days.

IMPACTS ON WILD HORSE VIEWING

The present wild horse population of 625 horses would be reduced 86 percent to a population of 90 horses in the short term with an increase to 140 horses in the long term, and the wild horse habitat of 443,979 acres would be reduced 76 percent to 107,000 acres. This would reduce the wild horse viewing capability to 107,000 acres. Under the proposal, the density of 1 horse per 710 acres would be reduced to 1 horse per 764 acres. Although this would enhance the wild, free-roaming nature of the animals, it would decrease the viewing opportunities.

Approximately 45 horses would remain on the Cathedral Bluffs allotment in the long term. This allotment is predominantly covered by pinyon-juniper trees which act as a screen and reduce viewing opportunities. This would leave approximately 95 horses up on the ridges, which is less than the approximately 200 horses that currently roam the ridge area.

CONCLUSION OF IMPACTS ON RECREATION RESOURCES

The reduction of livestock grazing would have a beneficial impact on the naturalness values of the Skull Creek Study Area. The increased wildlife forage, resulting in a higher big game capacity in the EIS area, would increase big game recreational days by 19 percent, representing an additional 18,684 days in the year 2000. However, individual hunter success would decline due to increased hunter density. Wild horse viewing opportunities would decline sharply due to the proposed 86 percent reduction in the wild horse population in the EIS area.

Impacts on Economic Conditions

Analysis of impacts in this section was accomplished by considering the EIS area population affected; the range livestock economy (including income, employment, and public finance and tax base) and recreation-related income, economy.

IMPACTS ON RANCH AND LIVESTOCK INCOME

Under the action proposal, 56 ranching operations would receive reductions in allowable federal AUMs while 17 operations would receive increases. Grazing use would remain unchanged for 27 operations.

Some of the ranches receiving reductions in allowable grazing use may be able to substitute other privately-owned forage or hay in order to avoid reducing herd size. Such adjustments were considered in the ranch models (Appendix F) as other costs and included in the gross and net revenue changes indicated in Table 4-15.

Table 4-15 indicates the ranch size grouping of the 73 operations that would incur revenue changes resulting from increases or reductions in grazing use. To estimate the income impacts associated with grazing use changes, the difference between proposed grazing use and actual grazing use (active licensed use) was determined for public lands.

Since private lands within the allotments are also subject to conditions of the overall management, there would be a similar impact on private land. This impact was estimated and added to the change in BLM forage to determine the total impact on income for the 73 ranches affected. Table 4-15 indicates gross and net revenue changes resulting from the grazing use changes.

It should be noted that these aggregate figures do not reveal the wide variation in impacts that would occur to individual ranching operations. Changes in the grazing use (BLM and private) available to particular ranches would range from small increases to reductions of about 50 percent.

Changes in gross and net revenue for ranching operations and changes in sales and income to other sectors of the EIS area economy are presented in Table 4-16.

In the short term, gross revenue of all the ranches would be reduced by an estimated $l,452,736 which indicates that indirect income to other sections of the EIS area economy would be reduced by $1,210,129.

The short term net revenue, which is direct income to the ranching families, would be reduced by $99,731, which would result in an additional $160,667 reduction in indirect income in the EIS area. Thus, the total direct plus indirect income short term effect would be an estimated $260,398 reduction, which amounts to 0.7 percent of the 1977 Rio Blanco County personal income.

The estimated short term net revenue changes would not cause a major impact on the 73 affected ranching operations. About 26 out of the 72 were already receiving negative net revenues before the reductions. The estimated median change in net revenue resulting from the action proposal would be about 10 percent.

Table 4-17 identifies the relative dependency on BLM forage for the 73 ranches, and Table 4-18 translates that relative dependency (along with alternate forage sources and season of use) into an estimate of the criticality of ranch dependency on BLM grazing.

It should be noted that 58 percent of the total 100 ranches associated with BLM grazing had a criticality of ranch dependency estimated as "high". This percentage figure has increased to 78 percent for the 73 ranches affected by changes in grazing use.

Of the 139 families in the EIS area associated with BLM grazing permits, 106 families would be affected by the action proposal. Of the 106 families affected, 85 percent or 90 families depend on ranching as a primary source of income. Thus, it appears that the subset of EIS area operators associated with the forage use changes are about equally dependent on BLM grazing from the standpoint of variability of their operations and their source of income as those operators not so affected.

Many factors influence the ability of a ranching operation to survive income losses such as debt burden, level of capitalization, present net income (from ranching operations as well as from other sources), diversification of operation, operator's age, scale of operation, and availability of and proximity to alternate forage sources.

Lack of information on individual operators as well as the wide range of decision options available to them make it impossible to determine whether the reduction-related income losses would force operators out of the livestock business. However, there is a possibility that some of the impacted operations could cease, with some recombining of properties occurring. It is also possible, given the probable continued growth of non-agricultural economic activites such as mining and recreation in the area, that some properties could be converted to these or other nonranching uses.

As indicated in the Livestock Grazing section, it is predicted that an additional 47,055 AUMs of forage above short term levels would be available for livestock use by the year 2000. First consideration on use of additional forage would be given to those operators receiving reductions as a result of the action proposal. It is estimated that by the year 2000, at the end of the analysis period, total BLM forage use could be 156,058 AUMs.

The use level at the end of 20 years would be an increase of 20,030 AUMs over the present actual level, with an estimated associated increase in private AUMs of 6,434; a total gain of 26,464 AUMs. The estimated growth in gross and net revenue over present levels in the EIS area resulting from this increased level of forage use would be $1,100,759 and $125,193 respectively. Increases in

TABLE 4-15
RANCH SIZE AND INCOME EFFECTS
ALTERNATIVE A - ACTION PROPOSAL

Model	Cattle	Sheep	No. of Ranches	Total BLM AUM Change	Total Corr. Pvt. Land AUM Change	Total BLM Plus Pvt. AUM Change	Avg. AUM Change/Rnch	Gross Revenue Change/ Ranch	Gross Revenue Chg/All Ranch	Net Revenue Change/ Ranch	Net Revenue Chg/All Ranch	Changes In Hired Empl. (Man-Years)
Short Term												
1	1-149		9	-864	-122	-986	-110	$ -3,216	$ -28,944	$+1,108	$+9,972	-.46
2	150-449		17	-4,144	-1,727	-5,871	-345	-10,088	-171,496	+409	+6,953	-4.14
3	450-749		9	-4,196	-1,242	-5,438	-604	-19,751	-177,759	-2,180	-19,620	-1.35
4	750-1,999		15	-13,229	-13,529	-26,758	-1,784	-55,019	-825,285	-2,153	-32,295	-5.51
5	2,000 or more		1	+557	+439	+996	+996	+60,567	+60,567	+10,335	+10,335	+.56
6		1-6,000	17	-4,617	-2,685	-7,302	-430	-16,237	-276,029	-4,109	-69,853	-5.48
7	1-1,399	1-1,749	3	-521	-650	-1,171	-390	-11,034	-33,102	-1,701	-5,103	-.64
8	1,400 or more	1,750 or more	2	-11	0	-11	-6	-334	-688	-60	-120	--
		TOTAL	73	-27,025	-19,516	-46,541			$-1,452,736		$-99,731	-18.14
Long Term												
1	1-149		9	-479	-43	-522	-58	$ -1,696	$ -15,264	$ +584	$+5,256	-.24
2	150-449		17	+890	-389	+501	+29	+848	+14,416	-34	-585	+.35
3	450-749		9	+4,747	-58	+4,689	+521	+17,037	+153,333	+1,880	+16,920	+1.17
4	750-1,999		15	+7,613	+4,535	+12,148	+810	+24,980	+374,700	+978	+14,670	+2.5
5	2,000 or more		1	+2,123	+1,516	+3,639	+3,639	+221,288	+221,288	+37,762	+37,762	+2.03
6		1-6,000	18	+2,829	+873	+3,702	+206	+7,779	+140,022	+1,969	+35,442	+2.78
7	1-1,399	1-1,749	4	+1,300	--	+1,300	+325	+36,749	+146,996	+1,418	+5,672	+.39
8	1,400 or more	1,750 or more	2	+1,007	--	+1,007	+504	+32,662	+65,324	+5,028	+10,056	+.73
		TOTAL	75	+20,030	+6,434	+26,464			$+1,100,815		$+125,193	+9.71

SOURCE: Bartlett, E.T., R.G. Taylor, and J.R. McKean. 1979. Impacts on Federal Grazing on the Economy of Colorado. Fort Collins. Colorado State University.

BLM Range Management Automated System, 1979, for ranch sizing.

NOTE: Income effects derived from analysis in Appendix F. Private AUMs within allotments have been included in the ranch income analysis since their level of use changes in approximate proportion with BLM AUMs.

TABLE 4-16
CHANGES IN REVENUE
ALTERNATIVE A - ACTION PROPOSAL

Economic Sector and Revenue Type	Short Term	Long Term
Ranch Operators		
Gross Revenue	$ -1,452,736	$ +1,100,759
Net Revenue	$ -99,731	$ +125,193
Other Economy Sectors		
Gross Revenue 1/	$ -1,210,129	$ +916,932
Net Revenue 2/	$ -160,667	$ +201,686
Total Change in EIS Area Income 3/	$ -260,398	$ +326,879

1/ Agriculture/livestock business activity multiplier of 1.833
2/ Agriculture/livestock income multiplier of 2.611
3/ Total net revenue

TABLE 4-17
OPERATOR/RANCH DEPENDENCY ON BLM GRAZING
RANCHES IMPACTED BY THE ACTION PROPOSAL

Dependency (%)	Number of Ranches
0 - 10	16
11 - 20	9
21 - 30	14
31 - 40	16
41 - 50	7
51 - 60	6
61 - 70	4
71 - 80	0
81 - 90	1
91 - 100	0
Total	73

TABLE 4-18
CRITICALITY OF RANCHER DEPENDENCY ON BLM GRAZING
RANCHES IMPACTED BY THE ACTION PROPOSAL

Criticality	Number of Ranches	Percent of Total
High	57	78
Medium	9	12
Low	7	10
Total	73	100

NOTE: High means that BLM forage is judged to be an essential element for the survival of the ranching operation. Medium means that BLM forage use may or may not be an essential survival element. Low means that BLM forage use is judged not to be essential to the ranching operation survival.

A judgmental estimate of the criticality of rancher dependency on public land grazing was made by BLM personnel by applying the following three criteria to each ranching operation:

1. Proportion of forage acquired on public land
2. Season that forage is acquired
3. Ease of acquiring alternate sources of forage

gross and net revenues to other sectors of the EIS area economy would be $916,932 and $201,686 respectively. The total direct plus indirect increase over present levels would be $326,879, or 0.9 percent of the 1977 Rio Blanco County personal income.

While the long term situation presents an increase from the present grazing use level, the short term income reductions for some impacted ranching operations could, as indicated above, result in some operations ceasing and some combining of properties or conversion to other uses occurring.

There would be an estimated 18.14 man-years of hired employment decrease on EIS area ranches in the short term resulting from ranching cutbacks due to lower levels of BLM forage use (Table 4-15). It is possible that in the long term there would be an increase of about 9.71 man-years hired employment by the year 2000 above the present levels.

As a result of the action proposal, there would be a short term decrease in authorized AUMs (active qualifications) from the present level of 159,734 to 109,003. The decrease of 50,731 AUMs authorized use would represent economic value to the ranches associated with the decrease. Therefore, the relative value of such ranches and of the EIS area tax base would be decreased in the short term.

Various appraisal estimates suggest that the value of livestock ranches in western Colorado is about $1,000 to $1,200 per animal unit of carrying capacity (one animal unit equals 12 AUMs). A decrease of 50,731 AUMs would translate into a decrease of 4,227.58 animal units of authorized use, which would reduce the present value of the affected ranches by about $4,227,580. This decrease could result in a reduction in short term borrowing capabilities and possible losses could result for ranchers if they sell base properties during the short term when reductions are in force.

A related decrease would involve the tax base. In Rio Blanco County, agricultural property is assessed at 30 percent of its market value (Rio Blanco County Assessor). This would mean that decreased ranch values resulting from cuts in allowable use would result in a decrease in the tax base of about $1,268,274, or 0.6 percent of 1977 Rio Blanco County assessed valuation (Colorado Department of Local Affairs 1977).

In the long term, allowable use could be up to 156,058 AUMs which would mean a much smaller decrease from the present authorized use for EIS area ranches. The decrease of 3,676 AUMs would translate into 306.33 animal units which would decrease the present value of EIS area ranches by about $306,330. The related reduction in the tax base would be about $91,899, or 0.05 percent when compared to the 1977 Rio Blanco County assessed valuation.

It should be noted that Colorado agricultural land prices reflect demand influences for land which involve considerations other than future ranch income. Therefore, the likelihood that EIS area ranch property would appreciate is acknowledged. However, values of ranch property with decreased present value as a result of the action proposal might be expected to increase at a slower rate than similar properties experiencing no decrease in allowable use.

Property taxes paid to local governments might be affected in two different ways. The short term reduction in ranch assessed values of $4,227,580 would result in a $43,755 drop in property tax revenues at the present total mill levy of 34.5. It should be noted, however, that this tax revenue loss would occur only on reassessment of the affected ranch properties and only if other factors did not cause an offsetting appreciation. Since the short term reduction in allowable AUMs would last only a few years, it is possible that no such reassessment would take place. The long term decrease in assessed values of $306,330 would bring about a $3,171 drop in property tax revenues. Since livestock herds are also assessed for property taxes, reduction in herd sizes would also affect local government tax revenues.

IMPACTS ON RECREATION AND WILDLIFE DERIVED INCOME

The action proposal would provide habitat for expanding big game populations, particularly deer. Increased big game populations would create increased hunting and viewing opportunities. This additional human-related wildlife use would create additional income for EIS area households.

The Recreation section contains estimates of the increases in hunter recreation days that could accompany the expanded big game populations. From these figures it is possible to estimate the impact occuring to the state of Colorado from increased hunting in the EIS area. This is done by calculating the percentage of nonresident recreation days for each species, 51 percent for deer and 53 percent for elk (Section 3), and multiplying by a value derived for each nonresident recreation day, $193.36 for deer and $545.71 for elk (Section 3). Based on statewide value, the estimated impact of expanded nonresident big game hunting would be $1,375,462 for deer and $1,367,751 for elk, for a total of $2,743,213.

CONCLUSION OF IMPACTS ON ECONOMIC CONDITIONS

Under the action proposal, 56 ranching operations would receive initial reductions in allowable AUMs while 17 operations would receive increases. In the short term, net incomes would be reduced by $99,731 to $2,532,134 for ranching operations and $160,667 to $4,079,268 for other economy sectors.

In the long term, allowable AUMs would increase, and provide for an increase in net incomes of $125,193 to $2,757,053 for ranching operations, and $201,686 to $4,441,621 for other economy sectors.

Ranch values would be decreased by $4,227,580 in the short term, with a resulting decrease of $43,755 in property taxes paid to local governments. In the long term, ranch values would be decreased by $306,330 with a decrease of $3,171 in property taxes paid to local governments.

Of the 73 ranches affected, 66 percent depend on public land grazing for 20 percent or more of their total forage requirements, and 78 percent require BLM forage as an essential element for the survival of the ranching operation. It is possible that some operations may go out of business as a result of reductions in grazing use.

Ranch employment would be reduced by 18.14 man-years of hired employment to 180.49 in the short term, and increased by 9.71 man-years hired employment to 208.34 in the long term.

An impact to the state of Colorado would result from an increase in nonresident big game hunting in the EIS area. Revenues from this activity would increase by $2,743,213 for both deer and elk hunting in the long term.

Impacts on Social Conditions

In the short term, the social well-being of the 92 ranch families associated with the income losses would be adversely impacted. This adverse impact resulting from income loss would affect an estimated 305 people. It is possible that the forage and subsequent income loss would be regained, depending upon future livestock forage increases. However, the possibility does exist that the forage would not be regained by all impacted ranches. Consequently, the income loss would be long term for some individuals.

Some of these 92 families could also be adversely impacted if they were not able to remain in the range livestock business due to inability to sustain the forage losses, since the dependency on BLM forage of some ranches is relatively critical. Some of these individuals could be adversely impacted as a result of the social and occupational dislocation which could result from the inability to survive the forage use reductions.

It does not appear that these adverse impacts can be avoided initially, though it is possible that the forage, and associated income loss, would be regained by some ranches. In those cases where forage and income cannot be recovered, the unavoidable adverse impacts to the families would be long term, especially in those cases where BLM forage is critical.

Impacts on Land Uses

IMPACTS ON LIVESTOCK GRAZING

The principal effect of the proposed vegetation allocation and minimum rest requirement on livestock grazing would be a reduction in livestock use, primarily on spring range. Spring ranges, covering approximately 250,000 acres, have historically received nearly continuous spring use, often under heavy stocking. The minimum rest requirement is specifically applied to the critical period of plant growth, mainly in spring and early summer, as a method of improving these and other seasonal ranges.

In order to allow for deferment of spring grazing and stocking rate adjustments, it is estimated that grazing use would require a reduction of approximately 28 percent in sheep use on spring ranges and approximately 11 percent in cattle spring use periods. These reductions would have the greatest impact in terms of livestock grazing use and magnitude of reduction on spring/winter sheep allotments and spring/summer/fall/winter cattle allotments. These operations would be adversely affected in the short term due to added production costs through necessary acquisition of alternate forage sources and increased labor costs associated with the possible necessity of splitting sheep bands. Short term impacts to cattle grazing would be similar to those of sheep.

An impact common to both cattle and sheep operations is the possible necessity of holding livestock on private meadows longer in the spring if suitable substitute spring range cannot be found. If spring range is unavailable, increased hay supplies would be required, as early spring meadow production alone would be insufficient. Heavier use of meadows in the late spring would reduce hay yields, which could mean that the operator may have to purchase alternate forage sources the following winter.

If the demands for alternate sources of forage is great enough, operators can be expected to pay a higher price for those AUMs which they formerly obtained from BLM range (USDA and USDI 1977).

Short term impacts are, however, expected to be offset by increased forage quantity and quality over the long term. Studies conducted over a 14 year period in western Utah have shown that both forage production and range ewe production can be substantially increased under moderate sheep grazing (Hutchings and Stewart 1953). A moderate level of utilization is the intent of the proposal. Hutchings and Stewart found that the average net return from herds on moderately grazed range was more than twice as great as that from the herds on heavily grazed range. The greater overall return on moderately grazed range was directly attributed to the general better physical and productive condition of the sheep (lower death loss, fewer replacements required, greater wool clip, etc.). Similar results are expected with cattle production.

Implementation would have a short term adverse impact on proposed intensive livestock operations resulting in a 27,305 AUM reduction (25 percent) in present active licensed use (Table 4-19). Proposed less intensive management allotments would not be as severely affected with only a 745 AUM (7 percent) short term reduction and a 681 AUM (6 percent) long term reduction. Long term impacts would result in a 15,158 AUM (14 percent) increase in active licensed use on proposed intensive management allotments.

Under the proposal, 80 allotments on 1,447,025 acres of public land would be placed under intensive management. Intensive management would include implementation of minimum rest requirements and range improvements.

In order to implement the minimum rest requirement (or provide for different degrees of deferment), allotment pastures would be established. While one pasture in an allotment is deferred the others would be stocked to insure moderate utilization. Because the period of deferment coincides with the critical period of plant growth, spring, the net impact would require operators to spend more time on their base lands or acquire substitute spring range. This adverse impact should be offset by a long term increase in spring forage production on public lands.

Before construction of range improvements, the primary impact of the action proposal is to reduce stocking rates for season long grazing so that moderate utilization is insured. Numerous studies have demonstrated the economic and productive value of moderate stocking levels (Mueggler 1950, Rogler 1951, Hyder and Sawyer 1951, Hutchings and Stewart 1953, Reed and Peterson 1961, Hyder and Bement 1977, *Record Stockman* Jan. 11, 1979). In general, weaning weights, lamb production, and cow and ewe performance have been superior as compared to use under heavy stocking. In addition, sustained yield forage production has been maintained and/or improved at the moderate use level. The immediate effect of the proposal, in terms of livestock production, would be positive, as stocking rates would be set at a moderate use level.

During implementation, grazing management plans would be instituted. These plans would provide for various levels of deferment. In general, under season long and deferred rotation grazing systems, cattle production is superior for season long grazing at moderate stocking levels (Rogler 1951). The principal advantage of continuous grazing is that cattle have access to all plants in the range unit when they are highest in nutritive value. In addition, if yearlings are grazed there would be some sacrifice in gain under deferred rotation because younger cattle would not utilize mature forage as well as older cattle in the pastures deferred until summer and fall.

As range improvements, particularly water facilities, are completed during the implementation phase, there should be a general improvement in cow-calf performance. Improved distribution and accessibility of water would affect this change (Sneva et al. 1977).

The long term impact of the action proposal would be to substantially increase vegetation production on native range. As this increase occurs, additional vegetation would be allocated for livestock grazing. While a substantial part of this increase would come as a result of improved native range, a significant increase in production would result from the vegetation manipulations and seeding of degraded ranges. Seeding desirable species in a revegetation project within pastures would aid in management flexibility where there is presently a critical seasonal shortage of forage. These treatments would positively affect range condition and production on untreated areas by providing relief from grazing, particularly in drought years (these seeded subunits within pastures can be fenced for use as relief pastures).

In order to defer use on summer areas as part of the proposed management systems, cattle would be held on the spring range longer in some instances. Because in most years forage quality, particularly crude protein, would be declining in this period (late June or early July), spring pastures with improved native and introduced species may be used to insure optimum nutrition for lactating cows prior to and during the early breeding season. This kind of management should improve conception rates and, thus, benefit overall livestock production.

TABLE 4-19
Changes in Livestock Grazing Resulting From the Action Proposal
by Period of Use and Kind of Livestock

Kind of Livestock & Period of Use	Number of Allotments	Active Licensed Use (AUMs)	Initial Livestock Use	Projected Livestock Use	Percent Change Initial	Percent Change Projected
EXISTING INTENSIVE MANAGEMENT						
Cattle Spring/Summer/Fall	2	2,923	2,750	3,675	-6	+26
Cattle Spring/Summer/Fall/Winter	4	10,023	11,221	14,824	+12	+48
Total	6	12,946	13,971	18,499	+8	+43
PROPOSED INTENSIVE MANAGEMENT						
Cattle Spring	4	1,856	2,378	3,701	+28	+99
Cattle Spring/Summer	2	980	365	430	-63	-56
Cattle Spring/Summer/Fall	14	16,875	11,814	19,436	-30	+15
Cattle Spring/Summer/Fall/Winter	13	56,087	41,225	61,799	-27	+10
Cattle Spring/Fall/Winter	7	4,255	3,028	4,964	-29	+16
Cattle Summer/Fall	8	3,168	2,012	2,953	-37	-7
Cattle Fall/Winter	2	1,117	882	1,262	-21	+13
Sheep Spring	1	451	507	784	+12	+74
Sheep Spring/Fall/Winter	7	4,184	3,982	6,006	-5	+43
Sheep Spring/Winter	10	12,715	9,005	13,958	-29	+10
Sheep Winter	5	3,446	2,880	4,116	-16	+19
Cattle & Sheep Spring/Summer/Fall	1	1,647	1,633	2,068	-1	+26
Cattle & Sheep Spring/Summer/Fall/Winter	1	1,541	1,306	2,003	-14	+32
Total	75	108,322	81,017	123,480	-25	+14
PROPOSED LESS INTENSIVE MANAGEMENT						
Total	58	11,010	10,265	10,329	-7	-6
Livestock Trailing Use	--	3,750	3,750	3,750	--	--
EIS Area Total	139	136,028	109,003	156,058	-20	+15

Note: Information in this table was compiled from data for each allotment in Appendix B, Table B-1.

These improved grass species all retain higher levels of crude protein and total digestible nutrients than most native species at this time of year. Nutrient values of native range species are beginning to rapidly decline at this time of year.

The action proposal's intensive grazing management program can be effectively used as a tool in altering plant composition as well as forage quantity and quality. Intensity and timing of grazing in the late spring can be used as a means of stimulating vegetation regrowth for later use in the fall and winter. The fences, water, and vegetation manipulations proposed would make it possible to remove livestock from a pasture in the spring following moderate grazing. In most years there would be sufficient moisture for regrowth. Generally, this regrowth would have a higher leaf-stem ratio and be more nutritious than if the area had been deferred for seed set (Hyder and Sneva 1963, Sneva 1973).

Conclusion of Impacts to Livestock Grazing

The immediate impact of the action proposal would be a short term reduction in livestock grazing use with a consequent adverse impact to livestock production. Overall area-wide reductions from active licensed use would amount to 27,025 AUMs (20 percent), while reductions from active qualifications would be 50,731 AUMs (33 percent). Following the first 4 to 6 years of the implementation phase, the majority of allotments would experience a net improvement in forage production through improved range condition and trend which would be due to improved management and range improvements. This increase in forage and its effect on the quantity and quality of livestock production would increase economic returns to livestock operations in the EIS area. Those allotments not showing a productivity increase over the long term are, however, expected to have productivity levels near present active licensed use. Overall EIS area increases are expected to be 15 percent higher (20,030 AUMs) than present active licensed use over the long term. Long term productivity levels would, however, remain 2 percent (3,676 AUMs) below active qualifications. This trend in increased forage and livestock production should continue over the long term of 20 years and level off beyond that point.

IMPACTS ON AGRICULTURE

Implementation of the action proposal in the EIS area would affect crop production. The reduction or elimination of spring grazing, as proposed, would result in livestock being held on private lands for longer periods in the spring. Spring livestock grazing would be reduced or eliminated on 52 allotments. As a result, irrigation on private hay meadows would have to be deferred and feeding continued until cattle were moved to spring ranges. Crop yields would be reduced by an unquantifiable amount. Changes in sediment yields are not expected to have a significant impact (beneficial or adverse) on agricultural lands.

IMPACTS ON FORESTRY AND FOREST PRODUCTS

The vegetation manipulations proposed in this alternative would convert 42,723 acres of pinyon-juniper forest to grassland. Repeated periodic treatments would be necessary to maintain that grassland.

The production of wood products within the pinyon-juniper type would be adversely affected by this alternative. Many of the same areas proposed for pinyon-juniper manipulations are presently identified as potentially suitable for sustained yield of wood products. The conversion of these areas to grassland would eliminate timber management of pinyon-juniper on treated areas.

The mechanical vegetation manipulations within the pinyon-juniper woodlands would produce approximately 258,475 cords of down and dead pinyon and juniper fuelwood and other wood products given an 8 year period; about 32,310 cords per year. While actual percent composition would vary from site to site, approximately one half of the total would be pinyon and the remainder juniper. The 32,310 cords of wood per year represents the equivalent heat energy of over 5.2 million gallons of fuel oil and has a stumpage value of $161,550.

Only part of the downed wood could be salvaged prior to burning. Present demands for wood products within this area are approximately 20,000 cords per year. Most of this demand is for pinyon, with very little demand for juniper. Using 20,000 cords per year as the expected utilization rate over a 10 year period there would be a total net loss of 58,475 cords. This represents an annual loss of over 5,848 cords, (having a stumpage value of $29,240), with the heating equivalent of 0.9 million gallons of fuel oil.

The burning of 5,104 acres of standing green pinyon and juniper stands would damage or destroy an additional 30,879 cords of wood as well as the regeneration within the stand. This additional loss represents the energy equivalent of 4.9 million gallons of fuel oil and a stumpage value of $164,395.

The burning of 16,760 acres of existing chainings would also have an adverse effect on forestry and forest products. There is still approximately 5 cords of sound wood per acre within these chainings. Since most of this wood is juniper, and there is presently a low demand for juniper, the monetary value is negligible. However, burning this wood would result in the loss of the energy equivalent of 13.4 million gallons of fuel oil.

Chainings and sagebrush parks within the pinyon-juniper type offer the best opportunities for the immediate production of pinyon Christmas trees and pinyon and juniper transplants. The present demand for transplants can be met but not the demand for quality Christmas trees. Burning or manipulating certain sagebrush areas and chainings within the EIS area would destroy available pinyon Christmas trees.

In addition to the direct loss of trees due to chaining, an undetermined number of pinyon trees would be killed by outbreaks of pinyon ips (*Ips confusus*, a bark beetle). Outbreaks of the pinyon ips commonly and quickly develop in trees uprooted or injured, as in land clearing for range improvement (Furniss and Carolin 1977). The large amount of downed pinyon would result in ideal breeding habitat for the pinyon ips. Following a build up in the slash, the beetles would attack nearby live trees, and might cause extensive damage. Beetle populations developing in slash created in spring or early summer would cause the most damage to adjacent, live trees.

The mechanical vegetation manipulations would increase fire hazard. As the twigs and needles on the downed trees dry out, a flashy fuel would be created that would carry fire rapidly. The trunks and limbs would create heavy fuels that build up and maintain heat. The quantity of fuels would make control difficult. The increased fire hazard could result in increased soil and vegetation damage if a fire should occur in the slash during periods of low soil moisture.

Conclusion of Impacts on Forestry and Forest Products

This alternative would have an insignificant effect on trees or forestry, with the exception of the proposed vegetation manipulations, particularly within the pinyon-juniper type. Conversion of pinyon-juniper stands to grassland would remove that land from sustained-yield production of wood products. The proposed mechanical manipulations would produce 258,475 cords of dead wood, however, only 200,000 cords could be utilized at present levels of demand. The burning of unsalvageable wood from all manipulations, including the burning of existing chainings, would result in a net loss of 173,154 cords of wood which has the heat energy equivalent of 27.7 million gallons of fuel oil and a stumpage value of $865,770. Manipulations of existing chainings and some sagebrush areas would destroy available Christmas trees which would result in an unmet demand.

IMPACTS ON WILDERNESS

Actions proposed under this alternative have been identified which could adversely impact the six Wilderness Study Areas (WSAs). Some proposed projects could conflict with the "Interim Management Policy and Guidelines for Lands Under Wilderness Review" (BLM 1979). As outlined in the BLM standard operating procedures (Section 2), no action would be taken which would impair the suitability of the six proposed WSAs for inclusion in the National Wilderness Preservation System. As a result, no impacts are expected to occur within the six WSAs from actions proposed under this alternative.

MITIGATING MEASURES NOT INCLUDED IN THE DESCRIPTION OF ALTERNATIVE A (ACTION PROPOSAL)

Pinyon-juniper chainings and sagebrush treatments would have adverse impacts on yields of wood products and wildlife habitat. Firewood and Christmas tree sales would be conducted before and/or after pinyon-juniper treatment to minimize loss of wood products. Site specific analysis would be conducted on proposed pinyon-juniper and sagebrush manipulations to determine critical activity use areas (foraging areas, thermal cover, escape cover, season of use, etc.) of deer, elk, antelope, and sage grouse so that their critical values would not be lost. Vegetation manipulations within critical deer winter ranges would be scheduled after treatments adjacent to critical winter ranges are completed, and deer winter forage production is adequate to replace forage that would be lost during treatment of critical winter ranges.

ADVERSE IMPACTS THAT CANNOT BE AVOIDED

Air quality, soils, water resources, and visual resources would be adversely affected in the short term by project development and vegetation manipulations. Air quality would be temporarily affected by airborne dust from range improvement practices and by smoke in the general area of prescribed burns. Increased erosion and sediment yields would have short term effects on soils and water resources but would be reduced as vegetation is reestablished on areas disturbed by range improvements. Visual resources values could be impaired in the immediate vicinity of any projects or vegetation manipulations since steps taken to mitigate visual impacts of these improvements are designed for distant viewing.

Threatened and endangered species and cultural resources not discovered in initial surveys could be depleted, damaged, and/or destroyed during any soil or vegetation disturbing activities. Range improvements would also cause a loss of production in some areas. Loss of 55 AUMs of forage production would occur from 552 acres occupied by range facilities. Production of 89,354 cords of firewood would also be lost as the result of chaining 42,723 acres of pinyon-juniper.

Fences could cause death losses to mule deer where new fences are constructed within critical deer winter range or across migration routes.

Short term loss of AUMs and reductions in spring livestock use would cause an increased dependency on private hay meadows and irrigated pastures normally used for producing winter feed. This dependency, along with short term reductions in livestock use, would result in adverse economic impacts to ranching families. Net revenue would decrease by $99,731 with subsequent losses of $160,667 in indirect income to the EIS area for a total net reduction of $260,398. Short term loss of income could cause some ranches to go out of business.

SHORT TERM USE VS LONG TERM PRODUCTIVITY

Initial soil erosion and increases in sediment yields due to project development and vegetation manipulation would be a short lived occurrence. After revegetation measures, soil erosion and sedimentation would gradually decrease below the levels that presently exist. Projects and manipulations, causing short term soil erosion and sedimentation, are expected to help decrease erosion in the long term over the entire EIS area through their contribution to grazing distribution, and as a result, subsequent increases in vegetation cover. Manipulation of pinyon-juniper would cause a long term decrease in wood products on treated areas. However, through reseeding and release of existing herbaceous species, long term forage productivity would improve dramatically.

Initial loss of ranch income due to reduction in livestock use would have variable long term effects. Increased dependency on hay meadows and irrigated pastures to hold cattle, due to delayed spring turn out dates, would cause added feeding expense and adverse economic impacts on ranchers. Over the long term, however, expected increases in vegetation production would benefit ranchers and lessen dependency on private agricultural land. Proposed reductions in livestock numbers in the short term would be offset by increased vegetation production over the long term. The expected productivity increase would allow livestock grazing to equal or exceed present actual use levels on rangeland providing higher quality and quantity of forage. Those operations able to economically withstand the initial reduction would realize increased ranch income in the long term through improved vegetation and more efficient management due to range improvements. Those ranches unable to economically withstand initial reductions would probably go out of the livestock business before benefits from improved range could be realized.

Death losses occurring during wild horse gatherings would represent a long term loss of those specific animals. Since the main purposes of wild horse gathering are to reduce numbers to the grazing capacity of the range and provide better range for wild horses in the long term, the remaining numbers would benefit by having more forage throughout the year, especially in the winter. Well fed, healthy horses would have better chances of winter survival and the reduction in winter death loss would probably exceed roundup deaths.

IRRETRIEVABLE OR IRREVERSIBLE RESOURCE COMMITMENTS

Threatened and endangered species and cultural resources, overlooked in initial surveys, which are depleted, damaged, and/or destroyed during construction of range improvements or through erosion would represent an irretrievable loss.

POSSIBLE CONFLICTS WITH OTHER FEDERAL, STATE, OR LOCAL LAND USE PLANS

No conflicts are anticipated with other federal, state, or local land use plans.

IMPACTS OF ALTERNATIVE B - NO ACTION

Impacts on Air Quality

Impacts on air quality from a continuation of present grazing management practices would result in a maintenance of existing conditions. Overall air quality would remain in good condition.

Impacts on Soils

Range condition and trend improvements under the six existing AMPs would continue to enhance soil erosion conditions in areas where soil moisture and soil development are favorable. This would result in vegetation and litter cover increases, decreased soil compaction, increased water infiltration, and reduced soil erosion into streams. In turn, this would improve the productivity of soils on the six existing AMPs by an unquantifiable amount, thus increasing forage available to livestock and wildlife.

On the remaining I33 allotments, condition and trend would remain static or decline in the short and long term. On areas that show improvement in range condition (mainly vegetation cover), soil erosion rates would decrease by an unquantifiable amount. Where range condition and trend is declining, on-site erosion would continue at a rate of approximately 32.61 tons/acre/year, which is 0.85 tons/acre/year more than present conditions. Appendix D, Table D-1 lists present erosion rates by representative allotment.

Localized areas of decline in vegetation cover could absorb moisture 5 to 6 times slower and have twice as much exposed surface area subject to wind and water erosion (Leithead 1959, Rauzi and Hanson I966).

CONCLUSION OF IMPACTS ON SOILS

Anticipated improvement in range condition and trend on the six existing AMP allotments would improve erosion conditions by an unquantifiable amount over the long term. Localized areas of decline in vegetation cover on the remaining 133 allotments could have a reduction in water absorption and increase in exposed surface area subject to wind and water erosion. This would result in a long term average increase of 0.8 tons/acre/year of soil lost over present conditions.

Impacts on Water Resources

The six existing allotments managed under AMPs (156,471 acres), which have been fully implemented and are showing improvement in range trend, would respond much the same as they would under Alternative A. The rest of the allotments would either not change hydrologically or would continue to increase in runoff and sediment yields at their present rate depending on vegetation trends. Runoff is predicted to average 0.46 inches from high intensity storms (Appendix D) or a 3 percent change from the present conditions. Runoff from a normal year is not expected to change significantly. For this alternative, sediment yield would average 2.46 tons/acre/year, an increase of 3 percent from present conditions which is believed not to be significant. There is no change expected in ground water quantity or quality.

Impacts on Terrestrial Vegetation

Present management would have varied effects on condition, trend, composition, cover, and production. Generally, trend would remain the same as at present. Major changes may occur in range condition as influenced by trend (Appendix E). Fair condition range with declining trend would be expected to decline to poor condition in 20 years. Similarly, fair condition range with an improving trend is expected to improve to good condition. Any condition class with static trend is expected to remain in that condition class.

Total poor condition range is expected to increase by 89,476 acres (6 percent), with 99 percent of those acres attributable to declining fair condition range and 1 percent from declining good condition range (Table 4-20).

Since no change in management is proposed, present trends are expected to remain the same over the long term (Table 4-21).

Desirable species are expected to decrease by 17 percent on areas declining from fair to poor condition, while areas improving from fair to good condition are expected to exhibit a similar though opposite change. No significant increase in desirable species is expected.

Cover of desirable species is expected to decrease by approximately 14 percent as fair condition range declines to poor condition. No change is

TABLE 4-20
PRESENT AND FUTURE RANGE CONDITION
ALTERNATIVE B - NO ACTION

Condition	Present	Future
Poor	446,055	535,531
Fair	996,742	907,462
Good	79,009	78,813
Total	1,521,806	1,521,806

TABLE 4-21
PRESENT AND FUTURE RANGE TREND
ALTERNATIVE B - NO ACTION

Trend	Present	Future
Declining	198,254	198,254
Static	1,291,854	1,291,854
Improving	31,698	31,698
Total	1,521,806	1,521,806

expected in overall cover as there would be a similar increase in less desirable species.

Declining range condition, resulting from the No Action alternative, is expected to decrease vegetation production by an estimated 7 percent (13,300 AUMs) over the long term, with the most significant decreases occurring in the sagebrush, mountain shrub, and pinyon-juniper vegetation types.

Impacts on Riparian Vegetation

Impacts on riparian vegetation from a continuation of present grazing practices would result from direct consumption or trampling by livestock. Since no range improvements or spring rest periods are considered in this alternative, livestock would continue moderate to heavy grazing in those riparian zones where access is readily available. This would result in conditions generally remaining static or declining by the year 2000. Appendix E indicates changes in riparian vegetation by allotment.

Impacts on riparian vegetation composition would result in both increases and decreases in desirable species. Desirable herbaceous species, grasses and forbs, would not change substantially on 148 acres, would improve on 5 acres, and would decline on 144 acres. Woody species, especially willows, would increase on 65 acres. This would occur on the K Ranch (6307) and Wolf Creek (6323) allotments where steep banks limit access to livestock and grazing use is already light, and on Trappers Creek due to fencing. Woody species would remain the same on 150 acres, and decline on 82 acres where grazing is moderate or heavy.

Vegetation ground cover would increase on 73 acres, remain static on 113 acres, and decline on 111 acres. Increases would result from the increase in salt cedars along Piceance, Spring, Stinking Water, and West Creeks; and the invasion of sagebrush and rabbit brush along East Hunter, West Hunter, Lake and Soldier Creeks, and Ryan and Yankee Gulch.

Other decreases would generally result from overgrazing on willows and shrubs and trampling of sprouts and seedlings.

Condition ratings for riparian communities would remain poor on 48 acres, fair on 131 acres, and good on 38 acres. Reductions would occur from fair to poor on 75 acres along those streams presently exhibiting a declining trend. Improvements would occur from poor to good on 5 acres along Trappers Creek. This would yield a net decline of 70 acres out of the 297 acre total; with 43 acres in good condition, 131 acres in fair condition, and 123 acres in poor condition.

Impacts on Threatened and Endangered Plants

Under the No Action alternative, present species conditions and status would remain the same, or change according to existing trends.

Impacts on Terrestrial Wildlife

IMPACTS ON DEER AND ELK

Vegetation would not be allocated to support mule deer and elk populations above 1978 levels (45,394 deer, 1,783 elk) in the long term. In the case that deer and/or elk populations were excessive, recommendations would be submitted to the Colorado Division of Wildlife (CDOW) requesting that populations be adjusted to within the limits of proper use of forage supplies. If CDOW did not reduce animal numbers, long term adverse consequences could result.

Livestock use would exceed estimated grazing capacities (Alternative A) by about 20 percent on deer and elk range. Specific levels of forage would not be reserved for deer and elk winter use. Wildlife would be competitively disadvantaged on use of herbaceous forage since the bulk of their use occurs in the winter after prior forage consumption by livestock from spring through fall. The concept of stable carrying capacities for deer at high elevations in the central Rockies is unrealistic (literature quoted in Wallmo et al. 1977). A lack of reserved forage would accentuate population instability, especially during drought years and harsh winters.

Deer-elk-livestock dietary competition would generally remain about the same as current levels, except where current downward trends (359,600 acres) would aggravate future conditions. Deer would be competitively disadvantaged in areas where significant elk and/or livestock use occurs.

Deer-elk forage competition would intensify on these overlap areas of winter range. Elk are broad spectrum feeders (Wagner 1976) and would probably out-compete deer since they are more efficient competitors and browsers because of their large body size (Compton 1975). With less herbaceous forage available on winter range, elk and deer would consume more browse, resulting in excessive use of already limited desirable browse production.

Browse response to continued heavy levels of deer use would depend on current browse conditions (Table 3-7). On poor condition range (450,400 acres), heavy browsing pressure would lead to decadence and mortality of preferred species. Entire browse stands would be lost in some areas, while in others, decadence and highlining would effectively reduce availability and production. Carrying capacities and perhaps populations would decline to an unknown level in the long term. About 66,500 acres with declining trends on fair condition winter range would probably drop into poor condition in the long term. About 640,400 acres with static trends would probably remain static through the long term.

Livestock management would continue at currently less intensive levels. Management facilities necessary for intensive management would not be constructed. A lack of effective fencing separating springfall range from summer range on the Piceance Mountain (6023), Twin Buttes (6346), Cathedral Bluffs (6337), Fawn Creek (6024), Greasewood (6036), Spring Creek (6032), and East Douglas Creek (6354) allotments would continue the current trends of livestock moving to higher elevations in early to mid-spring before range readiness and depleting summer range conditions. Inadequate fencing would also continue distribution problems on livestock spring/fall range (deer winter range on 81,700 acres; 8 allotments), contributing to excessive use of understory and browse forage on critical use areas.

The combination of inadequate fencing and water distribution on deer winter range (livestock spring/fall range), as currently exists, is a major cause of severely depleted bottomlands throughout the EIS area. Desirable browse such as four-wing saltbush, winterfat, and willow, has been displaced by essentially unusable disclimax sagebrush and greasewood stands. Powell (1969) found that sagebrush growing on favorable sites contained significantly higher concentrations of volatile oils than sagebrush on harsher sites. In this way, the most potentially productive winter ranges have lost their value for big game winter use.

Early spring livestock use, on livestock spring/fall/winter range, would suppress grass-forb production, sometimes effecting increases in sagebrush density. Winter ranges would thus be maintained in an energy deficient state (from a nutritional standpoint). The overabundance of sagebrush would be essentially unusable since adequate alternative forage would not be available in the amounts necessary to keep sagebrush consumption below 20 to 30 percent of the diet. Rumen digestive efficiency would be impaired, leading to poor nutritional and productivity levels where deer were forced to consume large amounts of sagebrush.

Vegetation manipulations would not be implemented under this alternative. Thus, a lack of periodic stand renewal would lead to widespread browse decadence and contribute to declining winter range conditions. Potentially valuable bottomlands would be maintained in their current unproductive status and potential wildlife carrying capacities would not be realized. Deer numbers would exceed carrying capacities as winter ranges declined in productivity because of widespread vegetation stagnation. It is estimated that carrying capacities would decline to the extent of supporting about 37,800 deer in the long term, a reduction of about 17 percent from current populations. Elk populations would probably remain stable around current levels.

IMPACTS ON ANTELOPE

Active licensed use would constitute the livestock vegetation allocation, which would exceed proper use of forage supplies by about 3,500 AUMs on antelope range. Apparently, obvious adverse impacts would be expected but in comparing antelope population trends with levels of sheep use over the last five years (the time span over which licensed sheep use was averaged to determine the proposed level of livestock use), no obvious changes have been detected. However, a significant percentage of the proposed livestock allocation has been in nonuse over the last five years. If all of the authorized use were activated, especially over a period of years, adverse impacts to antelope habitat would be expected. Although long term habitat conditions would probably support the current population of about 219 antelope, herd productivity could decline.

Livestock could be permitted to use a higher percent of current annual growth, an estimated 10 percent over that proposed in Alternative A. On paper, 10 percent fewer competitive AUMs would be available to antelope. However, the 10 percent reduction in overall forage could amount to a significantly greater reduction in forage species highly valuable to antelope. Competition would be most severe for decreaser climax species which are highly preferred by both. Sheep would consume these "ice cream" plants first (i.e. bud sagebrush, winterfat, and certain forbs) and substantially reduce their availability to antelope. Antelope would be forced to consume less preferred plants with lower nutritional levels.

More important than short term availability of preferred antelope forage, would be the long term decline in plant composition and density of these species. Cook (1971) found reductions in plant vigor among many salt-desert shrub species with as little as 25 percent use of current annual growth, regardless of the season of use. Many of these highly palatable plants have already been much reduced in distribution and production from pristine levels. They are currently so sparse in some areas that they are no longer considered key species. Increasers, such as western wheatgrass, currently dominate palatable plant production and are now the managed-for key species. Levels of utilization would be measured on key species, while less abundant but more palatable plants would be selectively overutilized. The more productive and diverse salt-desert shrub plant community has and could continue to slowly transform into a simplified sagebrush-grassland complex. Many areas have lost their value as winter range due to these plant successional trends.

No vegetation manipulations would be conducted, the only method by which much of the 86,000 acres of depleted antelope habitat (77 percent of all antelope range) could be rehabilitated. In the long term, especially on antelope winter range, habitat conditions would deteriorate from a lack of periodic stand renewal and there would be no available effective means to reverse downward trends or rehabilitate ranges incapable of positive, natural responses.

IMPACTS ON SAGE GROUSE

Continued livestock use above grazing capacities (as defined in the action proposal), lack of spring rest, poor livestock distribution resulting from inadequate fencing and waters, and lack of vegetation manipulation would exert cumulative adverse impacts on sage grouse habitat. Sagebrush density would increase; understory production and diversity would be suppressed.

Suboptimal habitat conditions would affect grouse populations in several ways. Although summer diets may be somewhat flexible in relation to variable food supplies (Carr 1968), nutritional deficiencies could be expected to adversely influence productivity. Literature varies regarding the relationships of nesting habitat to sagebrush stand density. However, it seems likely that brood habitat characteristics (suitability) may be an important factor influencing grouse nest site selection. Adequate food close to the nest may be a necessity for the nesting hen and recently hatched chicks, since they have a limited searching radius (Carr 1968).

Thus, dense sagebrush stands with limited forb and insect production may normally be unacceptable to grouse as nesting habitat. Further, nesting success and nest density appear to be positively correlated with increasing herbaceous understory density and cover height (literature cited in Carr 1968). Thus, in areas with declining understory production and increasing sagebrush density, nesting, brooding, and adult summer habitats would decline in quality.

IMPACTS ON NONGAME BIRDS

No significant population changes would be expected in birds with grassland and shrub affinities. However, bird species diversity and abundance would be limited by grass and shrub height, the most obvious structural feature determining the extent of potential habitat complexity (Balda 1975). Birds associated with other habitats would not be impacted by this alternative.

IMPACTS ON SMALL MAMMALS

The proposed livestock vegetation allocation, level of utilization, and lack of spring rest provisions would slightly decrease current levels of herbaceous production. Small mammals that are benefitted or adversely affected by these conditions would either increase or decrease, depending on their habitat requirements. No obvious population changes would be anticipated in the long term.

IMPACTS ON PREDATORS

Impacts to predators would largely be determined by population trends of their respective prey bases. No obvious population changes would be expected over the long term.

IMPACTS ON THREATENED AND ENDANGERED SPECIES

No impacts would be expected on the five endangered species occurring in the EIS area.

CONCLUSION OF IMPACTS ON TERRESTRIAL WILDLIFE

Current plant successional and habitat condition trends on deer and elk ranges would continue through the long term. About 75,900 acres of fair condition habitat would continue declining, as would 283,700 acres of winter habitat. It is estimated that deer carrying capacities would gradually decline by 17 percent over the long term, with winter habitats capable of supporting about 37,800 deer. Recently expanding elk populations would stabilize over the long term.

About 23 percent of antelope range would remain in fair condition over the long term, while 77 percent would remain in poor condition. About 30 percent of antelope range could continue declining.

Although long term populations would probably remain at current levels (219 antelope) it could be inferred that declining habitat and nutritional levels could have net adverse impacts on their welfare.

Nesting, brooding, and adult summer habitats on sage grouse range would not improve, as understory diversity would be limited by widespread sagebrush site dominance.

No obvious changes in current populations of nongame birds, small mammals, or predators would be expected under this alternative.

Threatened and endangered species would not be affected, either positively or negatively, by the alternative.

Impacts on Aquatic Wildlife

Continuation of present grazing management practices would result in the maintenance of those riparian communities presently showing a stable trend, and a decline in those presently exhibiting a declining trend. Those impacts on the riparian zones associated with 78 perennial streams would induce similar impacts on aquatic habitat, since riparian vegetation plays a key role in shaping both the physical and biotic structure of the aquatic ecosystem.

Table 4-22 depicts long term trends in fish habitat in the EIS area. Fish habitat would improve along six miles of Trappers Creek due to improved riparian conditions following the exclusion of livestock by fencing. This fencing would occur as a result of implementing current habitat management plans. Fish habitat would remain unchanged along 46 miles of streams on public lands. This would be caused by continued heavy to moderate use by livestock along streambanks, suppressing vegetation growth essential for improvement of the aquatic ecosystem and fish habitat.

Aquatic life in the White River would continue to be influenced by the land use practices, primarily agricultural, on the private lands adjacent to the river. Since public segments along the river are generally small, no direct impacts would occur as a result of grazing on public lands. Fish habitat would decline along 21 miles of streams as a result of continued heavy grazing in those riparian communities presently exhibiting a declining trend. Continued grazing along these areas would lead to a loss of vegetation cover, reduced streambank stability, and increased stream siltation.

No impacts on aquatic life and fish habitat in the Divide Creek Reservoir would occur due to previous fencing of the reservoir. The aquatic life and existing fish habitat in the reservoirs on West Creek and Bitter Creek would be influenced by impacts on the streams above the reservoirs. Continued removal of riparian vegetation and trampling of streambanks would increase sediment loads, however, these should settle out under normal conditions as water velocities slow upon entry into the reservoirs. No dramatic change would occur in these reservoirs by the year 2000.

Since little or no angling use occurs in the EIS area, no impact on angling use would be expected from this alternative.

IMPACTS ON THREATENED AND ENDANGERED FISH SPECIES

There would be no impacts, as a result of the continuation of present grazing practices, on either endangered fish species, Colorado squawfish and boneytail chub, which occur in the White River.

Colorado cutthroat trout populations existing in both Lake and Soldier Creeks would show a small decline by the year 2000. Riparian vegetation associated with these streams already exhibits a declining trend, and would continue to decline. This would cause a deterioration of trout habitat through loss of cover, increase in siltation, and reshaping of the stream channel morphology.

The Colorado cutthroat trout population in Trappers Creek would improve due to improved habitat conditions following the fencing of the stream.

CONCLUSION OF IMPACTS ON AQUATIC WILDLIFE

Continuation of present grazing management would result in an overall decline in habitat for aquatic invertebrates and fish. Fish habitat would improve along 6 miles of stream, remain the same on 46 miles, and decline on 21 miles.

Impacts on Wild Horses

The Square S allotment is the only allotment under intensive management that lies within the boundaries of the wild horse range. There are approximately 146 wild horses using three of the five pastures in this allotment. Pasture C has a wild horse population of approximately 116 wild horses, while the remaining 30 head are in Pastures A and B.

Under the No Action alternative, those horses would continue to consume all of the available 1,326 AUMs of forage in Pasture C. The continued combination of both cattle and wild horse forage

Table 4-22
LONG TERM TRENDS IN FISH HABITAT
Alternative B - No Action

Allotment No.	Stream Name	Trend
6005/6019	Piceance Creek	No Change
6019/6021	Trappers Creek	Improve
6023	Willow Creek	No Change
	Middle Fork Stewart Creek	No Change
6024	Fawn Creek	No Change
	West Fawn Creek	No Change
6029	Black Sulfur Creek	No Change
6324	Divide Creek Reservoir	No Change
6337	Windy Canyon	Decline
	Bear Park Creek	Decline
	East Douglas Creek	Decline
6346	West Creek (in Reservoir)	No Change
6345	Brush Creek	Decline
6357	West Evacuation Creek	No Change
6358	Bitter Creek (in Reservoirs)	No Change
6367	Lake Creek	Decline
	Soldier Creek	Decline
6813	Cow Creek	No Change
	Big Beaver Creek	No Change
	White River	No Change

use results in over-obligation of approximately 36 percent.

The over-obligation would contribute to declining range condition and changes in composition from desirable forage species to less desirable forage species. These changes would affect the quality and quantity of forage for wild horses. Reductions in quality and quantity of forage would reduce the condition and reproduction of wild horses.

There should not be any significant impacts to the wild horses or to forage in Pastures A and B as these pastures are grazed below carrying capacity. There are about 30 horses in these two pastures and they have not shown any significant increase since 1974.

The Little Spring Creek, Hammond Draw, Duck Creek, Upper Fletcher, and Greasewood allotments all contain small herds of wild horses and are not entirely fenced, which allows movement of wild horses into and out of these allotments. Average wild horse use in each of these allotments varies from 8 to 20 head of wild horses.

Under the No Action alternative, these allotments are used by cattle during the spring/summer, or spring/summer/fall. Estimated livestock grazing capacities in Alternative A would indicate that the Hammond Draw and Duck Creek allotments are under-obligated by 23 percent and 16 percent respectively, while the Little Spring Creek, Upper Fletcher, and Greasewood allotments are over-obligated by 15 percent, 29 percent, and 6 percent respectively (1973 range survey). Even though the over-obligation or under-obligation on these allotments is relatively small, some impacts to the vegetation could occur.

These allotments are all used by mule deer, wild horses, and cattle during the spring growing season, which would not allow ample rest to improve rangeland conditions. Under the No Action alternative, the four over-obligated allotments should begin to show a declining range condition. Forage shortages for wild horses would be minimal for two to five years, however, there could be a significant impact on plants after five years of implementation of the No Action alternative. According to Dasmann (1964), if animals begin to crop the metabolic reserve of a plant, they may injure the plant to the point that it will die. Continued heavy grazing during the spring could cause a shift of preferred grass forage plants to annual weeds and shrubs, which wild horses could not survive on.

The Yellow Creek allotment consists of three pastures with 52 percent over-obligation occuring in the Rocky Ridge pasture and 64 percent occuring in the Boxelder pasture (data derived from actual use records and a 1973 range survey). The Barcus-Pinto pasture has a small herd of wild horses and there should be no significant impacts on this pasture. The Spring Creek allotment would have 42 percent over-obligation under the No Action alternative. The impacts that would occur on these allotments would be the same as those listed for the previous allotments, except they would begin immediately and would probably accelerate.

The Cathedral Bluffs, Lower Fletcher, and Twin Buttes allotments are primarily cattle winter use areas within the wild horse range. Impacts to horses are probably less in these allotments than in the previously discussed allotments, because the topography is rough and steep which limits access by cattle, leaving ample forage for the horses during the winter. However, severe impacts to the forage in valley bottoms and around the few watering areas could occur because animals naturally congregate on the most accessible areas such as valley bottoms, level mesas, and water holes (Stoddart and Smith 1955). Impacts on these allotments should be much slower than on the allotments discussed previously, because competition between horses and cattle is probably lower due to topography. However, those areas in valley bottoms and around water holes would show a declining range condition and changes in composition under this alternative.

CONCLUSION OF IMPACTS ON WILD HORSES

Adverse impacts under the No Action alternative are basically the same for all areas in the wild horse range. These major impacts are a declining range condition, reduction in forage for wild horses, and higher mortality of wild horses with reduced annual herd production.

Impacts on Cultural Resources

Under the No Action alternative, impacts to cultural resources would continue at their present rate. Site destruction due to erosion could occur as a result of declining rangeland conditions.

Impacts on Recreation Resources

The wild horse viewing opportunities would remain the same as at present. Long term big game hunting opportunities could be reduced with the possible decrease in the deer population shown in the Wildlife section.

The long term decrease of 7,625 head of deer could reduce the number of deer harvested by

1,884 head by the year 2000. This reduction could reduce the number of recreation days by 15,826 days.

Impacts on Visual Resources

There would be no impacts to visual resources under this alternative.

Impacts on Economic Conditions

Under the No Action alternative, economic conditions would not be expected to change from the present conditions. Gross and net revenues for ranching operations and other sectors of the livestock/agriculture economy are expected to remain constant through the long term.

However, the proposed reduction of present qualifications to the level of average active licensed use (actual) would result in a reduction in "paper AUMs" and thus a reduction in ranch property values. Present qualifications would be reduced from 159,734 AUMs to 136,028 AUMs, a decrease of 1,975.5 animal units. A reduction in 1,975.5 animal units would reduce the present value of the affected ranches by about $1,975,500 ($1,000 per animal unit). Related to the decreased ranch values would be a reduction in the tax base of about $592,650 or 0.3 percent of the 1977 Rio Blanco assessed valuation.

The Wildlife section of this alternative indicates that deer populations would decline in the long term. The Recreation section indicates an associated decrease in hunter recreation days that would accompany a decline in deer populations. Based on the statewide value per animal harvested, an estimated decrease of $1,560,659 would occur to the State's economy as a result of decreased deer hunting.

Impacts on Social Conditions

Adoption of this alternative would not change present population, employment, or income trends. As discussed in Section 3, in recent years there has been migration into the EIS area due to increased job opportunites, with the mining industry having passed agriculture in 1976 as the largest private employer in the area. In terms of income, this trend should bring the average income in the area closer to state and national averages.

Existing trends in social and cultural attitudes can be expected to continue under the No Action alternative. It can also be expected that the feeling of alienation from "big government" and over regulation would continue under this alternative.

Impacts on Land Uses

IMPACTS ON LIVESTOCK GRAZING

Continuation of present management would have varying long term effects on livestock management. Generally, overall changes in management due to declines or increases in forage conditions are not expected to be great. However, specific areas, such as spring range and ranges in poor condition, may undergo changes in the next twenty years that would have significant adverse effects on livestock management.

Spring ranges used year after year by both sheep and cattle are showing signs of deterioration and are in poor condition in many areas. Other seasonal ranges are also in poor condition but to a lesser extent. Continued heavy use on seasonal ranges, especially spring range, while in poor condition with declining trends, can be expected to lower forage productivity in the future with consequent decreases in livestock production.

Areas in higher condition classes (fair and good) with stable or improving trends are expected to remain in similar condition with no changes in livestock operation. Allotments in good or fair condition with declining trends would have no significant change in management even though production may be somewhat reduced.

IMPACTS ON AGRICULTURE

The No Action alternative would have no impact on crop production in the EIS area. Agricultural conditions and trends would continue at their present rate.

IMPACTS ON FORESTRY AND FOREST PRODUCTS

No significant impacts would occur to forestry or forest products with implementation of the No Action alternative.

IMPACTS ON WILDERNESS

Continuation of present grazing management practices is not expected to create impacts that would impair the suitability of the six Wilderness Study Areas.

MITIGATING MEASURES NOT INCLUDED IN THE DESCRIPTION OF ALTERNATIVE B

Adverse impacts identified with implementation of Alternative B (No Action) could not be mitigated without a change in grazing management.

ADVERSE IMPACTS THAT CANNOT BE AVOIDED

On allotments under less intensive management, rangeland in declining condition would continue to do so over the long term with subsequent increases in airborne dust, soil erosion and sedimentation which would adversely affect water quality. Soil displacement would increase by 0.8 tons/acre/year over the long term. Soil erosion would also continue to disturb or destroy cultural sites and degrade aesthetic values associated with visual resources.

Fair condition range with a downward trend (97,984 acres) would decline to poor condition over the long term with desirable species in the plant composition decreasing by 17 percent. Approximately 75 acres of fair condition riparian vegetation would decline to poor condition over the long term. Continued levels of livestock use on poor condition spring range would reduce forage production with subsequent declines in allowable livestock use.

Wildlife forage conditions would also deteriorate over the long term. Early spring livestock use would continue to adversely affect grass-forb production, resulting in continued increases in sagebrush density, and perpetuating dietary energy deficiencies associated with lack of understory forbs and grasses. Decreasing understory production would also result in long term declines in sage grouse nesting and brooding areas, and summer habitats.

Poor condition deer winter range (277,600 acres) would continue to decline, leading to decadence and mortality of desirable shrubs. Fair condition winter range (66,500 acres) would decline to poor condition in the long term. Currently declining antelope habitat conditions would continue on 30 percent of their range with about 77 percent remaining in poor condition over the long term. Overall, habitat conditions would continue to decline and would result in possible long term population decreases.

Continued existing wild horse and livestock grazing levels would result in declining range conditions on wild horse range. Forage availability would be reduced, thus increasing wild horse mortality.

SHORT TERM USE VS LONG TERM PRODUCTIVITY

Under this alternative, current trends in ecosystem productivity would be assumed to continue through the long term. Currently suboptimal levels of vegetation production would remain below site potential through the long term due to a lack of management facilities, no available effective means of stand renewal in degraded plant communities, and over-obligation of vegetation production. Where current stocking rates are balanced with fair and static vegetation conditions, long term plant productivity would remain stabilized below natural potentials.

On properly stocked good condition range, long term productivity would approach site potentials. On 97,984 acres with declining trends, a grazing imbalance would result in losses to nonrenewable resources (soils) and in a gradual reduction in long term vegetation productivity (site potentials could be lowered).

These vegetation trends would result in secondary impacts on dependent wildlife species. Declining habitat values would reduce long term wildlife carrying capacities and productivity and increase vulnerability to additive outside stress, such as energy development. Even localized distubance could have far reaching impacts on migratory species. Habitat loss in deer winter range would displace and concentrate animals into smaller areas, thus accelerating habitat declines. Nutrition and herd productivity would decline as mortality increased. Yearlong populations would be reduced, thus negatively impacting local economic and recreational conditions (productivity).

IRRETRIEVABLE OR IRREVERSIBLE RESOURCE COMMITMENTS

Reduction in site potentials through the loss of soil (up to 32.6 tons/acre/year) on poor condition range would be both irreversible and irretrievable. Given a lack of vegetation manipulation, site dominance by alien annuals and undersirable shrubs would occur unless management policies were changed.

Losses of cultural resources resulting from increased soil erosion would be irretrievable.

Economic losses resulting from reduced long term livestock grazing capacities and lowered big game populations would not be retrievable unless a change in management reversed declining trends.

POSSIBLE CONFLICTS WITH OTHER FEDERAL, STATE, OR LOCAL LAND USE PLANS

The No Action alternative would conflict with the Colorado Division of Wildlife long term population goals for big game species of wildlife which are to increase populations in the Northwest Region of the state. No conflicts are anticipated with other federal, state, or local land use plans.

IMPACTS OF ALTERNATIVE C - ELIMINATION OF LIVESTOCK GRAZING FROM PUBLIC LANDS

Impacts on Air Quality

Elimination of grazing would result in a maintenance of existing air quality.

Impacts on Soils

This alternative would reduce on-site erosion rates in the long term by 3.6 tons/acre/year from present conditions (Appendix D, Table D-1). Ground cover would increase through the first 20 years and then gradually stabilize with time (Reardon and Merrill 1976). With an increase in vegetation and surface litter, there would be an unquantifiable increase in water infiltration rates, improved soil structure, and soil permeability (Meeuwig 1970).

The moisture holding capacity and amount of nutrients available to plants would increase plant vigor as a result of more organic matter in the soil (Hormay 1970). Decreasing soil compaction through increased vegetation and litter cover would therefore reduce exposed areas subject to wind and water erosion. Soil productivity would improve by approximately 14 percent in the long term.

Impacts on Water Resources

Elimination of livestock grazing would have the following impacts on hydrologic processes and factors in the entire EIS area: (1) precipitation would be detained longer by improved plant cover; (2) evapotranspiration losses, although slight, would increase proportionately with plant cover; (3) infiltration rates would slowly approach those characteristic of the soil type without grazing use; (4) overland flow velocities and quantities would be reduced, especially those associated with moderate to heavy rainfall; (5) storm runoff volumes and peak discharge would be lowered; (6) channel stability would improve as scour and bank erosion decreased in frequency and magnitude; (7) the soil water deficit, or the difference between soil moisture needed by vegetation compared with soil moisture available for plant use, would be reduced, thus more soil moisture would become available for plant transpiration; (8) sediment discharges should decrease, as should potential maximum sediment transport capacities; (9) year-to-year climatic fluctuations would begin to exert less and less control over the water yield of subject allotments; and (10) runoff would decrease over the long term. Several of the above impacts could take two to five years or longer to become evident or measurable. Runoff is predicted to average 0.41 inches from high intensity storms (Appendix D), a reduction of 10 percent from the present conditions. Runoff from a normal year is not expected to change significantly.

For this alternative sediment yields would average 2.12 tons/acre/year, a reduction of 11 percent from present conditions which is believed not to be significant.

Impacts on Terrestrial Vegetation

Elimination of livestock grazing is expected to increase the rate of recovery of rangeland over any other alternative. Plant communities would advance toward climax conditions. However, the rate of succession and ultimate climax plant community composition would, in most cases, differ from pristine conditions because of dramatic livestock induced changes (within the last 100 years) affecting "... stand renewal processes, seral dominants and the tenure of successional stages ..." (Young et al. 1976).

In many areas succession has already reached an endpoint in the form of disclimax sagebrush and greasewood stands with lowered site potential. In other areas, the elimination of livestock "... would leave stark shrub dominated communities open to invasion by alien plants, some of which can persist in native plant communities in equilibrium with their environment" (Young et al. 1976).

Once productive bottom lands have also been dessicated by gullies. Vesicular soil surface crusts have also formed which reduce site potential by inhibiting plant seedling survival (Wood et al. 1978). These cumulative impacts have contributed to increased aridity on many sites and reduced vegetation productivity and site potential. These areas would require some type of land treatment before site potential and productivity could be restored.

Since the relatively short period of 20 years is used as a base time span over which to predict changes in vegetation, few areas are expected to reach good range condition with the possible exception of those areas presently in fair condition with an improving trend. In an undetermined amount of time, however, almost all areas should reach good condition. Present range conditions, trend, erosion condition, seed sources, climatic changes, and other factors would determine the length of time required for good condition to be achieved.

Over the next 20 years, elimination of livestock grazing is expected to increase good condition range by five times the present 79,009 acres. A subsequent 15 percent decrease in poor condition range and a 26 percent decrease in fair condition range are also expected (Table 4-23).

Areas with improving trend should increase 29 fold over the present 31,698 acres. Areas presently having a static trend would be reduced by 54 percent (1,291,554 acres). All areas presently in declining trend are expected to stop declining and become static (Table 4-24).

The most significant changes as the result of Alternative C are expected to occur in the grassland, mountain shrub, and sagebrush vegetation types with increases of 60, 58, and 29 percent respectively in amounts of good condition range.

Increases of desirable species in the vegetation compositition which affect changes in condition and trend are expected to average 17 percent on areas improving from fair to good condition (Table 4-2). A similar increase is expected on areas improving from poor to fair condition. Since the presence of desirable species varies by vegetation type (Table 4-2), increases would vary for given areas due to differing vegetation types and amounts of vegetation.

Plant cover is expected to remain relatively stable with only a 4 percent increase predicted. Increases in cover contributed by desirable species would cause a similar decrease in cover of less desirable species, since composition changes often involve replacement rather than accumulations of plants. Increases of mulch or dead plant materials are expected to show a dramatic, though unquantifiable, increase since plant materials normally consumed by livestock would be left to accumulate.

The standing crop of available forage at any given time is expected to be higher than under the other alternatives, however, annual production is expected to be lower. Research has documented many instances where grazed plants tend to produce more than ungrazed ones.

Impacts on Riparian Vegetation

Elimination of livestock grazing would produce an overall improvement on riparian vegetation in about seven years, and a continuing improvement through the year 2000. Restoration of typically riparian vegetation on almost all stream banks would be exhibited by dense growths of willows, alders, and shrubs (i.e. snowberry, serviceberry, etc.), with grasses and forbs covering the understory near maximum densities between and beneath overstory species (Crouch 1978). Where salt cedar has been established, an increase in this type would occur (Horton 1978).

Increases in desirable herbaceous vegetation would occur on 267 acres, and remain static on 30 acres. No decline would be expected. Desirable woody vegetation would increase on 220 acres, and decline on 15 acres. This decline would be the result of increases in salt cedar. No change in woody types would occur on 62 acres.

Vegetation ground cover would increase on 267 acres and remain the same on 30 acres.

Poor condition ratings would improve to fair on 12 acres, to good on 39 acres, and to excellent on 2 acres. Fair ratings would remain static on 16 acres, improve to good on 105 acres, and to excellent on 85 acres. Good ratings would remain static on 30 acres and improve to excellent on 8 acres.

An overall improvement in condition ratings would be achieved on 251 of the 297 total acres of riparian habitat. This would result in 95 acres in excellent condition, 174 acres in good condition, and 28 acres in fair condition.

Impacts on Threatened and Endangered Plants

In some cases, as with *Aquilegia barnebyi*, a plant's habitat can protect it from grazing (Painter and Emrich 1978). However, as is sometimes the case with the genus *Astragalus*, elimination of all livestock grazing could threaten a plant species by consequent increased vegetation competition.

Impacts on Terrestrial Wildlife

IMPACTS ON MULE DEER, ELK, AND ANTELOPE

The elimination of livestock grazing would affect deer, elk, and antelope in two basic ways: 1) short term changes in forage availablity, and 2) short and long term habitat changes resulting from plant successional trends released from the influence of livestock grazing.

In the short term, ungulates would benefit from increased forage availablity and diversity. In the long term, availability of preferred forage would be

TABLE 4-23
PRESENT AND FUTURE RANGE CONDITION
ALTERNATIVE C - ELIMINATION OF GRAZING

Condition	Present	Future
Poor	446,055	377,295
Fair	996,742	738,708
Good	79,009	405,803
Total	1,521,806	1,521,806

TABLE 4-24
PRESENT AND FUTURE RANGE TREND
ALTERNATIVE C - ELIMINATION OF GRAZING

Trend	Present	Future
Declining	198,254	--
Static	1,291,854	592,364
Improving	31,698	929,442
Total	1,521,806	1,521,806

determined by plant successional influences on species composition and production.

Mid-successional plant communities would advance towards climax conditions. The rate of succession and ultimate climax plant community composition would reflect livestock and big game induced changes in current vegetation conditions. The cumulative effects of these impacts (see Vegetation section) on big game habitats, particularly on winter ranges, has been the formation of more arid sites, which would generally slow the rate of successional change. Predicting the rate of future plant successional trends (changes in big game habitat suitability) would, in many cases, be speculative at best. No long term studies have been conducted on extensive regions in Great Basin ecosystems to assess these interrelationships.

In large part, the capacity of a given site to change significantly would be a function of current plant composition, big game grazing influences, precipitation patterns (including severity of winters), and the occurrance of wildfire. The only significant change in big game forage production that may occur within 20 years would be on currently fair and high poor condition range, where desirable forage species would have the capacity to increase both vegetatively and by reproduction.

Abundance of preferred species would not significantly change over the long term on poor and good condition range. Significant changes in herbaceous understory-shrub composition would generally not be evident within 20 years. On most poor condition winter range, interspecific plant competition and selective big game browsing would maintain currently decadent desirable shrub conditions.

In many areas, sufficient understory fuels would accumulate by the long term to support increased wildfire occurrance. Succession would be set back, which could benefit big game depending on burning conditions, plant composition, and future fire management policies. With the elimination of potentially beneficial influences of livestock use, i.e. stimulation of increased plant production (Wagner 1977) and improved availability of more nutritive plant parts (Smith et al. 1979), wildfire would constitute the only effective stand renewal process. Without wildfire, rangelands would typically regress into decadence and advance towards climax. With the continuation of current fire suppression policies, big game carrying capacities would decline through time.

It is uncertain what the short and long term carrying capacities of deer, elk, and antelope would be under this alternative, or how long it would take population expansions and/or declines in habitat productivity to reach an ecological equilibrium or imbalance. Deer populations in 1978 (before the 44 percent 1978-1979 winter die-off) appeared to be close to current winter range carrying capacities for normal winters. Poor condition winter range appears to be currently over-obligated by deer, while fair condition range does not. In general, livestock induced sagebrush dominated stands would form long-lived seral or disclimax stages, capable of supporting increased deer populations over the long term, especially where grass production would increase upon release from livestock use. Although shrub production would be reduced in some concentration areas in the long term, sagebrush would generally remain abundant indefinitely (especially given the exclusion of wildfire). It could be inferred then, that future limiting factors would lie outside of sagebrush habitats. It would appear likely that the amount of desirable shrub production in pinyon-juniper habitats would determine future winter range carrying capacities. Given heavy selective browsing and wildfire suppression, browse production would decline with time, as would carrying capacities. However, increased grass-forb availability could effectively function in a "browse sparing" capacity, potentially slowing rates of browse decline.

Deer populations would rise and fall periodically in response to climatically influenced carrying capacities between the short and long terms. Although increased forage availability may permit gradual population expansions, dietary energy and protein deficient winter ranges would remain a limiting factor on future populations. Grass-forb production (largely unavailable to deer on winter range) would increase to a much greater extent than usable desirable browse production.

Continued heavy deer browsing pressure on 240,000 acres of winter range with currently declining trends would gradually reduce carrying capacities. However, much of the currently static condition winter range (805,000 acres) would improve over the long term. The net result could amount to an estimated 15 percent carrying capacity increase, capable of supporting about 53,341 deer in the long term. Subsequent population declines in response to future limiting factors would probably not occur until after a 20 year period.

Elk and antelope populations would not be limited by forage resources until long after the 20 year time frame. Other human-related factors such as energy development would limit population growth in the EIS area, thus preventing them from realizing their natural potentials in relation to available forage production. Elk and antelope populations would probably increase by at least 8 percent and 2 percent respectively, to about 1,926 elk and 224 antelope.

IMPACTS ON OTHER TERRESTRIAL WILDLIFE

Increased understory complexity, in response to the elimination of livestock grazing, would improve food and cover habitat requirements for sage grouse and most small mammal and nongame bird populations. Animals benefitted by livestock grazing would decrease somewhat, while other animals favored by undisturbed habitat conditions would increase. The prey base of predators would generally increase, which could lead to increased predator populations.

IMPACTS ON THREATENED AND ENDANGERED SPECIES

No impacts would occur to the five threatened and endangered species in the EIS area.

CONCLUSION OF IMPACTS ON TERRESTRIAL WILDLIFE

Long term carrying capacities for deer, elk, and antelope could increase by an estimated 15, 8, and 2 percent respectively, to about 53,341 deer, 1,926 elk, and 224 antelope. Winter range would remain the limiting factor to 88 percent of the deer population, while human related disturbance, such as energy development, could exert an additional limiting factor on all big game populations.

Sage grouse, nongame bird, small mammal, and predator populations would all benefit from increased understory complexity but obvious changes in numbers would not be expected.

Threatened and endangered species would not be affected by the alternative.

Impacts on Aquatic Wildlife

Elimination of livestock grazing on public lands would lead to improved riparian vegetation conditions, increased streambank stability, and reduced stream siltation by the year 2000. Aquatic life in general would be enhanced along all 78 perennial flowing streams especially where riparian vegetation exhibits marked improvements.

Fish habitat along 71 miles of streams on public lands (Table 4-25) would improve during this period. This would result from an improvement in water quality through decreased stream sediment loads, by reshaping the stream morphology through increased streambank stability, and by increasing cover and shade through improved riparian vegetation. No change would occur along 2 miles on Cow and Big Beaver Creeks, which currently exhibit good conditions.

Even though large segments of private land exist along Piceance Creek and the White River, substantial reductions in sediment loads would occur as a result of natural revegetation of the watersheds drained by these streams. This would reduce or eliminate the adverse impacts on aquatic life.

Fish populations along these streams would increase (Duff 1977, Kimball et al. 1977, Berry 1979) due to the improvement in habitat conditions. Quantification of these increases, however, cannot be predicted due to insufficient data on existing populations. Angling use would not increase from its present level.

No impacts on aquatic life and fish habitat in Divide Creek Reservoir would occur due to previous fencing of the reservoir. Aquatic life and fish habitat in reservoirs located on Bitter Creek and West Creek would show improvements. An improvement in the watershed and riparian vegetation, and elimination of livestock trampling along the streambank and in the reservoir shallows would substantially reduce sedimentation and eliminate bottom substrate disturbance. This would increase numbers of aquatic invertebrates which serve as fish food organisms and enhance fish production.

IMPACTS ON THREATENED AND ENDANGERED FISH SPECIES

No impacts would occur to either the Colorado squawfish or boneytail chub through elimination of grazing. Even though the water quality of the White River would improve, low population levels would still be expected. Both species have historically exhibited a preference to habitat with heavy sediment loads (USFWS 1977), therefore, it would be erroneous to expect an increase in numbers of either species with a decrease in sedimentation.

The Colorado cutthroat trout populations in Trappers, Lake, and Soldier Creeks would improve due to improved habitat conditions. Improvements in riparian vegetation would lead to increased cover and shade, decreased stream siltation, and improved stream channel morphology.

CONCLUSION OF IMPACTS ON AQUATIC WILDLIFE

Elimination of livestock grazing would improve aquatic habitat in most of the 78 perennial streams. Fish habitat would improve on the 71 public stream miles and remain the same on 2 miles. Improvements along Trappers, Lake, and Soldier Creeks

TABLE 4-25
LONG TERM TRENDS IN FISH HABITAT
ALTERNATIVE C - ELIMINATION OF GRAZING

Allotment No.	Stream Name	Trend
6005/6019	Piceance Creek	Improve
6019/6021	Trappers Creek	Improve
6023	Willow Creek	Improve
	Middle Fork Stewart Creek	Improve
6024	Fawn Creek	Improve
	West Fawn Creek	Improve
6029	Black Sulfur Creek	Improve
6324	Divide Creek Reservoir	No Change
6337	Windy Canyon	Improve
	Bear Park Creek	Improve
	East Douglas Creek	Improve
6346	West Creek (in Reservoir)	Improve
6345	Brush Creek	Improve
6357	West Evacuation Creek	Improve
6358	Bitter Creek (in Reservoirs)	Improve
6367	Lake Creek	Improve
	Soldier Creek	Improve
6813	Cow Creek	No Change
	Big Beaver Creek	No Change
	White River	Improve

TABLE 4-26
RECREATIONAL HUNTING OPPORTUNITIES RESULTING FROM
EXPECTED INCREASES IN BIG GAME POPULATIONS
ALTERNATIVE C - ELIMINATION OF GRAZING

	Population		Harvest		Recreation Days per Animals Harvested	Increased Animals Harvested (yr. 2000)	Increased Recreation days (yr. 2000)
	Present	yr. 2000	Present	yr. 2000			
Deer	45,394	53,341	11,221	13,187	8.4	1,966	16,515
Elk	1,783	1,926	319	482	29.1	163	4,729
Antelope	219	224	50	52	4.5	2	7

would enhance the Colorado cutthroat trout populations, currently listed as threatened by the State.

Impacts on Wild Horses

Under this alternative wild horses would be managed on their existing range. Wild horse populations would be managed for 500 to 750 horses, with round-ups every 4 to 5 years to gather any excess over 500 head.

Wild horses would be allocated 11,250 AUMs of forage which would support 750 animals. The 11,250 AUMs would also provide a buffer of 3,750 AUMs when the horses were at the minimum population of 500 head. Competition from domestic livestock would be eliminated, which would provide increases in quality and quantity of forage for wild horses. Competition from mule deer would not be significant. Hubbard and Hanson (1976) reported average diet overlaps between mule deer and wild horses to be 5.6 percent. Although diet overlaps between elk and wild horses are significant (Hanson and Reid 1975), competition between elk and wild horses is insignificant because elk occupy only a minute portion of the wild horse area.

Since range improvement projects would not be maintained except those necessary for wild horses, all interior fences could be removed. This would increase exchange of horses between bands and increase the genetic variability of the total horse herd. Elimination of interior fences would also decrease the possibility of total elimination of the wild horse herd during winter storms.

Under this alternative, all private and state lands could be fenced by the land owners. Although these fences would present a hazard to wild horses, the majority would not present barriers to water or prevent normal movement patterns.

Impacts on Cultural Resources

The absence of livestock movement would positively impact cultural resources by decreasing site erosion, rubbing, horizontal and vertical displacement, and artifact breakage. The reduction of range facility construction would also cause a positive impact.

The intensified human activity in the area, as a result of the anticipated increase in wildlife, would cause an increase in vandalism upon cultural sites which would result in a loss of cultural data.

Impacts on Recreation Resources

This alternative would result in a 20 percent increase (21,151 recreational days) in big game hunter/viewing recreational days (Table 4-26) in the long term.

Impacts on Visual Resources

Under this alternative, adverse impacts to visual resources on public lands associated with livestock grazing would not occur because there would be no livestock grazing or associated developments such as vegetation manipulations or range facilities. However, possible construction of some 1,200 miles of boundary fence could result in adverse visual impacts on private and state lands within the EIS area.

Impacts on Economic Conditions

Under this alternative, all federal AUMs would be eliminated for all 100 ranching operations. The forage use changes and income effects identified in Table 4-27 are based on the changes in grazing that would occur under this alternative. It should be noted that, although changes in private AUMs could not be determined under these conditions, a reduction would probably occur in forage obtained from private land within allotments which would augment the gross and net revenue losses shown in Table 4-27.

Table 4-27 indicates the ranch size grouping of the 100 operations that would incur revenue changes resulting from forage use eliminations and the changes in gross and net revenues that would accompany the forage use changes. These are changes from the estimated present levels shown in Table 3-16.

Gross revenue of all the ranches would be reduced by an estimated $4,415,185 with a resulting loss by other sectors of the EIS area economy of $3,677,849.

Net revenue would be reduced by an estimated $432,412 with an additional $696,616 decrease in indirect income in the EIS area. The total direct plus indirect income short term effect would be an estimated $1,129,028, which amounts to 3.0 percent of the 1977 Rio Blanco County personal income.

The estimated net revenue changes would have a very significant effect on the 100 affected ranching operations. Some would experience a change

TABLE 4-27
RANCH SIZE AND INCOME EFFECTS
ALTERNATIVE C - ELIMINATION OF LIVESTOCK GRAZING ON PUBLIC LAND

								Gross Revenue		Net Revenue		
Model	Cattle	Sheep	No. of Ranches	Total BLM AUM Change	Total Corr. Pvt. Land AUM Change	Total BLM Plus Pvt. AUM Change	Avg. AUM Change/Rnch	Change/ Ranch	Chg/All Ranch	Change/ Ranch	Chg/All Ranch	Changes In Hired Empl. (Man-Years)
1	1-149		15	-2,586	0	-2,586	-172	$ -5,029	$ -75,435	$ +1,733	$ +25,995	-1.20
2	150-449		23	-15,336	0	-15,336	-667	-19,503	-448,569	+792	+18,216	-10.80
3	450-749		10	-20,099	0	-20,099	-2,010	-65,727	-657,270	-7,255	-72,550	-5.00
4	750-1,999		16	-57,363	0	-57,363	-3,585	-110,561	-1,768,976	+4,327	-69,232	-11.81
5	2,000 or more		1	-5,744	0	-5,744	-5,744	-349,293	-349,293	-59,605	-59,605	-3.20
6		1-6,000	28	-22,988	0	-22,988	-821	-31,001	-868,028	-7,846	-219,688	-17.25
7	1-1,399	1-1,749	5	-4,609	0	-4,609	-922	-26,060	-130,300	-4,022	-20,110	-2.50
8	1,400 or more	1,750 or more	2	-3,553	0	-3,553	-1,776	-58,657	-117,314	-17,719	-35,438	-2.30
		TOTAL	100	-132,278	0	-132,278			$-4,415,185		$-432,412	-54.06

Note: Private AUMs within allotments have not been included in the range income analysis since their level and type of use under the conditions of this alternative could not be determined.

Source: Bartlett et al. 1979. Impacts of Federal Grazing on the Economy of Colorado. Fort Collins. Colorado State University. BLM Range Management Automated System, 1979, for ranch sizing.

from positive to negative net income. Average percentage changes in net income from estimated present levels would change from a slight increase to a 29 percent reduction with a median change of about 15 percent reduction. It should again be stated that these are minimum reductions that would take place since the effects on private lands within allotments cannot be determined.

Net income reductions would affect most of the 100 ranches involved in this alternative. The ability of the ranching operations to survive income reductions of this magnitude is uncertain. It is probable that a number of the operations would cease, with the combination of properties or conversion to other uses occurring.

Since all of the ranches in the EIS area would be impacted by this alternative, their relative dependency on BLM forage and the criticality of that dependency are the same as those shown in Tables 3-17 and 3-18 respectively. Similarly, the percentage of families with ranching estimated as the primary source of income would be the same as described in Section 3.

Since grazing on public lands would be permanently eliminated under this alternative, changes in forage use and income effects would also occur in the long term.

There would be an estimated 54.06 man-years of hired employment decrease on EIS area ranches resulting from ranching cutbacks due to lower levels of BLM forage use (Table 4-27).

As a result of this alternative, there would be a decrease in authorized AUMs from the present qualifications (excluding 3,750 AUMs of livestock trailing use) of 155,984 to 0. The decrease of 155,984 AUMs allowable use would translate into a decrease of 12,998.66 animal units (at one animal unit per 12 AUMs) which would reduce the present value of the affected ranches by about $12,998,660 (at $1,000 per animal unit). Related to the decreased ranch values would be a reduction in the tax base of about $3,898,851, or 2.1 percent of 1977 Rio Blanco County assessed valuation.

Property taxes paid to local governments would be decreased $134,536 as a result of the $3,898,851 reduction in the tax base from lowered ranch values.

IMPACTS ON RECREATION AND WILDLIFE DERIVED INCOME

The Terrestrial Wildlife section indicates that this alternative would provide habitat for expanding big game populations. The Recreation section indicates that increased big game populations would create additional hunting and viewing opportuntities.

From the estimates of the increases in hunter recreation days, it is possible to estimate the impact that could occur to the state of Colorado from increased hunting in the EIS area. Based on state wide values per animal harvested, deer hunting would net $1,628,604 while elk hunting would net $1,367,751 for a total of $2,996,355.

CONCLUSION OF IMPACTS ON ECONOMIC CONDITIONS

Under this alternative, all federal AUMs would be eliminated for all 100 ranching operations. In the short term, net incomes would be reduced by $432,412 to $2,199,453 for ranching operations and by $696,616 to $3,543,319 for other economy sectors.

Ranch values would be decreased by $12,998,660 in the short term, with a resulting decrease of $134,536 property taxes paid to local governments. Long term effects would be the same as those for the short term.

Of the 100 ranches affected, 51 percent depend on public grazing for 20 percent or more of their total forage requirements, and 58 percent require BLM forage as an essential element for the survival of the ranching operation. It is likely that some ranching operations would go out of business.

Ranch employment would be reduced by 54.06 man-years of hired employment to 144.57 man-years.

The increase in nonresident hunting (deer and elk) in the EIS area would increase state revenues by $2,996,355.

Impacts on Social Conditions

Implementation of this alternative would produce adverse impacts resulting from reductions in income and in the value of ranches, with many of the ranchers having to seek other employment in order to avoid selling their ranches. For those forced to sell their ranches and to seek alternate ways of life, the probabilities are high that they would experience severe adverse impacts to their self images, especially if the ranch is sold at a loss.

It can be expected that the prevailing negative attitudes among ranchers toward "big government", government regulations, and federal planning would become intensified.

Impacts on Land Uses

IMPACTS ON LIVESTOCK GRAZING

Under the Elimination of Grazing alternative, all existing livestock use on public lands would be eliminated. All 100 operators (on 139 allotments) presently utilizing BLM administered public lands for livestock grazing would be adversely impacted. Private lands presently owned or leased by these operators are generally not adequate to maintain their herds yearlong. With elimination of grazing, these operators would be forced to buy or lease other grazing lands or sell portions of their livestock. Operators with inadequate forage resources would ultimately be forced out of the livestock business.

Approximately 132,278 AUMs (average active licensed use excluding 3,750 AUMs of livestock trailing use) of domestic livestock use per year would be lost. This would amount to an annual loss of approximately 11,023 animal units of livestock production in area herds. Approximately 77 percent of this use is made by cattle on public lands during spring/summer/fall with private land used to support herds during winter. An additional 19 percent of this use is made by sheep during spring and winter when other sources of forage during this period are not normally available.

IMPACTS ON AGRICULTURE

The elimination of livestock grazing could result in a change in the use of existing livestock operation base lands. Although it is impossible to quantify, the change could entail a loss of agricultural production on base lands (private) where ranch operation dependency on public land grazing is high or critical. These lands could be used as rural home sites, sand and gravel sources, or remain in agriculture production, producing livestock forage or non-livestock crops to be sold as a source of income. Some lands may be leased to operators who have been eliminated from public land grazing to supplement their base operations.

IMPACTS ON FORESTRY AND FOREST PRODUCTS

No impacts are expected as a result of this alternative.

IMPACTS ON WILDERNESS

Under this alternative, the six Wilderness Study Areas' suitability for further consideration for designation to the National Wilderness Preservation System would be enhanced. This alternative would have a positive effect upon the wilderness values in the EIS area. It can be assumed that natural succession would result in climax plant communities, thus improving the naturalness of the area in the long term.

MITIGATING MEASURES NOT INCLUDED IN THE DESCRIPTION OF ALTERNATIVE C

Damage to cultural resources resulting from expected increases in human activity could be partially mitigated through closer surveillance and/or closure of archeologically rich areas.

ADVERSE IMPACTS THAT CANNOT BE AVOIDED

Construction of 1,200 miles of boundary fence to separate public lands from state and private land would negatively impact visual resources and cultural resources. The impact would be lessened if some private and state lands ceased to support livestock grazing. In such cases, fencing would not be necessary to prevent livestock from using public lands. Increased human activity (hunters, energy development employees, etc.) could adversely affect cultural resources through increased vandalism and theft.

The majority of private lands in the EIS area would cease to serve as agricultural base lands which support range livestock operations.

Income losses within the EIS area would be $432,412 for ranching operations and $696,616 for other economy sectors. Losses in ranch valuation would be $12,998,660 with an associated tax base loss of $3,898,851.

SHORT TERM USE VS LONG TERM PRODUCTIVITY

Elimination of livestock grazing on public land would result in accelerated improvement of rangeland vegetation with subsequent increases of vegetation cover. Increasing cover over the 20 year long term period would result in reduced soil erosion, sedimentation, and increases in water quality and quantity. While vegetation condition would improve and annual cumulative biomass would be greater than under other alternatives, annual production would be lower during and after the 20 year long term period.

Fencing 1,200 miles of private and state boundaries would cause adverse visual impacts in VRM classes I, II, and III. However, increased vegetation cover on BLM land due to elimination of livestock grazing would enhance aesthetic values over the entire EIS area.

Loss of income to all sectors in the EIS area due to elimination of grazing could be partially offset by income received from increased recreational activities in the area. Decreased production from agricultural lands could be partially offset by shifts to sand and gravel production or locations for rural homesites. Hay production could continue on some base property and be sold almost exclusively as a source of winter feed for other operators. Forage provided to deer would be 11,550 AUMs below desired levels and livestock forage would be 3,676 AUMs below desired levels.

IRRETRIEVABLE OR IRREVERSIBLE RESOURCE COMMITMENTS

Damage or destruction of cultural resources due to soil disturbance, theft, or vandalism would be an irretrievable loss of archeological data.

Unused forage and loss of red meat production would represent an irretrievable loss of resources.

POSSIBLE CONFLICTS WITH OTHER FEDERAL, STATE, OR LOCAL LAND USE PLANS

Land use plans involving grazing use on federal, state, and private lands would be negatively affected by elimination of livestock grazing in the EIS area.

IMPACTS OF ALTERNATIVE D - OPTIMIZATION OF LIVESTOCK GRAZING

Impacts on Air Quality

Impacts on air quality resulting from minimum constraints on livestock would be the same as those predicted for the action proposal (Alternative A).

Impacts on Soils

On a long term basis, approximately 30.4 tons/acre/year of soil would be lost with this alternative compared to 31.7 tons/acre/year under present conditions (Appendix D, Table D-1). Increased vegetation cover during the first 20 years (Reardon and Merrill 1976) would decrease soil compaction from cattle grazing. Soil compaction conditions would stabilize after this period of time.

Soil disturbances such as chaining sagebrush and pinyon-juniper, prescribed burning, disc plowing, and installation of cattle guards and pipelines would reduce vegetation cover in the short term and have an adverse impact on soil erosion rates. Soil erosion rates could increase by 1.1 to 7.6 times that of present conditions (Gifford and Shaw 1973, Roundy et al. 1978). Soils with loam, clay loam, and sandy clay loam surface soil textures have shown the greatest potential for mechanical manipulations.

Localized exposed surface areas subject to wind and water erosion would cause soil productivity to decline by an unquantifiable amount in the short term. Soil productivity would improve by an average of 50 percent in the long term as range conditions improve and areas are revegetated. Chemical land treatments would maintain or improve soil erosion conditions over the short and long term as a result of vegetation cover remaining on the soil surface after treatment.

Impacts on Water Resources

Under this alternative, impacts on water resources would be similar to the action proposal. Runoff within the EIS area is predicted to average 0.43 inches from high intensity storms (Appendix D), a reduction of 4 percent from the present conditions. Runoff from a normal year is not expected to change significantly.

For this alternative, sediment yields would average 2.30 tons/acre/year in the long term, a reduction of 4 percent from present conditions which is believed not to be significant.

Impacts on Terrestrial Vegetation

Impacts to vegetation resulting from optimization of livestock are expected to be the same as those impacts resulting from the action proposal.

Good condition range would increase by 164,529 acres and fair and poor condition ranges would decrease by 140,797 and 23,732 acres respectively (Table 4-28).

Impacts to range trend would also be the same under both alternatives. Trend would improve on an additional 416,787 acres over the long term. Range presently with a static trend would improve and contribute 49 percent (218,533 acres) to total improving acreages. Range presently with declining trend would become stable and is expected to remain static over the long term (Table 4-29).

Amounts of desirable species in the vegetation composition are expected to increase by 17 percent on areas improving from fair to good condition, with similar increases expected on areas improving from poor to fair condition and trend is that of accelerating vegetation improvement over the 20 year long term period.

Plant cover of desirable species is expected to increase by 17 percent, while plant cover of all species would increase by 4 percent. Plant cover estimates in the long term are based on comparisons with existing data from within the EIS area.

Accumulations of mulch or dead plant materials should increase significantly, but amounts are unquantified.

Production of forage would be similar to that of the action proposal. A 27 percent increase in untreated areas and a 40 to 60 percent increase in manipulated areas is expected to occur.

Impacts on Riparian Vegetation

Impacts on riparian vegetation from optimization of livestock grazing would be similar to those under the action proposal (Alternative A). The increases in forage for livestock on all but three allotments

TABLE 4-28
PRESENT AND FUTURE RANGE CONDITION
ALTERNATIVE D - OPTIMIZATION OF LIVESTOCK GRAZING

Condition	Present	Future
Poor	446,055	422,323
Fair	996,742	855,945
Good	79,009	243,538
Total	1,521,806	1,521,806

TABLE 4-29
PRESENT AND FUTURE RANGE TREND
ALTERNATIVE D - OPTIMIZATION OF LIVESTOCK GRAZING

Trend	Present	Future
Declining	198,254	--
Static	1,291,854	1,073,321
Improving	31,698	448,485
Total	1,521,806	1,521,806

would not be sufficient to produce differences between the two alternatives. Ryan Gulch (6026 and 6027) would show a decline in herbaceous cover, with a condition rating declining from fair to poor; West Creek (6346) would also decline in herbaceous cover and would remain in poor condition.

Condition ratings would improve from poor to fair on 21 acres, poor to good on 5 acres, and fair to good on 63 acres. No change would occur on 189 acres, while 19 acres would decline. This would yield a net improvement of 70 acres out of the 297 acre total.

Impacts on Threatened and Endangered Plants

Impacts on T/E plant species would be the same as those stated in the action proposal.

Astragalus lutosus, reviewed as endangered on the 1975 *Federal Register*, seems to be locally common to the Piceance Basin. However, it should still be considered vulnerable and its status monitored. There is evidence of grazing on some of the sites where the species is found, but it does not seem to affect those populations. Since the species is associated with the Green River Formation and because it is geographically and edaphically limited, it is vulnerable to a serious reduction in numbers (Painter and Emrich 1978).

Impacts on Terrestrial Wildlife

IMPACTS ON DEER AND ELK

About 40,599 AUMs, capable of supporting 32,455 deer, would be allocated in the short term to mule deer (Appendix B, Table B-3). Elk would be allocated 2,264 AUMs, which could support 740 animals. The major impact of this alternative would involve a 29 percent reduction in the 1978 deer population and a 58 percent reduction in the elk population. Estimated long term deer and elk populations would approximate 36,579 and 798 animals respectively. It is assumed that big game populations would be reduced to these estimated levels so that vegetation resources would not be severely over-obligated. The portion of deer and elk diets that are competitive with livestock (largely grass and forb) would not be available.

These large population reductions would alleviate current heavy browsing pressure on poor condition winter ranges but potential improvement in browse conditions could be offset by increased big game dependence upon browse (due to the allocation). The proposed 39,400 acres of pinyon-juniper manipulation on winter ranges would regenerate decadent browse, thus improving browse production compared with the current situation. Although 65,000 acres of sagebrush and greasewood manipulations would improve herbaceous production, winter range would remain in an energy deficient state for mule deer and elk because of the allocation.

Deer and elk cover requirements in winter range could be adversely affected where the size of cover zones is excessively reduced (see action proposal for example allotments).

IMPACTS ON ANTELOPE

Antelope would be allocated 85 AUMs, which would support 97 animals. This would represent a 57 percent population reduction from the 1978 level. A population of 97 antelope could be nonviable, in that small populations are subject to inbreeding and are increasingly vulnerable to potentially decimating factors. All competitive forage would be allocated to livestock, portions of which could be important to animal and herd productivity. Although overall range conditions would remain satisfactory under this alternative, antelope habitat quality could decline. Their preferences for forage would be significantly constrained by livestock use. The extent to which the unavailable, competitive fraction of their diet would be important to their welfare is unknown. Antelope may be able to adjust dietary selection in relation to reduced availablity and still maintain adequate animal and herd productivity. On the other hand, a lack of certain essential nutrients could reduce productivity but how this would affect long term population trends is unknown.

Increased levels of forage productivity resulting from vegetation manipulations, minimum rest requirements, and range improvements would improve antelope habitat conditions where desirable browse and forbs would increase. Where grasses would be established as key species and increase at the expense of preferred forbs and shrubs, habitat conditions would decline.

IMPACTS ON SAGE GROUSE

Impacts would be the same as under the action proposal. Sage grouse habitat conditions would improve if vegetation manipulations do not excessively reduce forb production and amounts of residual, interspersed sagebrush cover, in relation to critical seasonal habitat requirements.

IMPACTS ON NONGAME BIRDS

No significant population changes would be expected in birds with grassland and shrub affinities. Populations would respond to vegetation manipulations as described in Alternative A. Long term bird species diversity and abundance would be reduced by about 50 percent on pinyon-juniper manipulations. Similar short term reductions would occur on sagebrush manipulations.

IMPACTS ON SMALL MAMMALS

No obvious changes in current small mammal populations would be expected in response to grazing management proposals. Population changes in response to vegetation manipulations would be the same as under Alternative A. Vegetation manipulations would lower species diversity but increase overall abundance over the short term; habitat generalists would be favored. In the long term, populations would be similar to pretreatment levels.

IMPACTS ON PREDATORS

Impacts on predator populations would largely be determined by population trends of their respective prey bases. No obvious population changes would be expected over the long term.

IMPACTS ON THREATENED AND ENDANGERED SPECIES

Threatened and endangered species would not be affected under this alternative.

CONCLUSION OF IMPACTS ON TERRESTRIAL WILDLIFE

The vegetation allocation would reduce deer, elk, and antelope populations by 29, 58, and 57 percent respectively from 1978 levels. Long term allocation could support about 36,579 deer, 798 elk, and 103 antelope. Browse conditions for deer and elk would improve somewhat, in response to reduced browsing pressure and pinyon-juniper manipulations. Winter range would remain in an energy deficient state because of the vegetation allocation.

Deer and elk cover requirements would be adversely affected if pinyon-juniper manipulation excessively reduces the size of effective cover zones.

A herd level of 97 antelope could be a nonviable population.

Sage grouse populations would be benefitted if vegetation manipulations adequately provide for habitat requirements on nesting, brooding, and winter ranges.

Most nongame birds, small mammals, and predators would benefit from grazing management proposals. Vegetation manipulations would reduce bird species diversity and abundance over the long term. Manipulations would reduce small mammal species diversity but increase overall abundance over the short term. Long term abundance would be similar to pretreatment levels. Obvious changes in predator populations would not be expected in either the short or long terms.

Threatened and endangered species would not be affected by the alternative.

Impacts on Aquatic Wildlife

Impacts on aquatic habitat from optimization of livestock grazing would be similar to those under the action proposal (Alternative A). The difference in forage allocation for livestock on all but three allotments would not be sufficient to produce dissimilarities between the two alternatives. Increased grazing would cause an unquantifiable number of aquatic invertebrates to be lost in Ryan Gulch (Allotments 6026 and 6027). This would result from a decline in herbeceous cover along the streambank causing a smothering effect from silt deposition. Siltation would also be a problem in the West Creek allotment (6346), however, fish habitat in the reservoir on this stream would not be significantly impacted because the light sediment loads would settle out upon entry into the reservoir.

IMPACTS ON THREATENED AND ENDANGERED FISH SPECIES

There would be no impacts on either of the endangered fish species, Colorado squawfish and boneytail chub, as a result of optimization of livestock grazing. Such conditions would not be expected to change as a result of impacts associated with this alternative.

The Colorado cutthroat trout populations in Trappers, Lake, and Soldier Creeks would improve due to improved habitat conditions following the fencing along all three streams.

Impacts on Wild Horses

Under this alternative, wild horses would be managed on the same wild horse range as proposed in Alternative A. Wild horses would be allocated 797 AUMs for 18 horses in the Cathedral Bluffs allotment, 16 horses in the Square S allotment, and 18 horses in the Yellow Creek allotment.

The allocation of 797 AUMs of forage would reduce present wild horse use by 92 percent in the EIS area and by 86 percent in the proposed wild horse management area. Under this alternative, 52 wild horses would be managed in the proposed wild horse management area and 573 wild horses would be removed. Impacts occurring to wild horses would be more pronounced under this alternative because wild horse reductions are 17 percent higher and the number of horses to be managed is 63 percent lower than under Alternative A.

As discussed under the Action Proposal, small herds of wild horses could be susceptible to total loss during severe winters and susceptible to inbreeding, although, some inbreeding occurs naturally. Under this alternative, the possibility exists that 52 horses may not constitute a viable population. Research data or studies specific to the viability of a wild horse population are lacking, however, dynamics of wildlife populations with similar reproductive capabilities as wild horses indicate a population of animals should include at least 100 animals to insure survival (Conley 1978).

Adverse and beneficial impacts from range improvements would be the same as those discussed under Alternative A except for the additional cross fences proposed for the Cathedral Bluffs allotments. These fences would disrupt the free-roaming behavior of wild horses and cut off trails to watering areas. The Cathedral Bluffs allotment has only one dependable water area located in the southern part of the allotment. Although new waters may be developed prior to fence construction, the dependability of these new waters may not be known for 3 to 5 years.

CONCLUSION OF IMPACTS ON WILD HORSES

This alternative recommends managing a herd of 52 wild horses which may not constitute a viable population. Total loss of the herd could occur from winter mortality and/or a lack of genetic variation. Under this alternative, the BLM may not be able to carry out the provisions identified in the Wild Horse and Burro Act. Other beneficial and adverse impacts are the same as those identified for Alternative A.

Impacts on Cultural Resources

Under this alternative, impacts to cultural resources would be the same as those described in Alternative A.

Impacts on Recreation Resources

This alternative would result in a 20 percent decrease (20,992 recreational days) in big game hunter/viewing recreational days (Table 4-30) due to the anticipated reduction in herd size of big game species.

Impacts on Visual Resources

The impacts on visual resources under this alternative would be the same as those discussed under the action proposal.

Impacts on Economic Conditions

Under this alternative, 60 ranching operations would receive increases in allowable federal AUMs, while 39 operations would receive reductions. The forage use changes and income effects identified in Table 4-31 are based on the changes in allowable grazing that would occur.

Table 4-31 indicates the ranch size grouping of the 99 operations that would incur revenue changes resulting from forage use increases or reductions and the changes in gross and net revenues that would result from the forage use changes. These are changes from the estimated present levels shown in Table 3-16 (Section 3).

Changes in gross and net revenue for ranching operations and changes in sales and income to other sectors of the EIS area economy are presented in Table 4-32.

Gross revenue of all the ranches would be reduced by an estimated $36,006 with a resulting loss by other sectors of the EIS area economy of $29,993.

Short term net revenue would be increased from present amounts by an estimated $43,825. This seeming contradiction to negative gross revenue results from the likelihood that some of the smaller cattle ranches, which are presently incurring negative net incomes, would reduce their losses. An additional $70,602 increment in indirect income would occur in the EIS area. The total direct plus

TABLE 4-30
RECREATIONAL HUNTING OPPORTUNITIES RESULTING FROM
EXPECTED INCREASES IN BIG GAME POPULATIONS
ALTERNATIVE D - OPTIMIZE LIVESTOCK GRAZING

	Population		Harvest		Recreation Days per Animals Harvested	Increased Animals Harvested (yr. 2000)	Increased Recreation days (yr. 2000)
	Present	yr. 2000	Present	yr. 2000			
Deer	45,394	36,579	11,221	9,145	8.4	2,076	17,438
Elk	1,783	798	319	200	29.1	119	3,463
Antelope	219	103	50	24	3.5	26	91

TABLE 4-31
RANCH SIZE AND INCOME EFFECTS
ALTERNATIVE D - OPTIMIZE LIVESTOCK GRAZING

Model	Cattle	Sheep	No. of Ranches	Total BLM AUM Change	Total Corr. Pvt. Land AUM Change	Total BLM Plus Pvt. AUM Change	Avg. AUM Change/Rnch	Gross Revenue Change/ Ranch	Gross Revenue Chg/All Ranch	Net Revenue Change/ Ranch	Net Revenue Chg/All Ranch	Changes In Hired Empl. (Man-Years)
Short Term												
1	1-149		15	-530	+127	-403	-27	$ -789	$-11,835	$ +272	$ +4,080	-.19
2	150-449		23	-1,659	-410	-2,069	-90	-2,632	-60,536	+107	+2,461	-1.46
3	450-749		10	-1,097	-504	-1,601	-160	-5,232	-52,320	-577	-5,770	-.40
4	750-1,999		15	-2,554	-4,613	-7,167	-478	-14,742	-221,130	-577	-8,655	-1.48
5	2,000 or more		1	+2,817	+2,034	+4,851	+4,851	+294,989	+294,989	+50,338	+50,338	+2.70
6		1-6,000	28	-1,728	+511	-1,217	-43	-1,624	-45,472	-411	-11,508	-.91
7	1-1,399	1-1,749	5	+1,083	+233	+1,316	+263	+7,444	+37,220	+1,147	+5,735	+.67
8	1,400 or more	1,750 or more	2	+715	0	+715	+358	+11,539	+23,078	+3,572	+7,144	+.48
		TOTAL	99	-2,953	-2,622	-5,575			$-36,006		$+43,825	-.59
Long Term												
1	1-149		15	-31	+298	+267	+18	$ +526	$ +7,890	$ -181	$ -2,715	+.12
2	150-499		23	+3,494	+1,765	+5,259	+229	+6,696	+154,008	-272	-6,256	+3.70
3	450-749		10	+9,015	+1,579	+10,594	+1,059	+34,629	+346,290	+3,822	+38,220	+2.64
4	750-1,999		15	+17,720	+11,029	+28,749	+1,917	+59,120	+886,800	+2,314	+34,710	+5.92
5	2,000 or more		1	+4,147	+2,952	+7,099	+7,099	+431,690	+431,690	+73,666	+73,666	+3.96
6		1-6,000	28	+5,827	+2,167	+7,994	+286	+10,799	+302,372	+2,733	+76,524	+6.00
7	1-1,399	1-1,749	5	+2,571	+271	+2,842	+568	+16,071	+80,355	+2,478	+12,390	+1.52
8	1,400 or more	1,750 or more	2	+1,343	+57	+1,400	+700	+22,873	+45,746	+6,984	+13,968	+.92
		TOTAL	99	+44,086	+20,118	+64,204			$+2,255,151		$+240,507	+24.78

Source: Bartlett et al. 1979. Impacts of Federal Grazing on the Economy of Colorado. Fort Collins. Colorado State University.

BLM Range Management Automated System, 1979, for ranch sizing.

indirect income short term effect would be an estimated increase of $114,427, which amounts to 0.3 percent of the 1977 Rio Blanco County personal income.

The estimated short term net revenue changes would have a relatively minor effect on the 99 affected ranching operations. Few, if any, would experience a change from positive to negative net income or vice versa. The estimated median change in net revenue resulting from this alternative would be about 2 percent. Nevertheless, these net income reductions would affect 53 out of the 99 ranches involved in this alternative. The likelihood of the ranching operations surviving these income reductions is not known. It is possible that some of the operations would cease, with some combination of properties or conversion to other uses occurring.

Table 4-33 identifies the relative dependency on BLM forage for the 99 ranches. Table 4-34 translates this relative dependency (along with alternate forage sources and season of use) into an estimate of the criticality of ranch dependency on BLM grazing.

It is predicted that an additional 47,039 AUMs of forage above short term levels would be available for livestock use by the year 2000; the end of the analysis period. At that time, BLM forage use could total 180,114 AUMs.

The use level in the year 2000 would be an increase of 44,086 BLM AUMs over the present actual level, with an estimated associated increase in private AUMs of 20,118 for a total forage use gain of 64,204 AUMs. The estimated growth in gross and net revenue over present levels in the EIS area resulting from this increased level of forage use would be $2,255,151 and $240,507 respectively. Since gross revenue would be raised by $2,255,151, sales in other sectors of the EIS area economy would be increased by $1,878,540. The gain of $240,507 in net revenue would result in an additional increment of $387,457 in indirect income in the EIS area. Thus, the total direct plus indirect income long term increase over present levels would be $627,964.

While the long term situation presents a significant increase from present forage use levels, the short term income reductions could have serious impacts on some ranching operations.

There would be an estimated 0.59 man-years of hired employment decrease on EIS area ranches in the short term resulting from ranching cutbacks in herd sizes. In the long term, employment would increase above the present by 24.78 man-years of hired employment.

The initial decrease of 26,659 AUMs authorized use would represent a loss of $2,222,000 in the present value of the affected ranches, with the resulting loss in the county tax base of $666,600 or 0.4 percent of the 1977 Rio Blanco County assessed valuation.

In the long term, the number of allowable AUMs would increase by 20,380, which would increase ranch values by $1,698,000. This would increase the county tax base by $509,400, or 0.3 percent of the 1977 Rio Blanco County assessed valuation.

Property taxes paid to local governments could decrease by $22,998 in the short term and increase by $17,574 in the long term.

IMPACTS ON RECREATION AND WILDLIFE DERIVED INCOME

A decrease in big game animal populations in the EIS area would decrease nonresident hunting, creating a decline in revenues to the state economy. Revenues would be reduced by $1,719,624 for deer hunting and $1,001,590 for elk hunting for a total of $2,721,214.

CONCLUSION OF IMPACTS ON ECONOMIC CONDITIONS

Optimization of livestock grazing on public lands would result in an increase of allowable AUMs for 60 ranching operations, and a reduction of AUMs for 39 operations. In the short term, net incomes would be increased by $43,825 to $2,675,690 for ranching operations, and $70,602 to $4,310,537 for other economy sectors.

In the long term, allowable AUMs would increase, creating an increase in net incomes of $240,507 for ranching operations and $387,457 for other economy sectors.

Ranch values would decrease by $2,222,000 in the short term, with a resulting decrease of $22,998 in property taxes paid to local governments. Ranch values would increase by $1,698,000 in the long term, with an increase in property tax revenues of $17,574.

Of the 99 ranches affected, 48 percent depend on public grazing for 20 percent or more of their total forage requirements, and 58 percent require BLM forage as an essential element for the survival of the ranching operation. It is possible that some ranching opeations may go out of business.

Ranch employment would be reduced by 0.59 man-years of hired employment to 198.04 in the short term, and increased by 24.78 man-years to 223.41 in the long term.

An impact to the state of Colorado would result from a decrease in nonresident big game hunting in

TABLE 4-32
CHANGES IN REVENUE
ALTERNATIVE D - OPTIMIZE LIVESTOCK GRAZING

Economic Sector And Revenue Type	Short Term	Long Term
Ranch Operations		
Gross Revenue	$-36,006	$+2,255,151
Net Revenue	$+43,825	$ +240,507
Other Economy Sectors		
Gross Revenue 1/	$-29,993	$+1,878,540
Net Revenue 2/	$+70,602	$ +387,457
Total Change in EIS Area Income 3/	$+114,427	$ +627,964

1/ Agriculture/livestock business activity multiplier of 1.833.
2/ Agriculture/livestock income multiplier of 2.611.
3/ Total net revenue

TABLE 4-33
CHANGES IN REVENUE
ALTERNATIVE D - OPTIMIZE LIVESTOCK GRAZING

Dependency (%)	Number of Ranches
0 - 10	35
11 - 20	13
21 - 30	16
31 - 40	16
41 - 50	8
51 - 60	6
61 - 70	4
71 - 80	0
81 - 90	1
91 - 100	0
Total	99

TABLE 4-34
CRITICALITY OF RANCHER DEPENDENCY ON BLM GRAZING
ALTERNATIVE D - OPTIMIZE LIVESTOCK GRAZING

Criticality	Number of Ranches	Percent of Total
High	57	58
Medium	20	20
Low	22	22
Total	99	100

NOTE: High means that BLM forage is judged to be an essential element for the survival of the ranching operation. Medium means that BLM forage use may or may not be an essential survival element. Low means that BLM forage use is judged not to be essential to the ranching operation's survival.

A judgmental estimate of the criticality of rancher dependency on public land grazing was made by BLM personnel by applying the following three criteria to each ranching operation:

1. Proportion of forage acquired on public land
2. Season that forage is acquired
3. Ease of acquiring alternate sources of forage

the EIS area. Revenues would decrease by $2,721,214 for both deer and elk hunting.

Impacts on Social Conditions

Under this alternative, 8 of the 100 ranches in the EIS area would receive increased incomes. The remaining 92 ranches would experience adverse social well-being impacts. Income losses per ranch would range from about $800 to $15,000 annually.

The ranching community in the area would be forced into two factions, with the largest faction receiving the adverse impacts. It can be expected that among the 92 percent of ranchers receiving adverse impacts, the prevailing negative attitudes toward "big government", government regulations, and federal planning would become intensified.

Impacts on Land Uses

IMPACTS ON LIVESTOCK GRAZING

Optimization of livestock grazing would have the same general impacts on livestock grazing as that of the action proposal. However, under this alternative, competitive AUMs which were allocated to wildlife and wild horses under the action proposal would be allocated exclusively to livestock. Livestock would also be given preference in allocating any increases in vegetation production.

The net effects of the shift in allocation for both the short and long term are summarized in Table 4-35. The major changes in sheep grazing would occur on allotments having spring, fall, and/or winter as major periods of use. Cattle grazing would be most affected on allotments used during spring/summer/fall or yearlong. Existing and proposed less intensive allotments would experience an overall 4 percent decrease in livestock use in the short term but as vegetation condition and production improve, long term production is expected to exceed active licensed use by 35 percent (41,946 AUMs). Proposed less intensive allotments would experience short and long term increases of 18 and 19 percent respectively.

Livestock grazing management associated with this alternative would be the same as those identified under the action proposal.

Conclusion of Impacts on Livestock Grazing

Short term impacts to livestock grazing would generally involve increased production costs associated with acquiring alternate sources of forage for those allotments facing a reduction. This impact would be carried over for allotments with remaining livestock reductions in the long term.

Over all, the EIS area would experience a 2 percent decrease in livestock grazing in the short term, amounting to only 2,953 AUMs. Increased long term vegetation productivity resulting from implementation would provide increased livestock use amounting to 33 percent (44,086 AUMs) over present active licensed use.

IMPACTS ON AGRICULTURE

Impacts resulting from the Optimize Livestock Grazing alternative would be essentially the same as those discussed under Alternative A.

IMPACTS ON FORESTRY AND FOREST PRODUCTS

Vegetation manipulations proposed under this alternative are the same as Alternative A, thus, the impacts would be the same as previously discussed.

IMPACTS ON WILDERNESS

Under this alternative, the impacts on wilderness values would be the same as under the action proposal (Alternative A). No actions would be allowed that would impair the wilderness suitability of the six Wilderness Study Areas.

MITIGATING MEASURES NOT INCLUDED IN THE DESCRIPTION OF ALTERNATIVE D

Pinyon-juniper chainings and sagebrush treatments would have an impact on yield of wood products and wildlife habitat. Firewood and Christmas tree sales would be conducted before and/or after pinyon-juniper treatment to minimize loss of wood products.

Site specific analysis would be conducted on proposed pinyon-juniper and sagebrush manipulations to determine critical activity use areas (foraging areas, thermal cover, escape cover, season of use, etc.) of deer, elk, antelope, and sage grouse so that their critical values would not be lost. Vegetation manipulations within critical deer winter ranges would be scheduled after treatments adjacent to critical winter ranges are completed, and deer winter forage production is adequate to re-

TABLE 4-35
Changes in Livestock Grazing Resulting from Optimization of Livestock Grazing
by Period of Use and Kind of Livestock

Kind of Livestock & Period of Use	Number of Allotments	Active Licensed Use (AUMs)	Initial Livestock Use	Projected Livestock Use	Percent Change Ini-tial	Percent Change Pro-jected
EXISTING INTENSIVE MANAGEMENT						
Cattle Spring/Summer/Fall	2	2,923	3,054	4,017	+5	+37
Cattle Spring/Summer/Fall/Winter	4	10,023	15,118	18,150	+51	+81
Total	6	12,946	18,172	22,167	+40	+71
PROPOSED INTENSIVE MANAGEMENT						
Cattle Spring	4	1,856	2,916	4,153	+57	+124
Cattle Spring/Summer	2	980	520	603	-47	-39
Cattle Spring/Summer/Fall	14	16,875	10,779	14,837	-36	-12
Cattle Spring/Summer/Fall/Winter	13	56,087	54,384	79,178	-3	+41
Cattle Spring/Fall/Winter	7	4,255	3,905	5,811	-8	+37
Cattle Summer/Fall	8	3,168	2,324	3,357	-27	+6
Cattle Fall/Winter	2	1,117	1,154	1,533	+3	+37
Sheep Spring	1	451	516	793	+14	+75
Sheep Spring/Fall/Winter	7	4,184	4,923	7,021	+18	+68
Sheep Spring/Winter	10	12,715	9,837	14,400	-23	+13
Sheep Winter	5	3,446	3,109	4,383	-10	+27
Cattle & Sheep Spring/Summer/Fall	1	1,647	1,887	2,335	+15	+42
Cattle & Sheep Spring/Summer/Fall/Winter	1	1,541	1,946	2,643	+26	+72
Total	75	108,322	98,200	141,047	-9	+30
PROPOSED LESS INTENSIVE MANAGEMENT						
Total	58	11,010	12,953	13,150	+18	+19
Livestock Trailing Use	--	3,750	3,750	3,750	--	--
EIS Area Total	139	136,028	133,075	180,114	-2	+33

place forage that would be lost during treatment of critical winter ranges.

Management of wild horses under this alternative would be carried out to maintain a viable wild horse herd by minimizing winter death losses and undesirable genetic traits due to inbreeding. During severe winters, use of gates and let down fences to allow access to all available winter feed and winter feeding could be used to minimize death losses. Improved access and introduction of new blood lines could minimize undesirable effects of inbreeding.

ADVERSE IMPACTS THAT CANNOT BE AVOIDED

Airborne dust and soil erosion resulting from project development and vegetation manipulation would cause temporary decreases in air quality and increases in sediment yields. Smoke resulting from prescribed burning would temporarily affect air quality in the general area of the burn. Vegetation manipulations such as chaining would also cause a loss of 89,354 cords of firewood for an indeterminate period of time from 42,723 acres of pinyon-juniper manipulation.

New fence construction within critical deer winter ranges and migration routes could result in increased deer mortality. Additional interior fencing proposed under this alternative could adversely affect wild horse movements and could result in death losses to small, isolated herds during severe winters.

Management under this alternative could reduce antelope populations to nonviable levels which could endanger their future existence.

Visual resource values can be impaired in the immediate vicinity of any project or vegetation manipulations since steps taken to mitigate visual impacts of these improvements are designed for distant viewing.

Threatened and endangered species and subsurface cultural and historic sites not discovered in initial surveys could be damaged, depleted, or destroyed during any soil or vegetation disturbing activities.

Reductions in spring livestock use would cause an increased dependency on private hay meadows and irrigated pastures normally used for producing winter feed. Short term reductions of 3 percent (2,953 AUMs) in active licensed livestock use would occur with a 17 percent reduction in present authorized livestock use. Minor production losses of 55 AUMs would also occur from 552 acres occupied by range facilities.

SHORT TERM USE VS LONG TERM PRODUCTIVITY

Initial soil erosion due to project development and vegetation manipulation would be a short lived occurrence. After revegetation measures, soil erosion would gradually decrease. Projects and manipulations, are expected to help decrease soil erosion in the long term over the entire EIS area through their enhancement of grazing distribution with consequent increases in vegetation cover.

Manipulation of pinyon-juniper would cause a long term decrease in wood products on treated areas. However, through reseeding and release of existing herbaceous species, long term forage productivity would improve dramatically.

Additional interior fencing on wild horse ranges could adversely affect wild horse movements and result in death losses in severe winters to small herds isolated in part by the fences. However, the interior fencing is designed to improve control over livestock movements and grazing use. This degree of control would help avoid overuse in many areas with subsequent improvement in forage production and availibility. Improved forage production would enable wild horses to improve their physical condition and, thus, increase their survival chances in severe winters. Also, more forage would be available in winter to help sustain wild horses during severe winter weather.

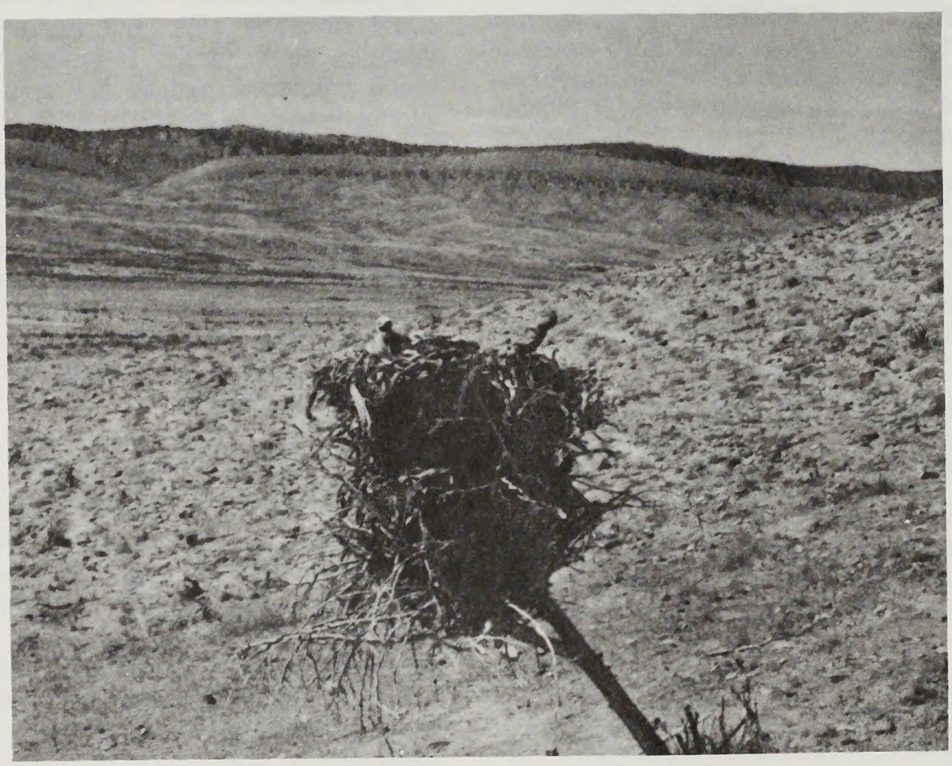
Increased dependency on hay meadows and irrigated pastures, to hold cattle due to delayed spring turn out dates, would cause added feeding expense and negative economic impacts on ranchers. Over the long term, however, expected increases in vegetation production would benefit ranchers and lessen or eliminate dependency on private agricultural land. The expected productivity increase would allow livestock grazing to exceed present actual use levels. Those operations able to economically withstand the initial reduction would realize increased ranch income in the long term through improved vegetation and more efficient management due to range improvements. Those ranches unable to economically withstand initial reductions would probably go out of the livestock business before benefits from improved rangeland conditions are realized.

IRRETRIEVABLE OR IRREVERSIBLE RESOURCE COMMITMENTS

Threatened and endangered species and subsurface cultural resources overlooked in original surveys could be damaged during any soil disturbing activity.

POSSIBLE CONFLICTS WITH OTHER FEDERAL, STATE, OR LOCAL LAND USE PLANS

Colorado Division of Wildlife long term population goals for big game species of wildlife would not be achieved under this alternative. No other conflicts are anticipated with other federal, state, or local land use plans.



IMPACTS OF ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE USES

Impacts on Air Quality

Impacts on air quality would be the same as those predicted for the action proposal (Alternative A) which would essentially entail minimal adverse impacts from particulate matter associated with prescribed burning. Overall air quality would remain good.

Impacts on Soils

Eliminating spring grazing would reduce soil compaction (Gifford et al. 1977) in the short and long term. This in conjunction with increasing cover, would in turn decrease the amount of on-site erosion from the soil surface. On-site erosion rates are expected to decrease from present conditions by 2.7 tons/acre/year in the long term (Appendix D, Table D-1).

Eliminating livestock grazing on rangeland in severe or critical soil erosion conditions would improve on-site erosion rates on the Artesia and K Ranch allotments by an average of 3.0 and 4.7 tons/acre/year respectively (Appendix D, Table D-1). Increased vegetation cover during the first 20 years (Reardon and Merrill 1976) would decrease soil compaction from cattle grazing. Soil compaction conditions would stabilize after this period of time.

Soil disturbances from range improvements would reduce vegetation cover in the short term and have an adverse impact on soil erosion rates. Soil erosion rates could increase by 1.1 to 7.6 times that of present conditions (Gifford and Shaw 1973, Roundy et al. 1978).

Soils with loam, clay loam, and sandy clay loam surface soil textures have shown the greatest potential for mechanical manipulations. Localized exposed surface areas subject to wind and water erosion would cause soil productivity to decline by an unquantifiable amount in the short term. Overall long term soil productivity would be improved.

Chemical land treatments would maintain or improve soil erosion conditions over the short and long term as a result of vegetation cover remaining on the soil surface after manipulation.

Maintaining 107,000 acres of wild horse habitat to support 450 wild horses would have an adverse effect on on-site erosion rates. A lack of proposed interior fences within this area would preclude pasture division for some type of grazing management (Reardon and Merrill 1976) and, therefore, result in an overall unquantifiable adverse impact on on-site erosion rates. Soil compaction and resulting on-site erosion would be greater on continually grazed areas and could result in a 4 percent decrease in water infiltration rates (McCarty and Mazurak 1976).

CONCLUSION OF IMPACTS ON SOILS

On a long term basis, this alternative would result in a reduction of present on-site erosion by an average of 2.7 tons/acre/year. Soil disturbances from range improvements would reduce vegetation cover in the short term and have an adverse impact on soil erosion rates. Soil erosion rates could increase by 1.1 to 7.6 times that of present conditions (Gifford and Shaw 1973, Roundy et al. 1978). These adverse impacts would decrease as vegetation is reestablished.

Impacts on Water Resources

With the exception of areas where restrictions are to be imposed and areas where cattle grazing is to be reduced, impacts with this alternative would be basically the same as with Alternative A.

Elimination of spring/summer grazing on all allotments would result in decreased soil compaction and improved vegetation cover. The result would be a net decrease in runoff and sediment yield for the entire EIS area, and an overall improvement in water quality and watershed conditions. Runoff is predicted to average 0.42 inches from high intensity storms (Appendix D), a 7 percent reduction from the present conditions. Runoff from a normal year is not expected to change significantly. For this alternative, sediment yields would average 2.19 tons/acre/year, a long term reduction of 8 percent from the present conditions which is believed not to be significant. The proposed range facilities would have impacts similar to those outlined in Alternative A.

Impacts on Terrestrial Vegetation

Emphasis on other resource uses is expected to increase good condition range 245,237 acres, with decreases of 53,973 and 191,272 acres of poor and fair condition range respectively (Table 4-36).

Acreages with improving trend would increase 711,051 acres, while those in static trend would decrease 512,748 acres. Areas with declining trend are expected to stabilize and become static (Table 4-37).

Amounts of desirable species in the vegetation composition are expected to increase by 17 percent on areas improving from fair to good condition, with similar increases expected on areas improving from poor to fair condition. The major influence the reduction in livestock use has on condition and trend is that of accelerating vegetation improvement over the 20 year long term period.

Plant cover of desirable species is expected to increase by 17 percent, while plant cover of all species should increase by 4 percent. Plant cover estimates in the long term are based on comparisons with existing data from within the EIS area.

Accumulations of mulch or dead plant materials should increase significantly, but amounts are unquantified.

Production of forage would be similar to that of the action proposal. A 27 percent increase in untreated areas and a 40 to 60 percent increase in manipulated areas is expected to occur.

Impacts on Riparian Vegetation

Impacts on riparian vegetation created by emphasis on other resource uses, would be caused by dramatic decreases in forage allocation, fencing of 55.5 miles of stream, and the implementation of the various range improvements described under the action proposal. A decrease or elimination of livestock grazing on riparian vegetation would occur by reducing or eliminating numbers, decreasing use, or through better distribution of livestock. These impacts would lead to marked improvements in riparian vegetation composition and condition, and increases in vegetation ground cover along stream banks by the year 2000 (Appendix E).

Increases in desirable herbaceous vegetation would occur on 259 acres and remain unchanged on 38 acres. Improvements would generally be exhibited by increases in percent composition of perennial grasses (primarily bluegrasses), sedges, rushes, and desirable forbs. An improvement in desirable trees and shrubs would occur on 210 acres, remain unchanged on 81 acres, and decline on 6 acres. The decline would occur on the lower portion of Piceance Creek near the confluence of the White River where an existing stand of salt cedar would increase and out-compete existing willows for living space and available water.

Vegetation ground cover would increase on 259 acres and remain the same on 38 acres.

Condition ratings would generally improve in most riparian communities. Ratings would improve from poor to fair on 32 acres, poor to good on 20 acres, fair to good on 98 acres, fair to excellent on 60 acres, and good to excellent on 1 acre for a total improvement on 211 acres. Fair ratings would remain unchanged on 49 acres, and good ratings would not change on 38 acres.

Impacts on Threatened and Endangered Plants

Enhancement of other resources may affect threatened and endangered (T/E) plants through increased wild horse and wildlife trampling and grazing, and perhaps through plant competition from improved range conditions. Some T/E plants occur in areas unsuitable for or inaccessable to livestock but increased wild horse numbers on 107,000 acres and increased wildlife numbers could affect T/E plants. Increased off-road-vehicle use associated with big game hunting could occur with increased big game populations creating adverse effects on T/E plants.

Impacts on Terrestrial Wildlife

IMPACTS ON MULE DEER, ELK, AND ANTELOPE

The total big game wildlife vegetation allocation would be 64,521 AUMs in the short term and 96,815 AUMs in the long term. Mule deer would be allocated 59,577 AUMs in the short term and 87,861 AUMs in the long term (Appendix B, Table B-4) which would support the existing population of 45,394 deer in the short term and a 23 percent population increase (55,835 deer) in the long term. Elk would be allocated 4,745 AUMs in the short term to support the existing population of 1,783 elk. In the long term, 7,607 AUMs would be allocated to support an 8 percent population increase (1,926 elk). The short and long term antelope allocation would be 199 AUMs and 1,347 AUMs respectively.

The most significant impact of this alternative would be to increase forage availability to wildlife. Deer, elk, and antelope nutrition would improve, and dietary energy deficits on winter range would decrease in response to increased herbaceous forage availability. Big game would make more effective use of sagebrush without impairing digestive efficiency. Consumption of herbaceous forage

TABLE 4-36
PRESENT AND FUTURE RANGE CONDITION
ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE USES

Condition	Present	Future
Poor	446,055	392,082
Fair	996,742	805,478
Good	79,009	324,246
Total	1,521,806	1,521,806

TABLE 4-37
PRESENT AND FUTURE RANGE TREND
ALTERNATIVE E - EMPHASIS ON OTHER RESOURCES USES

Trend	Present	Future
Declining	198,254	0
Static	1,291,854	779,106
Improving	31,698	742,700
Total	1,521,806	1,521,806

would increase, which could potentially alleviate browsing pressure on desirable shrubs. Proposed livestock management would compliment wildlife use in many areas. Cattle and sheep use could potentially benefit deer and elk nutrition by increasing palatable plant production and nutrient levels (Anderson et al. 1975, Wagner 1977, Smith et al. 1979).

In addition to annual spring rest from livestock grazing on all allotments, 11 allotments (Table 2-10) would also receive fall rest. Allotments rested in the fall contain poor browse conditions on some of the more important critical winter ranges in the EIS area. Declining browse conditions would improve in the long term if deer browsing is not the determining factor of poor conditions. Short and long term impacts would involve increased forage availability on all seasonal ranges.

About 62 miles of fence would be constructed on 8 of the 14 allotments that would be managed under intensive livestock management (Table 2-8; Appendix A, Table A-4). Fencing is proposed to control livestock distribution on critical deer winter range. Although fences would increase deer winter losses, fencing would improve livestock distribution, which would improve winter forage conditions and reduce starvation related winter mortality. Long term impacts would be expected to be beneficial to both winter survival rates and habitat conditions.

Proposed water development (226 facilities - Appendix A, Table A-4), whether proposed for intensive livestock management or for wildlife habitat improvement, would serve to increase big game carrying capacities on all seasonal ranges. Forage production would increase in response to improved livestock distribution. More waters could increase the limits of usable big game summer range.

All proposed vegetation manipulations (83,890 acres - Appendix A, Table A-5) would be specifically designed to improve wildlife habitat conditions. The same potential adverse impacts would apply as discussed in Alternative A (action proposal), except that no spraying with 2, 4-D is proposed. The major objective of these manipulations would be to improve desirable browse production on currently poor condition habitat (primarily winter range).

Despite winter range habitat improvement projects, forage conditions on winter range would remain a limiting factor to 88 percent of the deer in the EIS area. Improvement in long term browse conditions could be limited on critical winter ranges because of anticipated heavy deer browsing pressure. Browse improvement projects would be successful on normal winter ranges with moderate deer densities.

Vegetation manipulations would function with the allocation and grazing management proposals in raising winter range carrying capacities above the existing situation or above any of the other alternatives. Assuming successful browse regeneration on treated areas, deer, elk, and antelope carrying capacities could increase by 23, 8, and 2 percent respectively.

Adverse impacts associated with vegetation manipulations on deer and elk cover requirements on winter range would be similar to those discussed in Alternative A (action proposal). The treatment of pinyon-juniper stands along ridgetops adjacent to critical feeding areas on southern exposures could reduce both food and cover values of these critical use areas.

IMPACTS ON SAGE GROUSE

Sage grouse would indirectly benefit from improved understory production and diversity resulting from the vegetation allocation. Improved nesting and brood habitat conditions could increase flock productivity. The other grazing management proposals would contribute to similar habitat improvement.

Impacts resulting from vegetation manipulations would be similar to those discussed in Alternative A. Manipulations would be designed to improve habitat quality on brood and summer ranges. Short and long term impacts would generally benefit sage grouse if sagebrush manipulations are limited in size and are irregularly shaped.

Proposed water developments would improve habitat quality through improved livestock distribution and would increase the acreage of usable summer habitat.

WATERFOWL

About 112 reservoirs (Appendix A, Table A-4) would be constructed. Significant long term population increases would not be expected.

IMPACTS ON NONGAME BIRDS

Impacts resulting from grazing management proposals and vegetation manipulations would be the same as in Alternative A. Most species would benefit from improved understory production and diversity. The proposed 49,520 acres of pinyon-juniper manipulation would decrease bird species diversity and abundance by over 50 percent on treated areas in the long term. The proposed 34,370 acres of sagebrush manipulation would result in short term reduction in bird species diversity and abundance.

IMPACTS ON SMALL MAMMALS

Small mammals would generally benefit from the vegetation allocation and grazing management proposals. Vegetation manipulations would lower species diversity but increase overall abundance over the short term; habitat generalists would be favored. In the long term, populations would be similar to pretreatment levels.

IMPACTS ON PREDATORS

No changes would be expected in predator populations. Population levels would fluctuate in response to changes in respective prey bases.

IMPACTS ON THREATENED AND ENDANGERED SPECIES

No impacts would be expected on the five endangered terrestrial species in the EIS area.

CONCLUSION OF IMPACTS ON TERRESTRIAL WILDLIFE

In the long term, deer, elk, and antelope carrying capacities could increase by 23, 8, and 2 percent respectively which would be capable of supporting about 55,835 deer, 1,926 elk, and 224 antelope. Forage availability on winter range would remain a limiting factor on 88 percent of the deer in the EIS area. Most of the 208,000 acres of poor condition winter range with declining trends would shift to a static trend in the long term. Poor condition winter range with currently static trends would largely change to improving trends.

Sage grouse habitat condition would improve on nesting, brooding, and summer ranges as a result of vegetation manipulations and water development.

Most nongame birds, small mammals, and predators would benefit from grazing management proposals. Pinyon-juniper manipulations would reduce bird species diversity and abundance over the long term. Sagebrush manipulations would reduce bird diversity and abundance over the short term. Manipulations would reduce small mammal species diversity but increase overall abundance over the short term. Long term abundance would be similar to pretreatment levels. Obvious changes in predator populations would not be expected in either the short or long terms.

Threatened and endangered species would not be affected by this alternative.

Impacts on Aquatic Wildlife

Impacts on aquatic life resulting from emphasis on other resource uses would generally result in improved conditions on most perennial streams flowing through public lands by the year 2000. This would occur as a result of improved riparian conditions through dramatic decreases in livestock numbers, implementation of range improvements as proposed under the action proposal, and by the fencing of approximately 55.5 miles on 19 streams. These innovations would decrease stream siltation and improve water quality, increase streamside cover, and improve streambank stability and streambottom morphology. This would lead to improved conditions and enhance the ability of the aquatic ecosystem to support a diversity of aquatic life.

Aquatic life in the White River and Piceance Creek would continue to be influenced by the agricultural practices on private lands which comprise better than 90 percent of both stream length totals. Therefore, no impacts would occur on either stream from this alternative.

IMPACTS ON FISH

Fish habitat would improve from these changes as indicated in Table 4-38. Improvements in fish habitat would occur on approximately 53 miles of stream flowing through public lands, while 20 miles would remain unchanged. Improved habitat conditions would also lead to unquantifiable, yet marginal, increases in total fish biomass. Causes for these improvements would be the fencing of approximately 25 miles of known trout habitat, and dramatic reductions in livestock numbers along an additional 28 miles of trout stream.

The fish habitat in Divide Creek Reservoir would not be impacted from the proposed grazing management under this alternative due to previous fencing. Reductions would not be sufficient to improve the fish habitat in the reservoirs on Bitter and West Creeks. Big Beaver and Cow Creeks would not change as they already exhibit good conditions.

Since little or no angling use occurs in the EIS area, no impact on angling use would be expected from this alternative.

TABLE 4-38
LONG TERM TRENDS IN FISH HABITAT
ALTERNATIVE E - EMPAHSIS ON OTHER RESOURCE USES

Allotment No.	Stream Name	Trend
6005/6019	Piceance Creek	No Change
6019/6021	Trappers Creek	Improve
6023	Willow Creek	No Change
	Middle Fork Stewart Creek	Improve
6024	Fawn Creek	Improve
	West Fawn Creek	Improve
6029	Black Sulfur Creek	Improve
6324	Divide Creek Reservoir	No Change
6337	Windy Canyon	Improve
	Bear Park Creek	Improve
	East Douglas Creek	Improve
6346	West Creek (in Reservoir)	No Change
6345	Brush Creek	Improve
6357	West Evacuation Creek	Improve
6358	Bitter Creek (in Reservoirs)	No Change
6367	Lake Creek	Improve
	Soldier Creek	Improve
6813	Cow Creek	No Change
	Big Beaver Creek	No Change
	White River	No Change

TABLE 4-39
RECREATIONAL HUNTING OPPORTUNITIES RESULTING FROM
EXPECTED INCREASES IN BIG GAME POPULATIONS
ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE USES

	Population		Harvest		Recreation Days per Animals Harvested	Increased Animals Harvested (yr. 2000)	Increased Recreation days (yr. 2000)
	Present	yr. 2000	Present	yr. 2000			
Deer	45,394	66,152	11,221	16,354	8.4	5,133	43,117
Elk	1,783	1,926	319	482	29.1	163	4,743
Antelope	219	224	50	52	3.5	2	7

IMPACTS ON THREATENED AND ENDANGERED FISH SPECIES

There would be no impacts on either of the endangered fish species, Colorado squawfish and boneytail chub, as a result of emphasis on other resource uses. Both species are either presently existing at low population levels, or use the White River only sporadically. Such conditions would not be expected to change from impacts associated with this alternative.

The Colorado cutthroat trout populations in Trappers, Lake, and Soldier Creeks would improve due to improved habitat conditions following the fencing along all three streams.

CONCLUSION OF IMPACTS ON AQUATIC WILDLIFE

Implementation of this alternative would improve aquatic habitat on most of the perennial streams in the EIS area. Fish habitat would improve along 53 public stream miles and remain unchanged on 20 stream miles. The Colorado cutthroat trout populations in Trappers, Lake, and Soldier Creeks would be enhanced due to fencing.

Impacts on Wild Horses

This alternative would recommend managing 416 to 450 wild horses in the 107,000 acre wild horse management area proposed in Alternative A (Map 2-1). The allocation of forage in this alternative recommends a 3,419 AUM reduction in wild horse use, which decreases wild horse use by 100 percent in areas outside the proposed horse range. Use inside the proposed wild horse range would be increased by 458 AUMs during the long term.

The adverse impacts associated with total removal of wild horses outside the proposed wild horse area would be the same as those discussed in Alternative A, except that the number of horses impacted through removal would be 351. These impacts would include stress and death losses associated with removal operations.

Impacts for those horses in the proposed management area would be decreased forage competition resulting in increased annual herd production.

Increased allocation of forage during the long term for cattle, wild horses, and wildlife would result in impacts similar to those identified in Alternative A. In the long term, increased livestock grazing use would occur in areas presently under-utilized by livestock. Some of this use would occur on wild horse winter range which could reduce forage available to wild horses. Forage shortages during winter could increase wild horse mortality.

Impacts on Cultural Resources

Under this alternative, impacts to cultural resources would be similiar to those discussed under Alternative A. The accelerated improvement in soil protection would be a beneficial impact and provide added protection for archeological sites. The proposed range improvements could be an adverse impact since increased land disturbance would result. Disturbance of 84,205 acres would occur with a possibility of encountering 1,447 cultural sites (1 site/58.2 acres). Secondary adverse impacts would result from increased human activity and consequent vandalism of sites.

Impacts on Visual Resources

The impacts that are expected to occur under Alternative A would also apply under this alternative in that any disturbance would affect visual resources in the immediate area. The extent of an individual project's impact would depend primarily on the visual rating class in the area.

Impacts on Recreation Resources

Under this alternative the wild horse viewing opportunities would be adversely impacted, as discussed under Alternative A, with a proposed 28 percent population reduction. The projected increase in big game populations would result in a 27 percent increase in hunter/viewing recreational days (Table 4-39).

Impacts on Economic Conditions

Under this alternative, 99 ranching operations would receive reductions in allowable federal AUMs, while 1 operation would receive an increase. The forage use changes and income effects identified in Table 4-40 are based on the changes in allowable grazing use that would occur under this alternative.

Table 4-40 indicates the range size grouping of the 100 operations that would incur revenue changes resulting from forage use reductions or increases and the changes in gross and net revenues that would accompany the forage use

TABLE 4-40
RANCH SIZE AND INCOME EFFECTS
ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE VALUES

Model	Cattle	Sheep	No. of Ranches	Total BLM AUM Change	Total Corr. Pvt. Land AUM Change	Total BLM Plus Pvt. AUM Change	Avg. AUM Change/Rnch	Gross Revenue Change/ Ranch	Gross Revenue Chg/All Ranch	Net Revenue Change/ Ranch	Net Revenue Chg/All Ranch	Changes In Hired Empl. (Man-Years)
Short Term												
1	1-149		15	-1,542	-512	-2,054	-137	$ -4,006	$ -60,090	$ +1,381	$+20,715	-.95
2	150-449		23	-8,642	-4,655	-13,297	-578	-16,901	-388,723	+686	+15,778	-9.37
3	450-749		10	-11,194	-3,619	-14,813	-1,481	-48,429	-484,290	-5,345	-53,450	-3.69
4	750-1,999		16	-32,233	-29,543	-61,776	-3,861	-119,073	-1,905,168	-4,661	-74,576	-12.72
5	2,000 or more		1	-2,109	-1,436	-3,545	-3,545	-215,571	-215,571	-36,786	-36,786	-1.98
6		1-6,000	28	-11,872	-6,168	-18,040	-644	-24,317	-680,876	-6,154	-172,312	-13.54
7	1-1,399	1-1,749	5	-2,244	-4,038	-6,282	-1,256	-35,520	-177,600	-5,479	-27,395	-3.41
8	1,400 or more	1,750 or more	2	-1,450	-3,321	-4,771	-2,386	-79,364	-158,728	-23,804	-47,608	-3.06
		TOTAL	100	-71,286	-53,292	-124,578			$-4,071,046		$-375,634	-48.72
Long Term												
1	1-149		15	-1,315	-464	-1,779	-119	$ -3,480	$ -52,200	$ +1,199	$+17,985	-.82
2	150-449		23	-6,102	-3,907	-10,009	-435	-12,719	-292,537	+516	+11,868	-7.05
3	450-749		10	-5,825	-2,760	-8,585	-858	-28,057	-280,570	-3,097	-30,970	-2.14
4	750-1,999		16	-21,107	-20,948	-42,055	-2,628	-81,048	-1,296,768	-3,172	-50,752	-8.66
5	2,000 or more		1	-1,179	-798	-1,977	-1,977	-120,221	-120,221	-20,515	-20,515	-1.10
6		1-6,000	28	-9,325	-5,720	-15,045	-537	-20,277	-567,756	-5,132	-143,696	-11.29
7	1-1,399	1-1,749	5	-1,398	-2,986	-4,384	-877	-24,788	-123,940	-3,826	-19,130	-2.37
8	1,400 or more	1,750 or more	2	-929	-2,826	-3,755	-1,878	-60,510	-121,020	-18,736	-37,472	-2.51
		TOTAL	100	-47,180	-40,409	-87,589			$-2,855,012		$-272,682	-35.94

Source: Bartlett et al. 1979. Impacts of Federal Grazing on the Economy of Colorado. Fort Collins. Colorado State University. BLM Range Management Automated System, 1979, for ranch sizing.

changes. These are changes from the estimated present levels shown in Table 3-16 (Section 3).

Changes in gross and net revenue for ranching operations and changes in sales and income to other sectors of the EIS area economy are presented in Table 4-41.

Gross revenue of all the ranches would be reduced by an estimated $4,071,046 with a resulting loss by other sectors of the EIS area economy of an additional $3,391,181. Net revenue of all ranches would be reduced by an estimated $375,634 with an additional $605,146 decrease in indirect income in the EIS area. The total direct plus indirect income short term effect would be an estimated $980,780, which amounts to 2.6 percent of the 1977 Rio Blanco County personal income.

The estimated short term net revenue changes would have a fairly significant effect on the 100 affected ranching operations. Some might experience a change from positive to negative net income. Average percentage changes in net income from estimated present levels would range from a slight increase to a 32 percent reduction with a median change of about a 12 percent reduction.

Net income reductions would affect about 72 out of the 100 ranches involved in this alternative. The capability of the ranching operations to survive income reductions of this magnitude is uncertain. It is possible that a number of the operations would cease, with a combination of properties or conversion to other uses occurring.

Since all of the ranches in the EIS area would be impacted by this alternative, their relative dependency on BLM forage and the criticality of that dependency are the same as those shown in Tables 3-17 and 3-18 (Section 3) respectively. Similarly, the percentage of families with ranching estimated as the primary source of income would be the same as described in Section 3.

It is predicted that an additional 24,103 AUMs of forage above short term levels would be available for livestock use in 20 years, at the end of the analysis period. At that time total BLM forage use could be 88,845 AUMs.

The use level in the year 2000 would be a decrease of 47,180 AUMs from the present active licensed use level, with an associated decrease in private AUMs of 40,409 for a total forage use reduction of 87,589 AUMs. The estimated declines in gross and net revenue from present levels in the EIS area resulting from this decreased level of forage use would be $2,855,012 and $272,682 respectively.

Since long term gross revenue for ranching operations would be reduced by $2,855,012, sales in other sectors of the EIS area economy would be reduced by $2,378,225. The decrease of $272,682 in net revenue for ranching operations would result in an additional loss of $439,291 in indirect income in the EIS area. Thus, the total direct plus indirect income reduction from present levels in the long term would be $711,973 or 1.9 percent of the 1977 Rio Blanco County personal income.

While the long term situation offers some recovery of the short term grazing use reductions under this alternative, the income reductions in both the short and long term could have serious effects on some impacted ranching operations.

There would be an estimated 48.72 man-years of hired employment decrease on EIS area ranches in the short term resulting from ranching cutbacks due to lower levels of BLM forage use (Table 4-40). It is possible that in the long term there would be a reduction of 35.94 man-years employment below the present level.

As a result of this alternative, there would be a decrease in authorized AUMs (active qualifications) from the present level of 159,734 AUMs to 64,742 AUMs. The decrease of 94,992 AUMs authorized use would translate into a decrease of 7,916 animal units (at 1 animal unit per 12 AUMs) which would reduce the present value of the affected ranches by about $7,916,000 (at $1,000 per animal unit). Related to the decreased ranch values would be a reduction in the tax base of about $2,374,800 or 1.3 percent of 1977 Rio Blanco County assessed valuation.

In the long term, allowable use could be up to 88,845 AUMs which could mean a somewhat smaller decrease from present authorized livestock use levels. The decrease of 70,889 AUMs would translate into 5,907.42 animal units which would decrease the present value of EIS area ranches by about $5,907,420. The related reduction in the tax base would be about $1,772,226, or 1.0 percent when compared to the 1977 Rio Blanco County assessed valuation.

Property taxes paid to local governments might be decreased $81,931 in the short term as a result of the $2,374,800 reduction in the tax base from lowered ranch values. In the long term, the decrease in ranch assessed values of $1,772,226 would bring about a $61,142 loss (a $20,789 gain over the short term) in property tax revenues.

IMPACTS ON RECREATION AND WILDLIFE DERIVED INCOME

The Terrestrial Wildlife section indicates that this alternative would provide habitat for expanding big game populations, particularly deer. The Recre-

TABLE 4-41
CHANGES IN REVENUE
ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE USES

Economic Sector And Revenue Type	Short Term	Long Term
Ranch Operations		
Gross Revenue	$-4,071,046	$-2,855,012
Net Revenue	$- 375,634	$- 272,682
Other Economy Sectors		
Gross Revenue 1/	$-3,391,181	$-2,378,225
Net Revenue 2/	$- 605,146	$- 439,291
Total Change in EIS Area Income 3/	$- 980,780	$- 711,973

1/ Agriculture/livestock business activity multiplier of 1.833
2/ Agriculture/livestock income multiplier of 2.611
3/ Total net revenue

ation section indicates that these increased big game populations would create additional hunting/viewing opportunities. This expanded human-related wildlife use would create an increased income of unknown magnitude for EIS area households.

The Recreation section also contains estimates of the increases in hunter recreation days that could accompany the expanded big game populations. From these figures it is possible to estimate the impact that could occur to the state of Colorado from increased hunting in the EIS area. Based on statewide values per animal harvested, the estimated impact of expanded nonresident big game hunting would be $2,268,034 for deer and $1,371,800 for elk, for a total of $3,639,834.

CONCLUSION OF IMPACTS ON ECONOMIC CONDITIONS

Emphasis on other resource values would result in a decrease of allowable AUMs for 99 ranching operations, while 1 operation would receive an increase. In the short term, net incomes would be decreased by $375,634 to $2,256,231 for ranching operations, and $605,146 to $3,634,789 for other economy sectors.

In the long term, allowable AUMs would increase, but still show a net decrease below present levels by $272,682 for ranching operations, and $439,291 for other economy sectors.

Ranch values would decrease by $7,916,000 in the short term, with a resulting decrease of $81,931 in property tax revenues paid to local governments. In the long term, ranch values would show a decrease of $5,907,420 with a decrease of $61,142 in property tax revenues paid to local governments.

Of the 100 ranches affected, 48 percent depend on public grazing for 20 percent or more of their total forage requirements, and 58 percent require BLM forage as an essential element for the survival of the ranching operation. It is possible that some ranching operations may go out of business.

Ranch employment would be reduced by 48.72 man-years of hired employment to 149.91 man-years in the short term, and by 35.94 to 162.69 man-years in the long term.

The increase in nonresident deer and elk hunting in the EIS area would increase state revenues by $3,639,834 in the long term.

Impacts on Social Conditions

Livestock operators would experience major adverse impacts with both reduction of their incomes and the value of their ranches. Gross income reductions per ranch would range from $4,000 to $215,600 annually. Net revenue changes would range from 9 to 30 percent per ranch. Many of the ranchers would be forced to seek other employment in order to avoid selling their ranches. For those who would find it necessary to sell and seek an alternate way of life, the probabilities are high that they would experience severe adverse impacts to their self images. This would be especially true if the ranch is sold at a loss.

If this action is implemented, the prevailing negative attitudes among ranchers toward "big government", government regulations, and federal planning would be intensified.

Impacts on Land Uses

IMPACTS ON LIVESTOCK GRAZING

A short term reduction in livestock use totaling 71,286 AUMs would occur under this alternative, which represents a 52 percent reduction in the present livestock grazing use occurring on public lands.

Livestock use would be eliminated throughout the EIS area yearly in the spring, however, elimination of fall use would occur only on critical deer winter range. Spring and fall grazing use would be reduced 26,000 AUMs and 2,666 AUMs respectively, below grazing use proposed in Alternative A.

Four allotments, now used exclusively as spring range, would have all livestock use eliminated in the spring. Permittees would be forced to buy feed or locate other spring range on private, state, or other federal lands. Livestock operators having fall use eliminated on their allotments would also be forced to seek the same alternate forage sources at added cost.

The remaining sheep and cattle allotments having spring use as part of their use period would experience severe cutbacks in livestock grazing and bear additional production costs in providing livestock forage in the spring.

Possible shifts from cow/calf to yearling operations could occur as the result of elimination of spring use. Increased demand for fall use on present spring range could occur to supplement yearling operations.

IMPACTS ON AGRICULTURE

Impacts under this alternative would be similar to the impacts identified in Alternative A. Reductions in spring livestock grazing use on public lands would require operators to hold their livestock on private land, much of which is irrigated hayland. If cattle are kept on the hayland to compensate for reduced spring grazing, hay yield would be reduced due to spring grazing and lack of early irrigation on these lands.

IMPACTS ON FORESTRY AND FOREST PRODUCTS

Under this alternative, mechanical treatment of 49,520 acres of pinyon-juniper woodland would produce 299,596 cords of wood products, of which only 200,000 cords would be utilized based on present demands. The 99,596 cords of wood products not utilized would have a heat energy equivalent of 15.9 million gallons of fuel oil and a stumpage value of $497,980.

IMPACTS ON WILDERNESS

No range improvements are proposed in the six Wilderness Study Areas (WSAs). No impacts are expected to occur under this alternative that would impair the wilderness suitability of the six WSAs.

MITIGATING MEASURES NOT INCLUDED IN THE DESCRIPTION OF ALTERNATIVE E

Loss of sustained yield of firewood occurring as the result of pinyon-juniper manipulation could be mitigated by conducting firewood sales before and/or after treatment. Vegetation manipulation could also have adverse affects on wildlife habitat. To avoid such an occurrence, a site specific analysis would be conducted on proposed pinyon-juniper and sagebrush manipulations to determine critical activity use areas (foraging areas, thermal cover, escape cover, season of use, etc.) of deer, elk, antelope, and sage grouse so that their critical values would not be lost. Vegetation manipulations within critical deer winter ranges would be scheduled after treatments adjacent to critical winter ranges are completed, and deer winter forage production is adequate to replace forage that would be lost during treatment of critical winter ranges.

ADVERSE IMPACTS THAT CANNOT BE AVOIDED

Vegetation manipulations and construction of range improvement facilities would affect several resources. Air quality would be temporarily affected due to dust in the air from soil disturbances and from smoke following prescribed burns. Soil erosion would also occur as the result of soil disturbance with subsequent sedimentation affecting water quality. The loss of 49,520 acres of pinyon-juniper stands resulting from manipulations would represent a loss of 99,596 cords of fuel wood. Cultural resources could also be damaged by vegetation manipulations as well as by increased human activity resulting from enhancement of other resources.

Reductions in allowable federal AUMs would adversely impact 99 of the 100 ranch operations. Short term direct income losses to ranches and indirect income losses to other sectors would total $980,780. Ranch valuations would be reduced by $7,916,000 with an associated loss of $2,374,800 in the local tax base.

The loss of 71,286 AUMs would represent a 52 percent reduction from the present situation, and would represent a significant adverse impact to livestock grazing. This would lead to increased production costs for alternative forage sources. In addition the spring use period would be totally eliminated along with an additional 2,666 AUMs loss in fall use on deer winter ranges. Heavy livestock reductions could put some ranching operations out of business resulting in a recombination of base lands with other ranches or the conversion to other land uses. Those operations able to economically withstand the initial reduction would continue in the livestock business while those ranch unable to economically withstand initial reductions would probably go out of the livestock business.

New fence construction with critical winter ranges and migration routes could result in increased deer mortality. Adverse impacts to wild horses would also occur through removal operations of excess wild horses. By reducing the wild horse range, 351 wild horses would be removed resulting in some death losses. The reduction of wild horse range from 462,000 to 107,000 acres, and the subsequent removal of wild horses would create an adverse impact on recreation by decreasing wild horse viewing opportunities.

SHORT TERM USE VS LONG TERM PRODUCTIVITY

Unquantifiable increases in soil erosion due to project development and vegetation manipulation would occur on a short term basis. After revegetation measures, soil erosion would gradually drop to levels below those which presently exist. Projects and manipulations, causing short term soil erosion, are expected to help decrease soil erosion in the long term over the entire EIS area through their contribution to grazing distribution with consequent increases in vegetation cover.

Initial loss of ranch income due to reduction in livestock use would have variable long term effects. Heavy livestock reductions under this alternative would force some ranches out of business. Those ranches forced out of business could be combined with other ranches into larger, more efficient, and more productive operations.

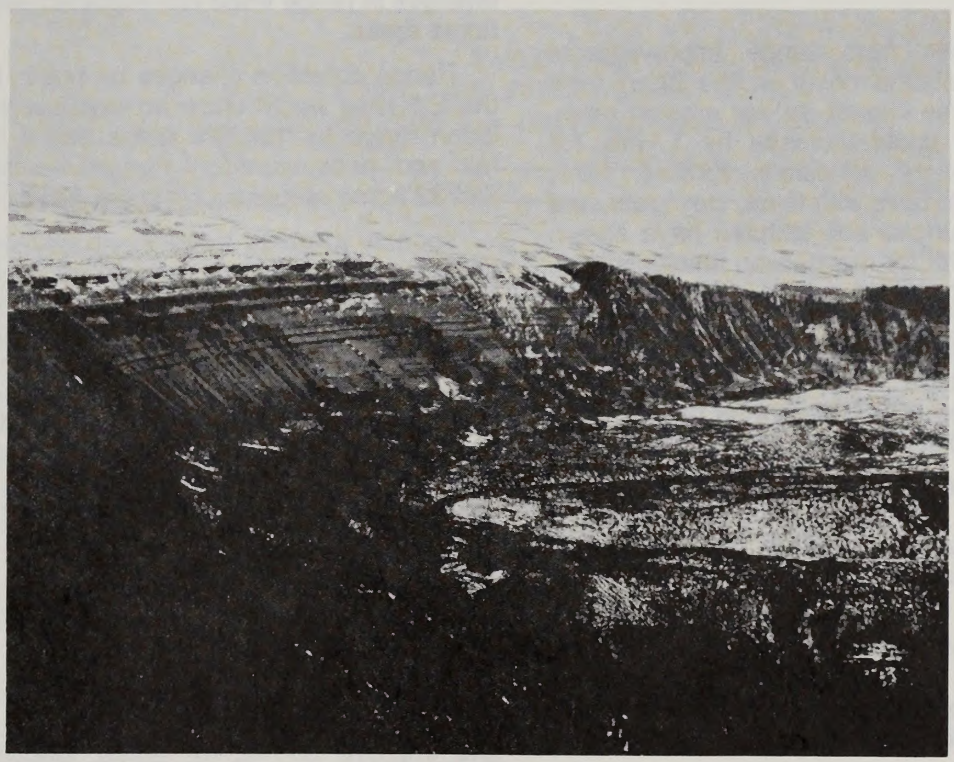
Manipulation of pinyon-juniper would cause a long term decrease in wood products on treated areas. However, through reseeding and release of existing herbaceous species, long term forage productivity would improve dramatically.

IRRETRIEVABLE OR IRREVERSIBLE RESOURCE COMMITMENTS

The loss of cultural resources and threatened and endangered species due to soil disturbance from vegetation manipulations and construction of improvement facilities would represent an irretrievable loss.

POSSIBLE CONFLICTS WITH OTHER FEDERAL, STATE, OR LOCAL LAND USE PLANS

No conflicts are anticipated with other federal, state, or local land use plans.



IMPACTS OF ALTERNATIVE F - OPTIMIZE WILD HORSES

Impacts on Air Quality

Impacts on air quality resulting from optimization of wild horses would be similar to those predicted for the action proposal.

Impacts on Soils

On-site erosion would decrease by 1.4 tons/acre/year with approximately 30.39 tons/acre/year of soil being relocated (Appendix D, Table D-1). Increased vegetation cover during the first 20 years (Reardon and Merrill 1976) would decrease soil compaction from livestock and wild horse grazing. Soil compaction conditions would stabilize after this period of time.

Soil disturbances from range improvements would reduce vegetation cover in the short term and have an adverse impact on soil erosion rates. Soil erosion rates could increase by 1.1 to 7.6 times that of present conditions (Gifford 1973, Roundy et al. 1977). Soils with loam, clay loam, and sandy clay loam surface soil textures have shown the greatest potential for mechanical manipulations. Localized exposed surface areas subject to wind and water erosion would cause soil productivity to decline by an unquantifiable amount in the short term. In the long term, soil productivity would improve by an average of 20 percent as range conditions improve and disturbed areas revegetate.

Chemical land treatments would maintain or improve soil erosion conditions over the short and long term as a result of vegetation cover remaining on the soil surface after manipulations.

Without interior fences within the 443,979 acre wild horse area, deferred rotation pasture management could not be implemented. Improvements in soil erosion conditions (McCarty and Mazurak 1976, Reardon and Merrill 1976) may not occur within the enclosed area.

Impacts on Water Resources

Impacts on water resources under the Optimize Wild Horses alternative would be the same as under Alternative A. There would be very little difference in runoff. Sediment yields would be slightly above those in Alternative A but would decrease below existing levels (Appendix D). Runoff is predicted to average 0.43 inches from high intensity storms (see Appendix D), a 4 percent reduction from the present conditions. Runoff from a normal year is not expected to change significantly. For this alternative sediment yields would average 2.30 tons/acre/year, a 4 percent reduction from present conditions which is believed not to be significant.

Impacts on Terrestrial Vegetation

Impacts to vegetation condition and trend resulting from optimization of wild horses would be the same as under the action proposal on all areas except the wild horse range, where no change in present range condition is expected. However, changes in range trend are expected within the wild horse areas.

Range condition changes on public lands within the EIS area would show an increase in good condition range by 164,529 acres and a decrease in fair and poor condition ranges by 140,797 and 23,732 acres respectively (Table 4-42).

Impacts to range trend would also be the same under both alternatives except on the wild horse range. Trend would improve on an additional 416,787 acres over the long term. Range presently with a static trend would improve and contribute 50 percent (224,265 acres) to total improving acreages. Range presently with declining trend would become stable except for 5,732 acres which would continue to decline due to continuous wild horse use on the wild horse range (Table 4-43).

Vegetation within the 443,979 acre wild horse range is mostly in fair condition (278,875 acres) with 139,614 and 25,490 acres in poor and good condition respectively.

Range trend would decline over the long term on 5,732 acres, remain static on 426,103 acres, and improve on 12,144 acres. Declining trends, over the long term on the wild horse range are expected to result from continuous wild horse use throughout the year and from continuous livestock use during the authorized grazing periods.

Horses are territorial and tend to congregate in preferred areas for indeterminate lengths of time, which could result in overuse in these areas. Yearlong use by wild horses would limit the increase in desirable species by not allowing these plants the necessary amount of rest during critical growth periods. Grass and sedge species are expected to be

TABLE 4-42
PRESENT AND FUTURE RANGE CONDITION
ALTERNATIVE F - OPTIMIZE WILD HORSES

Condition	Present	Future
Poor	446,055	422,323
Fair	996,742	855,945
Good	79,009	243,538
Total	1,521,806	1,521,806

TABLE 4-43
PRESENT AND FUTURE RANGE TREND
ALTERNATIVE F - OPTIMIZE WILD HORSES

Trend	Present	Future
Declining	198,254	5,732
Static	1,291,854	1,067,589
Improving	31,698	448,485
Total	1,521,806	1,521,806

most affected since these are preferred forage species (Hubbard and Hansen 1976).

Declines in vegetation condition on 5,732 acres, of the wild horse range due to continuous yearlong wild horse use and authorized livestock use, would be offset by increased vegetation production. Increased production would result from the complementary effects of improved distribution due to water developments and more uniform coverage of forage due to vegetation manipulations.

Abundance of desirable species in the vegetation composition are expected to increase by approximately 17 percent (Table 4-2) on areas changing from one condition class to another. Since condition class changes are expected to occur only on areas outside the wild horse range, changes in desirable species abundance are expected to be less than 17 percent on the wild horse range. Increases in desirable species would therefore be attributed to improvements within range condition classes.

Desirable species cover would increase by approximately 17 percent on areas improving by one condition class. Overall cover is expected to increase by less than 4 percent. Within the wild horse range, cover changes of desirable species are expected to be less than 17 percent with overall cover changing little if any.

Production of forage outside the wild horse range would be greater than within the wild horse range on areas without vegetation manipulations. However, overall production resulting from vegetation manipulations within the wild horse range will be greater since more manipulations are scheduled for this area.

Impacts on Riparian Vegetation

Impacts on riparian vegetation resulting from this alternative would not differ significantly from those impacts resulting from the action proposal (Alternative A). The basic difference between these two alternatives concerns adjustments in the vegetation allocation for both livestock and wild horses, favoring expansion of the numbers of wild horses. These adjustments would occur on seven allotments that contain nine riparian communities (Appendix E). Dissimilarities between the two alternatives in vegetation allocation, for either livestock or wild horses, would not be great enough to cause a difference in the use patterns in these riparian zones.

Impacts on Threatened and Endangered Plants

This alternative would result in essentially the same impacts upon T/E species as stated in Alternative A.

Impacts on Terrestrial Wildlife

IMPACTS ON MULE DEER

The substitution of wild horse AUMs for livestock AUMs in the proposed vegetation allocation would not affect forage conditions for deer. Impacts would be the same as those discussed under the action proposal. The short term allocation (59,577 AUMs) would support the existing deer population (45,394 animals). The long term allocation would increase by 11 percent, to 66,388 AUMs, potentially supporting 51,526 deer on public lands in the EIS area (Appendix B, Table B-1).

The proposed allocation would increase forage availability and reduce livestock-deer dietary competition resulting in long term beneficial impacts on both deer winter nutrition and carrying capacities. Livestock minimum rest requirements in the spring would increase grass-forb production, which would benefit deer the most in late winter and early spring when deer are coming off "maintenance" winter diets. Rest from spring livestock use may also increase production of mountain mahogany and bitterbrush (McKean and Bartmann 1971).

Fall/winter livestock and wild horse use would not affect deer forage conditions on fair to good condition deer winter ranges. However, yearlong horse use, as well as late season livestock use, in conjunction with heavy deer winter use, could inhibit improvement on some of the 35,600 acres of poor condition deer winter range within the proposed wild horse range. Impacts outside the proposed wild horse range would be the same as discussed under the action proposal. Proposed monitoring studies would identify specific problem areas and determine necessary livestock, wild horse, or deer use adjustments.

The proposed water and fence development (Tables 2-15 and 2-16) would improve livestock distribution patterns and herbaceous understory production, thereby reducing livestock use of browse (especially on deer winter range) and lessening livestock-deer dietary competition. Facilities development would allow the implementation of minimum rest requirements and would uniformly distribute late season livestock use, the net result being an overall improvement in deer forage conditions on all seasonal ranges.

Although fence construction would contribute to improving forage conditions for deer, it would increase deer winter mortality. About 41 miles and 28 miles of fence would be constructed on deer winter range and critical winter range respectively. The 19 miles of proposed fence on the Little Hills (6006) allotment (critical winter range) would result in an indeterminable increase in deer mortality. Fences would restrict deer movement (in search of food) and would entangle deer in weakened conditions.

About 8 miles of the proposed 19 miles of fence on the Little Hills allotment (6006) and 10 miles of proposed fence on the Thirteen Mile (6011) and Lower Fourteen Mile (6014) allotments would be situated in and lie perpendicular to major deer spring/fall migration routes. Although fencing would be constructed in accordance with BLM Big Game Fence Manual 1737, mortality could be excessive if fences are not properly located in relation to slope, aspect, drifting snow, etc.

Vegetation manipulation is proposed on about 167,000 acres of mule deer habitat. Anticipated improved forage conditions on summer range (pending the mitigation of adverse impacts associated with treatment methods discussed under the action proposal) could contribute to yearlong population increases in the Rangely deer herds. Population increases on summer ranges of the White River deer herd would be limited by winter mortality rates.

Deer forage production and carrying capacities would increase (subject to the mitigation of adverse impacts discussed under the action proposal) on the proposed manipulation of 81,600 acres of fair condition winter range. The manipulation of 42,200 acres of poor condition winter range on 32 allotments (Table 4-6), would improve nutritional levels for existing deer numbers but would not increase carrying capacities above 1978 levels.

Deer populations could suffer short term reductions in browse availability where large scale vegetation manipulations would be implemented concurrently on allotments within the same deer winter ranges. Increased deer mortality rates could occur where these treatments are scheduled within 1 to 4 year periods (see Alternative A for impacted allotments).

Vegetation manipulation would be the only action affecting deer cover requirements. Impacts would be the same as those discussed under the action proposal (Alternative A).

Vegetation manipulation would affect deer cover requirements on winter range but not on summer ranges. Pinyon-juniper manipulation could reduce winter range carrying capacities if critical cover zones are manipulated (see the action proposal for example allotments).

IMPACTS ON ELK

The current elk population of 1,783 animals would be allocated 4,745 AUMs on public lands in the EIS area (Appendix B, Table B-1). The long term allocation would increase 8 percent (5,004 AUMs) which could support about 1,926 elk.

Livestock actual use would be reduced 13,222 AUMs within elk range, which would yield an additional 7,933 competitive AUMs above the existing level that would be potentially usable to elk. Proposed livestock minimum rest requirements in the spring, functioning with reductions in livestock grazing use, would increase herbaceous forage production and complement elk grazing habits. Habitat improvement would be most evident on late winter-early spring range.

The proposed 47,800 acres of vegetation manipulation on elk range would increase diversity and production of preferred elk forage.

Fence and water development in elk range would improve livestock distribution, which would improve forage conditions for elk. Although livestock would use previously ungrazed areas, the development of 94 waters on elk summer range could also expand elk distribution. The current population expansion would continue until unknown future limiting factors or CDOW and Piceance Basin HMP management goals would exert an influence.

Summer range cover requirements would not be affected since aspen and timber stands would not be manipulated. Although elk make extensive use of pinyon-juniper woodlands in winter, the loss of pinyon-juniper on proposed manipulations would be insignificant compared with its overall abundance. The loss of cover would be compensated to some degree by improved forage conditions.

IMPACTS ON ANTELOPE

There are no wild horses on antelope range. The vegetation allocation would be the same as the action proposal; 199 AUMs would be allocated to support the existing population of 219 antelope in the short term on public lands in the EIS area. The long term allocation and population would be about 207 AUMs and 224 antelope respectively (Appendix B, Table B-1). Livestock actual use would be reduced about 3,500 AUMs on allotments supporting antelope, which would improve antelope habitat conditions on all seasonal ranges in the EIS area. Increased forage production would reduce dietary competition for preferred antelope forage, which would contribute to a long term carrying capacity increase of 2 percent.

Spring minimum rest requirements, in conjunction with the proposed livestock reductions, vegetation manipulations and improved livestock distribution, would increase production of preferred antelope forage on all seasonal ranges. The proposed 13,000 acres of vegetation manipulation on currently poor condition habitat would transform low producing sites into productive, diverse habitats. Antelope would benefit if treatments are restricted in size (see discussion under the action proposal).

No fences are proposed on antelope range. The proposed 98 check dams and reservoirs could increase carrying capacities if water availability is a limiting factor on populations.

IMPACTS ON SAGE GROUSE

Impacts would be the same as under the action proposal. In considering all aspects of this alternative, sage grouse habitat would improve if vegetation manipulations do not excessively reduce forb production and amounts of residual, interspersed sagebrush cover in relation to critical seasonal habitat requirements.

IMPACTS ON WATERFOWL

Waterfowl populations would not be affected under this alternative.

IMPACTS ON NONGAME BIRDS

Impacts would be the same as under the action proposal. Birds with grassland and shrub affinities would be benefitted by grazing management proposals. Vegetation manipulation of pinyon-juniper and sagebrush habitats would reduce bird species diversity and abundance.

IMPACTS ON SMALL MAMMALS

Small mammals would generally benefit from the proposal. Vegetation manipulations would lower species diversity but increase overall abundance over the short term. In the long term, populations would be similar to pretreatment levels.

IMPACTS ON PREDATORS

This alternative would not adversely affect predators in the EIS area. Obvious population changes would not be expected.

IMPACTS ON THREATENED AND ENDANGERED SPECIES

This alternative would not be expected to impact the five threatened and endangered species found in the EIS area.

CONCLUSION OF IMPACTS ON TERRESTRIAL WILDLIFE

Allotment carrying capacities for mule deer would increase, ranging from 5 to 23 percent on 78 percent of mule deer range. No long term increase would occur on 22 percent of their range. In the long term, deer carrying capacities EIS area-wide could increase about 11 percent above 1978 levels (71,599 AUMs would be allocated to support about 51,526 deer).

Carrying capacities would increase about 23 percent on most summer ranges of the Rangely deer herds. Yearlong populations would increase if winter range is not a limiting factor to these herds. Summer population increases in the White River deer herd would be limited to the capacity of their winter range.

Poor condition winter and critical winter ranges (27 percent of all winter range), which support 41 percent of the winter deer population in the EIS area, would not sustain populations above 1978 levels.

Winter carrying capacities could decline if pinyon-juniper manipulations excessively reduces the size of effective cover zones, or if sagebrush manipulation occurs along the edges of pinyon-juniper woodlands.

Proposed fencing on critical winter ranges and major spring-fall migration routes would increase deer mortality rates, although this would be offset to some degree by improved forage conditions resulting from improved livestock distribution.

Yearlong elk habitat conditions would improve to the extent of increasing carrying capacities by 8 percent. The current population of 1,783 elk could increase to about 1,926 elk. The present poor condition range would be reduced from 36 percent to 21 percent of all elk range in the long term, while good condition range would increase from less than 1 percent to 18 percent. Renewed understory production would account for these major habitat improvements.

Cumulative impacts of the proposals discussed would result in the antelope habitat condition changes indicated in Alternative A. Although 59 percent of antelope range would remain in poor condition in the long term, there would be a 17 percent increase in acreage of fair and good condition habitat. Current declining trends on poor condition range would largely change to improving trends. Overall changes in habitat condition would be slow, except on the 13,000 acres of vegetation manipulation, where improvement would be evident within the short term. Antelope carrying capacities could increase by about 2 percent, resulting in a population increase from the existing 219 antelope to 224 antelope.

Sage grouse populations would benefit under this alternative if vegetation manipulations adequately provide for habitat requirements on nesting, brooding, and winter ranges.

Most nongame birds, small mammals, and predators would benefit from grazing management proposals.. Pinyon-juniper manipulations would reduce bird species diversity and abundance over the long term. Sagebrush manipulations would reduce their diversity and abundance over the short term. Manipulations would reduce small mammals species diversity but increase overall abundance over the short term. Long term abundance would be similar to pretreatment levels. Obvious changes in predator populations would not be expected in either the short or long terms. Threatened and endangered species would not be affected by this alternative.

Impacts on Aquatic Wildlife

Impacts on aquatic life resulting from minimum constraints on wild horses would not differ significantly from those outlined under the action proposal (Alternative A). This would be due to similarities in the predicted response of riparian vegetation in both alternatives. Fish habitat would also respond similarly under either alternative.

IMPACTS ON THREATENED AND ENDANGERED FISH SPECIES

The Colorado squawfish and boneytail chub, endangered fish species occuring in the White River, are not expected to be impacted from this alternative. Both species either presently exist at low population levels or use the river only sporadically. Conditions would not be expected to change due to impacts associated with this alternative.

The Colorado cutthroat trout populations in Trappers, Lake, and Soldier Creeks would improve due to improved habitat conditions following the fencing along all three streams.

Impacts on Wild Horses

Under this alternative, forage for wild horses would be increased by 7,501 AUMs after required livestock reductions are completed 3 years after implementation. Total forage allocations for wild horses would be 16,865 AUMs. The increase in forage would provide a surplus during the third year of 3,695 AUMs and a decreasing surplus each following year of approximately 12 percent per year. (The 12 percent decrease in AUMs each year is directly proportional to the average annual increase in wild horses.)

A percentage of this surplus would probably not be used since the wild horses would not move out of their home ranges for 2 to 3 years. However, a portion of the surplus forage would occur in areas presently used by wild horses and would benefit these horses by providing ample forage through severe winters and reducing competition between horses. Additional benefical impacts would result in healthier horses, with decreasing mortality rates and increased annual herd production. Increases in number of horses would lead to dispersal in 3 to 4 years, into those areas not currently used by wild horses.

In order to maintain horses below the allocated 16,865 AUMs of forage, excess wild horses would be removed every 4 years. These horses, approximately 120 to 140 per year per area for the four management areas, would suffer short term stress resulting from being removed from their native range. Those horses not captured, but disturbed during gathering operations, would also suffer from stress and a small percentage of the mares may abort their fetus. Death losses could occur during capture operations.

Under this alternative, the impacts resulting from the livestock period of use would be comparable to those discussed under the action proposal. However, a surplus in allocated forage would result in decreased spring use within an area the first 2 years after excess wild horses were removed. This may offset some of the continuous yearlong wild horse use which would help in maintaining stable range conditions within the wild horse range.

Manipulation of sagebrush and pinyon-juniper would provide beneficial impacts to wild horses by providing an increase in quantity and quality of forage. The proposed projects would also provide a constant reliable food source to insure a productive, healthy horse herd which would be in balance with other resources.

The construction of new water facilities would improve distribution of wild horses approximately 5 years after construction. The proposed 30 foot gates would improve the genetic variability of the herd and enhance the free-roaming behavior of the wild horses.

CONCLUSION OF IMPACTS ON WILD HORSES

The proposed increase in forage allocated for wild horses would allow increases in wild horse numbers, provide sufficient forage for severe winters, and provide forage for dispersal into other areas within the wild horse range. The increased forage would also decrease mortality and increase annual production.

Utilization during the growing season would be reduced for the first 2 years after excess wild horses are removed from an area. This would help offset continuous yearlong use by horses and maintain stable range conditions within the wild horse range.

Range improvements would provide an increase in forage, improve distribution, increase management options, and enhance the free-roaming behavior of wild horses.

Impacts on Cultural Resources

Under this alternative, impacts to cultural resources would be similar to those discussed under Alternative A. The accelerated improvement in soil protection would be a beneficial impact and provide added protection for archeological sites. The proposed range improvements could be an adverse impact since increased land disturbance would result. Disturbance of 167,863 acres would occur with the possibility of encountering 2,884 cultural sites (1 site/58.2 acres). Secondary adverse impacts would result from increased human activity and consequent vandalism of sites.

Impacts on Visual Resources

The impacts that are expected to occur to visual resources as a result of this alternative are similar to those discussed under the action proposal.

Impacts on Recreation Resources

Under this alternative, the effects on recreation resources would be the same as under Alternative A (Table 4-21), with the exception of wild horse viewing opportunities which would increase with the proposed increase in the wild horse population.

Impacts on Economic Conditions

The economic analysis of this alternative assesses the impacts on those ranches affected by increased wild horse allocations, and those not affected by wild horse allocations but affected by allocation proposed in Alternative A (also proposed in this alternative). Impacts are presented for the ranches affected by wild horse allocations and for all ranches affected by this alternative.

Under this alternative, 56 ranching operations would receive reductions while 17 operations would receive increases. Of the 73 operations affected by this alternative, 15 are affected by the increased wild horse allocations. Of that 15, 14 ranching operations would receive reductions while 1 would receive an increase.

Table 4-44 shows only those changes that would occur to the 15 ranching operations affected by the increased wild horse allocations. The changes depicted in Table 4-44 are in addition to those shown in Table 4-15 for Alternative A (Action Proposal).

The short term effect of this alternative would be a reduction of 32,276 AUMs from present active licensed use (136,028 AUMs) with an associated decrease of 21,953 AUMs from private land. Total forage use reduction of this alternative would be 54,229 AUMs.

In the long term, an additional 41,778 AUMs of forage above the short term level would be available for use by livestock. Total BLM forage available in the long term would be 141,780 AUMs. This level of use would be a decrease of 14,278 AUMs below the long term use identified in Alternative A, with an associated decrease of 3,725 AUMs on private land. Total forage use would be 18,003 AUMs below the long term level of Alternative A.

Changes in gross and net revenue for ranching operations and changes in sales and income to other sectors of the EIS area economy are presented in Table 4-45.

The estimated net revenue changes resulting from this alternative would have a significant impact on the ranches which are affected and a few might experience a change from positive to negative net income. Average percentage changes in net income would range from a slight increase to a 29 percent reduction with the average change being a 10 percent reduction. Some operations could cease with combining of properties or conversion to other uses occurring.

Table 4-46 identifies the relative dependency on BLM forage for the 15 ranches, and Table 4-47 translates that relative dependency (along with al-

TABLE 4-44
RANCH SIZE AND INCOME EFFECTS
ALTERNATIVE F - OPTIMIZE WILD HORSES 1/

Model	Cattle	Sheep	No. of Ranches	Total BLM AUM Change	Total Corr. Pvt. Land AUM Change	Total BLM Plus Pvt. AUM Change	Avg. AUM Change/Rnch	Gross Revenue Change/ Ranch	Gross Revenue Chg/All Ranch	Net Revenue Change/ Ranch	Net Revenue Chg/All Ranch	Changes In Hired Empl. (Man-Years)
Short Term												
1	1-149		1	-28	0	-28	-28	$ -819	$ -819	$ +282	$ +282	-.01
2	150-449		4	-375	-64	-439	-110	-3,216	-12,864	+131	+524	-.31
3	450-749		3	-1,824	-403	-2,227	-742	-24,263	-72,789	-2,678	-8,034	-.55
4	750-1,999		4	-2,044	-1,477	-3,521	-880	-27,147	-108,588	-1,063	-4,252	-.72
5	2,000 or more		1	-328	-240	-568	-568	-34,540	-34,540	-5,894	-5,894	-.32
6		1-6,000	1	-406	-7	-413	-413	-15,595	-15,595	-3,947	-3,947	-.31
7	1-1,399	1-1,749	1	-246	-246	-492	-492	-13,907	-13,907	-2,146	-2,146	-.28
8	1,400 or more	1,750 or more 2/	0	0	0	0	0	0	0	0	0	0
		TOTAL	15	-5,251	-2,437	-7,688			$-259,102		$-23,467	-2.50
Long Term												
1	1-149		1	-47	0	-47	-47	$ -1,374	$ -1,374	$ +474	$ +474	-0.02
2	150-449		4	-1,242	-212	-1,454	-364	-10,643	-42,572	+432	+1,728	-1.02
3	450-749		3	-5,685	-459	-6,144	-2,048	-66,970	-200,910	-7,391	-22,173	-1.53
4	750-1,999		4	-5,328	-2,698	-8,026	-2,007	-61,896	-247,584	-2,423	-9,692	-1.65
5	2,000 or more		1	-327	-199	-526	-526	-31,986	-31,986	-5,458	-5,458	-0.29
6		1-6,000	1	-1,206	0	-1,206	-1,206	-45,539	-45,539	-11,525	-11,525	-0.91
7	1-1,399	1-1,749	1	-443	-157	-600	-600	-16,959	-16,959	-2,618	-2,618	-0.33
8	1,400 or more	1,750 or more 2/	0	0	0	0	0	0	0	0	0	0
		TOTAL	15	-14,278	-3,725	-18,003			$-586,924		$-49,264	-5.75

1/ Changes presented in this table are in addition to the changes in Alternative A (Action Proposal), Table 4-15. Thus, total change for this alternative is the changes in Table 4-15 plus the changes on this table.

2/ No ranches in model class 8 were affected by wild horse allocations.

SOURCE: BLM Range Management Automated System, 1979, for ranch sizing.

ternate forage sources and season of use) into an estimate of the criticality of ranch dependency on BLM grazing.

A slightly smaller proportion of the families affected by this alternative are considered to have ranching as their primary source of income than in the total EIS area, with 74 percent (17 out of 23 families) as compared to 84 percent for the area.

There would be an estimated decrease of 20.64 man-years of hired employment in the short term. It is possible that in the long term there would be an increase of 3.96 man-years of employment above the present level.

As a result of this alternative, there would be a decrease in allowable AUMs from present qualificantions of 159,734 AUMs to proposed allowable use of 103,752 AUMs, a decrease of 55,982 AUMs. This would be a reduction of 4,665 animal units which would decrease present ranch values by $4,665,000 ($1,000 per animal unit). Related to the decreased ranch values, would be a reduction in the tax base of about $1,399,500 or 0.8 percent of the 1977 Rio Blanco County assessed valuation.

In the long term, allowable use could be up to 141,780 AUMs which would be a decrease of 17,954 AUMs below present qualifications. This decrease would translate into 1,496 animal units which would reduce the present value of affected ranches by about $1,496,000. The related reduction in the tax base would be about $448,800 or 0.25 percent oi the 1977 Rio Blanco County assessed valuation.

Property taxes paid to local governments might be decreased $48,283 in the short term as a result of the $1,399,500 reduction in the tax base from lowered ranch values. In the long term, the decrease in ranch assessed values of $448,800 could bring about a $15,484 loss in property tax revenues.

IMPACTS ON RECREATION/WILDLIFE DERIVED INCOME

The impacts of this alternative on recreation-related income would be the same as Alternative A, a long term increase of $2,743,213 in statewide revenues from increased deer and elk hunting.

CONCLUSION OF IMPACTS ON ECONOMIC CONDITIONS

Under this alternative, 56 ranching operations would receive reductions while 17 operations would receive increases. Of the 73 operations affected by this alternative, 15 are affected by the increased wild horse allocations. Of that 15, 14 ranching operations would receive reductions while 1 would receive an increase.

In the short term, net incomes would be reduced by $123,198 to $2,508,667 for ranching operations, and $198,472 to $4,041,463 for other economy sectors. In the long term, net incomes would increase by $75,936 to $2,707,801 for ranching operations, and $122,333 to $4,362,268 for other economy sectors.

Ranch values would be decreased by $4,665,000 in the short term, with a resulting decrease of $48,283 in property taxes paid to local governments. In the long term, ranch values would be decreased by $1,496,000 with a resulting decrease of $15,484 in property taxes paid to local governments.

Of the 73 ranches affected, 66 percent depend on public grazing for 20 percent or more of their total forage requirements, and 78 percent require BLM forage as an essential element for the survival of the ranching operation. It is possible that short term reductions could force some ranching operations out of business.

Ranch employment would be reduced in the short term by 20.64 man-years of hired employment to 177.99 man-years and increased by 3.96 to 202.59 man-years in the long term.

The increase in nonresident deer and elk hunting in the EIS area would increase state revenues by $2,743,213 in the long term.

Impacts on Social Conditions

This section will deal with the 15 ranching operations affected by increased wild horse allocations. Social impacts of the other 85 operations would be similar to those under Alternative A. Of the 15 ranch operations, 10 would experience adverse impacts to social well-being consisting of reductions in net revenues ranging from $1,050 to $15,900.

In addition to intensifying the prevailing anti-"big government", anti-government regulations, and anti-planning sentiments in the ranching community, a specific attitude associated with wild horses would become intensified; that is, the belief among area ranchers that the wild horse program was imposed on them by an urban majority ignorant of the physical and economic realities of the livestock business.

TABLE 4-45
CHANGES IN REVENUE
ALTERNATIVE F - OPTIMIZE WILD HORSES

Economic Sector and Revenue Type	15 Ranches Affected		All Ranches Affected	
	Short Term	Long Term	Short Term	Long Term
Ranch Operations				
Gross Revenue	$-259,102	$-586,924	$-1,711,838	$+513,835
Net Revenue	-23,467	-49,264	-123,198	+75,936
Other Economy Sectors				
Gross Revenue 1/	-215,831	-488,908	-1,425,961	+428,025
Net Revenue 2/	-37,805	-79,364	-198,472	+122,333
Total Change in EIS Area Income 3/	$ -61,272	$-128,628	$ -321,670	$+198,269

1/ Agriculture/livestock business activity multiplier of 1.833
2/ Agriculture/livestock income multiplier of 2.611
3/ Total Net revenue

TABLE 4-46
OPERATOR/RANCH DEPENDENCY ON BLM GRAZING
ALTERNATIVE F - OPTIMIZE WILD HORSES

Dependency (%)	Number of Ranches
0 - 10	0
11 - 20	2
21 - 30	2
31 - 40	3
41 - 50	1
51 - 60	2
61 - 70	4
71 - 80	0
81 - 90	1
91 - 100	0
Total	15

TABLE 4-47
CRITICALITY OF RANCHER DEPENDENCY ON BLM GRAZING
ALTERNATIVE F - OPTIMIZE WILD HORSES

Criticality	Number of Ranches	Percent of Total
High	12	80
Medium	2	13
Low	1	7
Total	15	100

NOTE: High means that BLM forage is judged to be an essential element for the survival of the ranching operation. Medium means that BLM forage use may or may not be an essential survival element. Low means that BLM forage use is judged not to be essential to the ranching operation survivial.

A judgmental estimate of the criticality of rancher dependency on public land grazing was made by BLM personnel by applying the following three criteria to each ranching operation:

1. Proportion of forage acquired on public land
2. Season that forage is acquired
3. Ease of acquiring alternate sources of forage

Impacts on Land Uses

IMPACTS ON LIVESTOCK GRAZING

Livestock grazing would continue as discussed under Alternative A on all allotments except those 14 allotments within the wild horse range. The short term livestock grazing use on the wild horse range would be reduced below the livestock allocation in Alternative A by 5,251 AUMs. The short term reduction below present livestock use levels for all allotments affected by this alternative would be 32,276 AUMs or 24 percent.

Livestock operators would have to find alternative sources of forage to offset the reduction in grazing use. New fencing proposed under Alternative A would not be constructed within the wild horse range. Poor control of livestock would continue. Without improved livestock control, estimated production increases indicated in Alternative A would not be reached under this alternative.

IMPACTS ON AGRICULTURE

The impacts to crop production under this alternative would be the same as under the action proposal.

IMPACTS ON FORESTRY AND FOREST PRODUCTS

Vegetation manipulation of pinyon-juniper woodlands would occur on 48,845 acres through mechanical treatment and on 3,244 acres through prescribed burning. Prescribed burning would occur on 5,690 acres of existing pinyon-juniper chainings.

Mechanical treatments of pinyon-juniper would produce 295,512 cords of wood products, of which, only 200,000 cords would be utilized based on present demands. Prescribed burning would destroy 19,626 cords of standing green wood and 28,450 cords of unused wood products (existing chainings).

The 115,138 cords of wood produced (excluding the 28,450 in existing chainings) would not be utilized based on present demands. This amount of wood has a heat energy equivalent of 18.4 million gallons of fuel oil and a stumpage value of $575,690.

The Christmas trees occurring in the 5,690 acres of existing chainings to be treated would be destroyed.

IMPACTS ON WILDERNESS

Under this alternative, the impacts on wilderness values would be the same as under the action proposal. No action would be allowed that would impair the suitability of the six proposed Wilderness Study Areas for inclusion in the National Wilderness Preservation System.

MITIGATING MEASURES NOT INCLUDED IN THE DESCRIPTION OF ALTERNATIVE F

Loss of sustained yield of firewood occurring as the result of pinyon-juniper manipulation could be mitigated by conducting firewood sales before and/or after treatment. Vegetation manipulation can also have adverse affects on wildlife habitat. To avoid such an occurrence, a site specific analysis would be conducted on proposed pinyon-juniper and sagebrush manipulations to determine critical activity use areas (foraging areas, thermal cover, escape cover, season of use, etc.) of deer, elk, antelope, and sage grouse so that their critical values would not be lost. Vegetation manipulations within critical deer winter ranges would be scheduled after treatments adjacent to critical winter ranges are completed, and deer winter forage production is adequate to replace forage that would be lost during treatment of critical winter ranges.

ADVERSE IMPACTS THAT CANNOT BE AVOIDED

Project development and vegetation manipulation would cause varying amounts of soil disturbance and would have adverse affects on many resources. Air quality would be temporarily affected by dust following soil disturbances and by smoke following burning. Erosion with resultant sedimentation would be a temporary problem affecting soils and water quality. However, as vegetation is reestablished, erosion, sedimentation, and dust would be diminished.

Threatened and endangered species and subsurface cultural resources or historic sites could be damaged, depleted, or destroyed by project development and vegetation manipulation if they are not discovered in the original survey of the range improvement location. Visual resource values could also be impaired in the immediate vicinity of any project or vegetation manipulation since steps taken to mitigate visual impacts of these improvements are designed for distant viewing.

Vegetation manipulations such as chaining pinyon-juniper would interrupt or reduce sustained yields of wood products and create a loss of 115,138 cords of firewood on 23,009 acres. Production amounting to 55 AUMs would also be lost from 552 acres occupied by range facilities.

New facilities such as fencing could cause increased deer mortality if they are constructed within critical deer winter ranges or migration routes. Death losses to horses could also occur during horse removal operations.

As the result of vegetation allocation to wild horses, 14 allotments would receive short term reductions in livestock use amounting to 18,725 AUMs. Fifty-six allotments unaffected by wild horse allocations would also receive reductions.

Short term net direct and indirect income losses would be $321,670 (below present levels). Short term ranch values would decrease by $4,665,000 due to decreases in allowable AUMs. Reductions in spring livestock use would cause an increased dependency on private hay meadows and irrigated pastures normally used for producing winter feed. Short term loss of income could cause ranches to go out of business and force families to move from the area and resettle elsewhere.

IRRETRIEVABLE OR IRREVERSIBLE RESOURCE COMMITMENTS

Threatened and endangered species and subsurface cultural or historic sites overlooked in original surveys could be damaged, depleted, or destroyed and would represent an irretrievable loss.

SHORT TERM USE VS LONG TERM PRODUCTIVITY

Initial soil erosion and sediment yields due to project development and vegetation manipulation would be a short lived occurrence. After revegetation measures, soil erosion and sedimentation would gradually decrease. Projects and manipulations, causing short term erosion, are expected to help decrease soil erosion in the long term over the entire EIS area through their contribution to grazing distribution with consequent increases in vegetation cover. Manipulation of pinyon-juniper would cause a long term decrease in wood products on treated areas. However, through reseeding and release of existing herbaceous species, long term forage productivity would improve dramatically.

Long term direct and indirect income gains to the EIS area economy would be $198,269. Ranch values, while increasing above short term values, would still remain $1,496,000 below present values. However, 14 allotments, having short term reductions due to vegetation allocation to wild horses, would realize a 2,747 AUM (7 percent) increase over the long term due to improved vegetation conditions. Overall EIS area increases in average active licensed use would increase by 15,631 AUMs (11 percent) in the long term.

Increased dependency on hay meadows and irrigated pastures, to hold cattle due to delayed spring turn out dates, would cause added feeding expenses and adverse economic impacts on ranchers. Over the long term, however, expected increases in vegetation production would benefit ranchers and lessen or eliminate dependency on private agricultural lands. Ranches unable to withstand short term losses would go out of business before benefits from improved rangeland conditions are realized. Those ranches able to withstand short term losses would realize increased productivity from their range in the long term resulting in more stable and efficient ranching operations.

Death losses occurring during wild horse gatherings would represent a long term loss of those specific animals. Since the main purposes of wild horse gathering are to reduce numbers to the grazing capacity of the range and provide better range for wild horses, the remaining numbers would benefit by having more forage throughout the year, especially in the winter. Well fed, healthy horses would have better chances of winter survival and reduction in winter death loss would probably exceed roundup deaths.

POSSIBLE CONFLICTS WITH OTHER FEDERAL, STATE, AND LOCAL LAND USE PLANS

No conflicts are anticipated with other federal, state, or local land use plans.

Section 5
LIST OF PREPARERS

SECTION 5

LIST OF PREPARERS

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APPENDICES

APPENDIX A

PROPOSED RANGE IMPROVEMENTS

Proposed Range Improvements

Appendix A includes a description of range improvements, construction methods, and design restrictions.

Table A-1 shows the support facilities proposed for each allotment under Alternative A, the Action Proposal.

Table A-2 shows the vegetation manipulations and treatment methods proposed for each allotment under Alternative A.

Table A-3 shows the general implementation schedule for each allotment under Alternative A.

Table A-4 shows the support facilities proposed for each allotment under Alternative E, Emphasis on Other Resource Uses.

Table A-5 shows the vegetation manipulations proposed for each allotment under Alternative E.

APPENDIX A

PROPOSED RANGE IMPROVEMENTS

Range improvements listed in the following tables are only approximations of what would be required to implement the various alternatives. The exact amount and locations of the required range improvements would be determined during implementation of the selected grazing management program and would be subject to site specific environmental analysis.

SUPPORT FACILITIES

Fences

Fences are needed to improve livestock distribution and to control livestock drift into areas scheduled for rest or into adjacent allotments. Fences proposed would be constructed in accordance with big game wildlife requirements (BLM Manual 1737) using steel line posts, wooden corner posts, and barbed wire.

Water Developments

Water catchments proposed would be constructed with a butyl rubber or asphalt collection area, a storage bag or tank, a big game proof fence around the collection area, and a pipeline to a trough or troughs.

Wells proposed would be drilled in areas suitable for piping or hauling water distances of 4 or 5 miles. Wells would be cased and pumped by the most economical means.

Springs would be developed to provide water to a trough for livestock with the spring area fenced to protect the spring and riparian area. Some springs and seeps may be drilled with a horizontal well driller.

Pipelines would be constructed from a water source and storage tank using plastic pipe, buried where possible. A water trough would be located about every 3/4 of a mile.

Small reservoirs (1 to 2 acre feet) and check dams would be constructed in suitable areas with the size being determined by the amount of water needed, and the length of time it is needed. Some reservoirs, where possible, would be fenced to create riparian vegetation and wildlife habitat with water provided to livestock through water gaps in the fence or piped to a water trough.

On some allotments, proposed and existing water developments would be fenced. Fencing proposed and existing waters in an area would provide livestock management by restricting access to water. Fenced water developments would reduce the cost required to fence some allotments and eliminate restricted wild horse movements created by pasture fences.

DESIGN RESTRICTIONS FOR SUPPORT FACILITIES

Fences would include the following design restrictions and requirements:

(1) Off-road vehicular traffic during construction would be held to a minimum.

(2) Fence posts would be colored to blend in with surroundings except where visibility is required for safety.

(3) Where fences would cross existing roads, either gates or cattleguards would be installed.

(4) Gates would be installed along fence lines at regular intervals.

(5) Vegetation clearance would be held to a minimum. Fence lines would not be cleared with a bull dozer.

(6) In big game areas, fences would be designed to accommodate movement of big game per BLM 1737 fencing manual (Information Memorandum No. CO-77-94).

(7) On allotments used by wild horses, fences would be designed so as to have minimal impact on horse movement.

Design restrictions for water development would include:

(1) Actual work in spring and stream beds would be done by hand where possible.

(2) After construction of spring head boxes, troughs, pipelines, and well sites, the areas would be cleaned up and refuse removed.

(3) Cuts, fills, and excavations would be dressed and blended with surroundings. Pipelines would be buried where possible.

(4) Size of storage tanks and troughs would be designed to accommodate expected needs of animals using each source.

(5) Overflow would be discharged from tank sites, wells cased to prevent cave-in and well sites would be fenced.

(6) Storage structures would be designed to provide water to wildlife (animals and birds). Escape ramps would be installed.

(7) Water development would be located and designed within visual resource management guidelines.

(8) The source of all spring developments would be fenced.

(9) Where practical, the design of reservoirs would allow for piping water to a trough and fencing the reservoir or allow for enclosing a portion of the reservoir with a fence and allow the other portion to be used by livestock. Vegetation would be planted around the reservoir.

VEGETATION MANIPULATIONS

Pinyon-Juniper

Treatment methods proposed for pinyon-juniper include:

(1) Mechanical with a Follow-up Prescribed Burn

Not all of an area would be treated due to the design restrictions discussed below. Small irregular tracts (about 40 acres) would be treated leaving cover strips, fingers, and islands within the proposed treatment area.

Treatment would be accomplished by chaining (anchor chain dragged between two crawler tractors) or by tree crushing (large tractor traveling on bladed steel drums). Seed from selected grass, forbs, and browse would be aerially broadcast onto the site prior to mechanical treatment.

Prescribed burning of the treated area would follow mechanical treatment, (3 to 5 years) after sufficient time has been allowed for utilization of available wood products (firewood and fence posts).

(2) Prescribed Burning

Prescribed burning is proposed for 5,104 acres of pinyon-juniper (Table A-2). Some mechanical clearing of fire breaks would be necessary. Existing roads and natural fire breaks would be used when possible. Seed from selected grass, forbs, and browse would be either aerial broadcast or drilled with a rangeland drill. Drilling would be the preferred method of seeding. Not all of the 3,660 acres in the proposed project areas would be treated. Treatments would be subject to the design restrictions discussed below.

(3) Wood Product Sales

Another method for manipulation of the pinyon-juniper type would be through wood product sales. Increased demand for firewood and other pinyon-juniper products may require designating areas for wood product sales. Wood product sales could remove the overstory with less impact to the soil. Properly carried out partial cuts or small clearcuts could be used as range improvement manipulations on pinyon-juniper sites which could include sites with shallow soils and moderate or higher erosion potential. The expected increase in forage may not be as great as for other methods, but it could provide an opportunity to increase AUMs in an area where chaining would be environmentally unsound.

Existing Pinyon-Juniper Chainings

Approximately 16,760 acres of existing chainings are proposed for retreatment (Table A-2). Method of treatment proposed is prescribed burning. The purpose of burning these areas is to remove old slash piles for better livestock access and to eliminate regrowth of pinyon and juniper trees. The treated areas would not be reseeded unless it is determined that a desirable cover of grass, forbs, and browse would not be obtained following burning.

Sagebrush/Mountain Browse

Not all acreage proposed for treatment would be treated, because irregular shapes, leave strips, buffer strips, islands, and sage grouse cover requirements could reduce the acreage that can be treated in the proposed project area. Treatment methods proposed include:

(1) Mechanical

Most of the sagebrush areas proposed for mechanical treatment are stagnated stands dominated by big sagebrush with an understory of mostly annual grasses and forbs. Most of these areas would require reseeding due to the lack of perennial understory plants.

Mechanical treatments can include brush beating, chaining, and disc plowing. These areas would be reseeded with a mixture of grass, forb, and browse seed planted with a rangeland drill.

(2) Chemical

Chemical treatment is proposed for 27,747 acres of sagebrush (Table A-2). The proposed treatment areas would be sprayed with 2, 4-D (low volatile formulation) to reduce the cover of sagebrush. This herbicide would be applied in a water carrier at a rate of two pounds active ingredients per acre. Either fixed wing aircraft or helicopters would be used for all spraying. Any application of 2, 4-D would be in accordance with BLM Manual 9220.

(3) Prescribed Burning

Prescribed burning is proposed for areas of sagebrush, sagebrush-mountain browse mix, and decadent stands of mountain browse. Some mechanical clearing of fire breaks would be necessary. Maximum use of existing roads and natural fire breaks would be used. Some reseeding would be necessary on sites which would not naturally establish desired vegetation. Seeding would be accomplished by aerially broadcasting seed or by planting seed with a rangeland drill, the preferred method.

Greasewood

Approximately 9,110 acres of greasewood bottom lands has been proposed for treatment. Treatment method proposed would be a mechanical treatment (brush beating) followed by chemical treatment, if necessary. Treated areas would be reseeded with a rangeland drill following treatment.

Chemical treatment, when needed, would be the aerial application of 2, 4-D if the dominate understory consists of annual forbs or aerial application of atrazine applied in a water carrier at a rate of one pound active ingredients per acre if cheatgrass dominates the understory. The atrazine treatment would be followed by reseeding 12 months following treatment. The 2, 4-D would be applied as described under chemical sagebrush treatments. All chemical applications would be in accordance with BLM Manual 9220.

Other Treatments (Table A-2)

Four different types of treatments are proposed which include:

(1) Ground spraying individual houndstongue plants with 2, 4-D on 1,500 acres in the Piceance Mountain allotment (6023). Spraying would be done with a sprayer mounted on a rubber tire tractor. Reseeding with a rangeland drill may be required.

(2) Prescribed burning is proposed for 2,680 acres of a stagnated crested wheatgrass seeding on the Artesia allotment (6308). Old growth of crested wheatgrass has not been removed from the plant resulting in little or no utilization of those plants by grazing animals. Burning would be accomplished during early spring. Some mechanical clearing for fire breaks may be required.

(3) Approximately 1,600 acres of bottomland on the Red Wash allotment (6320) is dominated by annual weeds. Little or no perennial vegetation occurs on these sites. The proposed treatment method is aerial application of atrazine to create a herbaceous fallow, reseeding about 12 months later in the fall with a rangeland drill, and to aerial spray the area with 2, 4-D the spring following reseeding to control undesirable broadleaf weeds.

(4) Disc plowing and reseeding 800 acres of degraded grassland parks and drainage bottoms is proposed for the Smith-Crawford allotment (6625). At the same time, check dams in the drainages are proposed to raise the water table and restore wet meadows. Plowing with a rangeland disc plow is proposed to loosen the compacted soil followed by reseeding with a rangeland drill.

DESIGN RESTRICTION FOR VEGETATION MANIPULATIONS

(1) All projects affecting aquatic or riparian habitats would be reviewed by wildlife and fisheries biologists to reduce adverse impacts. A buffer strip along all perennial streams would be maintained in areas of vegetation manipulations.

(2) No vegetation manipulation would be allowed within areas of intensive mineral activity where major surface disturbance such as strip mining may occur.

(3) Vegetation manipulations would not be conducted on soils having high erosion susceptibility.

(4) Areas proposed for vegetation manipulation would not be grazed by livestock until understory vegetation became well established and was capable of supporting livestock grazing. A minimum of two complete growing seasons of rest from livestock grazing would be required to help ensure desirable vegetation to regain vigor.

(5) Vegetation manipulations would be irregular in shape, consisting of patches, strips, and fingers that maximize edge effect.

(6) No point of treated areas would be greater than 200 yards from suitable cover unless a need is revealed through analysis by an interdisciplinary team.

(7) Pinyon-juniper manipulations would be limited to 40 acre blocks unless the distance to cover stipulation is adhered to.

(8) Adequate cover for wild horses would be ensured in wild horse areas, before initiating pinyon-juniper manipulation.

(9) Priority would be given to the manipulation of pinyon-juniper areas having adequate understory vegetation capable of a positive response to removal of overstory vegetation, or to sites suitable for seeding after manipulation operations.

(10) Snags, flat-topped or open-limbed conifers, and trees used intensively by cavity nesters would be protected within vegetation manipulations. All snags would be preserved within a 1/2 mile radius of known active raptor nests.

(11) Manipulation of sagebrush would be evaluated on a site specific basis to determine impacts and necessary mitigation to ensure protection of sagebrush dependent wildlife species. In general, no sagebrush within a 2 mile radius of a sage grouse strutting ground would be manipulated where the canopy cover is less than 40 percent.

(12) Vegetation manipulations would not be conducted on any archeological, cultural, paleontological, or significant recreational areas.

(13) Mechanical manipulations would be limited to slopes of 20 percent or less.

(14) Prescribed burning manipulations would be prohibited in saw timber stands and highly developed areas (oil shale tracts, oil and gas fields, coal mining areas, etc.).

(15) *Chemical Manipulations*. Prescribed spraying plans would be required that would identify application procedures, environmental conditions where allowed, controls, and coordination responsibilities. This plan would be submitted to the BLM Washington Office prior to implementation.

Projects would not exceed State and EPA pollution standards. Application of chemicals would conform to EPA regulations and BLM requirements.

Areas within 100 feet of riparian zones and live water would not be sprayed.

Chemical spray would only be applied when winds are less than 5 miles per hour to control drift.

TABLE A-1
PROPOSED RANGE IMPROVEMENTS - SUPPORT FACILITIES
ALTERNATIVE A - ACTION PROPOSAL

Allot. No.	Allotment Name	Fences (Mi.)	Reservoirs (No.)	Check Dams (No.)	Catchments (No.)	Wells (No.)	Springs (No.)	Watering Troughs (No.)	Storage Tanks (No.)	Pipelines (Mi.)
6005	North Dry Fork	3	7	—	1	—	—	1	1	—
6006	Little Hills	19	10	—	—	2	6	12	3	7
6007	Main Dry Fork	—	6	—	1	—	—	1	1	—
6008	Segar Gulch	—	5	—	—	3	2	8	3	8
6009	Hyberger	1	7	—	—	—	2	2	—	—
6010	Little Rancho	—	3	—	—	—	2	2	—	—
6011	Thirteen Mile	5	2	—	1	—	4	5	1	—
6014	Lower Fourteen Mile	4	—	—	—	—	3	3	—	—
6015	Gordon Gulch	4	—	—	—	1	2	3	1	—
6016	Davis Creek	2	5	—	—	—	1	1	—	—
6017	Coyote-Schutte	3	2	—	—	—	1	1	—	—
6019	Cow Creek	—	5	—	3	—	8	11	3	—
6021	Naval Oil Shale	2	3	—	—	—	—	—	—	—
6023	Piceance Mountain	10	14	—	—	6	—	10	6	6
6024	Fawn Creek	3	10	—	2	2	—	4	4	—
6026	Reagles	3	6	—	1	1	3	6	2	2
6027	Square S	4	6	—	2	1	4	8	3	2
6028	Hatch Gulch	—	5	—	1	—	2	3	1	—
6029	Black Sulphur	9	7	—	1	2	—	5	3	2
6030	Yellow Creek	7	9	—	—	3	—	15	3	10
6031	Duck Creek	10	7	—	—	1	2	4	1	2
6032	Spring Creek	9	10	—	2	—	5	7	2	—
6036	Greasewood	5	3	—	2	2	—	6	4	3
6038	Little Spring Creek	5	7	—	2	1	—	4	3	2
6039	Hammond Draw	5	10	—	—	—	—	—	—	—
6040	Upper Fletcher	3	7	—	—	—	—	—	—	—
6041	Lower Fletcher	8	7	—	—	—	2	2	—	—
6042	Boise Draw	4	8	—	—	—	2	2	—	—
6302	Roundtop	—	5	—	2	1	—	2	2	—
6304	Basin Springs	4	2	—	1	—	3	4	1	—
6305	Martha's Hole	2	6	—	2	1	—	3	3	—
6306	Turner Creek	2	4	—	—	1	—	1	1	—
6307	K Ranch	—	11	—	1	1	—	2	2	—
6308	Artesia	—	11	—	3	1	—	6	4	2
6312	Raven Ridge	—	3	—	—	—	—	—	—	—
6314	Raven Park	—	10	—	—	—	—	—	—	—
6316	Spooky Mountain	—	20	—	—	1	—	1	1	—
6320	Red Wash	—	16	—	—	—	—	—	—	—
6322	Skull Creek	—	9	—	—	1	—	1	1	—
6323	Wolf Creek	—	12	—	2	2	8	14	4	2
6324	Massadona	—	8	—	—	—	—	—	—	—
6325	Bear Valley	—	3	—	1	—	—	1	1	—
6326	Elk Springs	—	24	—	1	—	—	1	1	—
6330	Upper Coal Creek	—	4	—	—	—	—	—	—	—
6331	Baking Powder	—	—	6	—	—	—	—	—	—
6332	Horse Draw	—	—	4	—	—	—	—	—	—
6333	Pinyon Ridge	—	15	—	—	1	—	1	1	—
6334	Coal Reef	—	5	—	—	—	—	—	—	—
6335	Hall Draw	—	7	—	—	—	—	—	—	—
6337	Cathedral Bluffs	11	28	—	—	2	5	12	2	5
6338	Johnson-Trujillo	2	6	—	—	—	2	2	—	—
6340	Shavetail Gulch	—	10	—	—	—	—	—	—	—
6342	Douglas Creek	—	—	5	—	—	—	—	—	—
6343	Gilsonite	—	9	—	—	—	—	—	—	—
6346	Twin Buttes	13	10	—	—	3	4	17	3	10
6354	East Douglas Creek	7	8	—	2	—	3	5	2	—
6357	Evacuation Creek	5	18	—	—	4	—	6	4	2
6361	Foundation Creek	5	5	—	—	—	—	—	—	—
6367	Cathedral Creek	7	4	—	—	—	—	—	—	—
6371	Miller Creek	—	—	6	—	—	—	—	—	—
6600	McAndrews Gulch	—	13	—	1	—	—	1	1	—
6603	Little Tom's Draw	4	5	—	—	—	—	—	—	—
6605	Keystone Ranch	5	13	—	—	—	3	3	—	—
6612	Black's Gulch	3	9	—	—	—	3	3	—	—
6613	Upper Smith Gulch	6	7	—	2	—	—	2	2	—
6620	Jordan Gulch	—	7	—	1	—	—	1	1	—
6621	Lower Smith Gulch	5	8	—	1	—	—	1	1	—
6625	Smith-Crawford	3	4	—	—	—	3	3	—	—
	Total	212	510	21	39	44	85	219	83	65

TABLE A-2
PROPOSED RANGE IMPROVEMENTS - VEGETATION MANIPULATIONS
ALTERNATIVE A - ACTION PROPOSAL

TREATMENT METHOD	SAGEBRUSH/MTN. BROWSE			PINYON/JUNIPER		EXISTING P/J CHAINING	GREASEWOOD	OTHER TREATMENT		TOTAL ACRES
Allotment No. Name	Mechanical (Acres)	Chemical (Acres)	Prescribed Burning (Acres)	Mechanical followed by Burning (Acres)	Prescribed Burning (Acres)	Prescribed Burning (Acres)	Mechanical followed by Chemical (Acres)	Acres	Treatment Method	
6005 North Dry Fork	—	—	—	334	—	—	—	—	—	334
6006 Little Hills	—	—	4,868	940	—	—	1,510	—	—	7,318
6007 Main Dry Fork	500	—	3,000	—	—	—	—	—	—	3,500
6008 Segar Gulch	—	732	200	300	444	—	—	—	—	1,676
6009 Hyberger	—	70	100	—	—	—	—	—	—	170
6010 Little Rancho	—	—	600	—	—	—	—	—	—	600
6011 Thirteen Mile	—	—	600	360	—	—	—	—	—	960
6012 Fourteen Mile	—	—	140	—	—	—	—	—	—	140
6015 Gordon Gulch	—	—	760	—	—	—	—	—	—	760
6016 Davis Creek	—	—	580	—	—	—	—	—	—	580
6017 Coyote-Schutte	—	—	500	528	—	—	—	—	—	1,028
6019 Cow Creek	—	—	2,200	—	—	—	—	—	—	2,200
6021 Naval Oil Shale	—	—	280	—	—	—	—	—	—	280
6023 Piceance Mountain	—	8,000	7,800	1,712	—	4,650	—	1,500	Chem. 1/	23,662
6024 Fawn Creek	—	—	800	1,032	—	—	—	—	—	1,832
6026 Reagles	—	600	4,200	876	—	—	—	—	—	5,676
6027 Square S	—	1,000	2,144	3,900	—	2,000	—	—	—	9,044
6028 Hatch Gulch	—	425	—	581	—	—	—	—	—	1,006
6029 Black Sulpher	—	300	800	872	—	—	—	—	—	1,972
6030 Yellow Creek	—	1,160	3,100	3,000	—	2,700	400	—	—	10,360
6031 Duck Creek	—	600	2,430	678	—	1,200	—	—	—	4,908
6032 Spring Creek	1,424	—	2,800	1,752	—	—	—	—	—	5,976
6033 E. Fork Spring Crk	—	—	180	—	—	—	—	—	—	180
6036 Greasewood	—	970	—	360	1,860	—	—	—	—	3,190
6038 Little Spring Creek	—	700	2,420	300	—	—	—	—	—	3,420
6039 Hammond Draw	—	—	—	492	—	—	—	—	—	492
6040 Upper Fletcher	—	—	990	320	—	—	—	—	—	1,310
6041 Lower Fletcher	—	240	—	812	—	—	—	—	—	1,052
6042 Boise Draw	—	—	920	—	—	1,070	—	—	—	1,990
6300 Cricket	—	—	—	—	—	—	—	—	—	0
6301 Cottonwood	—	—	—	—	—	—	—	—	—	0
6302 Roundtop	—	470	900	—	—	—	—	—	—	1,370
6304 Basin Springs	—	—	960	—	—	—	—	—	—	960
6305 Martha's Hole	—	160	430	—	—	—	—	—	—	590
6306 Turner Creek	—	—	1,000	—	—	—	—	—	—	1,000
6307 K Ranch	—	—	1,920	488	—	—	—	—	—	2,408
6308 Artesia	600	—	1,960	240	—	—	—	2,680	Burn 2/	5,480
6313 Coal Oil	—	—	—	—	—	—	—	—	—	0
6314 Raven Park	—	600	—	240	—	—	—	—	—	840
6316 Spooky Mountain	1,608	3,000	—	340	—	—	—	—	—	4,948
6320 Red Wash	—	—	200	—	—	—	—	1,600	Chem. 3/	1,800
6322 Skull Creek	—	—	600	—	1,200	—	—	—	—	1,800
6323 Wolf Creek	—	—	5,120	800	—	1,040	—	—	—	6,960
6324 Massadona	—	—	600	300	—	—	—	—	—	900
6326 Elk Springs	—	—	1,600	240	—	—	—	—	—	1,840
6330 Upper Coal Crk	—	100	—	—	—	—	—	—	—	100
6332 Horse Draw	500	—	—	—	—	—	—	—	—	500
6333 Pinyon Ridge	—	260	—	280	—	—	—	—	—	540
6334 Coal Reef	—	—	—	—	—	—	400	—	—	400
6335 Hall Draw	—	960	—	160	—	—	—	—	—	1,120
6337 Cathedral Bluffs	—	1,600	800	4,500	—	—	1,500	—	—	8,400
6338 Johnson-Trujillo	—	—	—	300	—	—	—	—	—	300
6340 Shavetail	—	—	—	172	—	—	—	—	—	172
6342 Douglas Creek	500	—	—	—	—	—	—	—	—	500

TABLE A-2
PROPOSED RANGE IMPROVEMENTS - VEGETATION MANIPULATIONS
ALTERNATIVE A - ACTION PROPOSAL

TREATMENT METHOD		SAGEBRUSH/MTN. BROWSE			PINYON/JUNIPER		EXIST-ING P/J CHAINING	GREASE-WOOD	OTHER TREATMENT		TOTAL ACRES
Allotment No.	Name	Mechan-ical (Acres)	Chem-ical (Acres)	Pre-scribed Burning (Acres)	Mechanical followed by Burn-ing (Acres)	Pre-scribed Burning (Acres)	Pre-scribed Burning (Acres)	Mechanical followed by Chem-ical (Acres)	Acres	Treat-ment Method	
6343	Gilsonite	--	--	--	280	--	--	--	--	--	280
6344	Weaver Draw	--	--	--	--	--	--	--	--	--	0
6346	Twin Buttes	--	--	1,560	1,440	--	1,100	3,000	--	--	7,100
6353	Park Canyon/ Bitter Creek	400	--	--	400	--	--	--	--	--	800
6354	East Douglas Crk	--	1,760	3,000	--	--	3,000	800	--	--	8,560
6357	Evacuation Creek	--	--	320	2,390	--	--	1,500	--	--	4,210
6361	Foundation Creek	--	--	700	320	--	--	--	--	--	1,020
6359	E. Evacuation Crk	--	--	--	--	--	--	--	--	--	0
6367	Cathedral Creek	480	--	--	740	--	--	--	--	--	1,220
6600	McAndrews Gulch	--	--	1,920	1,400	600	--	--	--	--	3,920
6602	River	--	--	--	--	--	--	--	--	--	0
6303	Little Tom's Draw	--	800	--	208	--	--	--	--	--	1,008
6604	West Shutta	--	--	800	--	--	--	--	--	--	800
6605	Keystone	--	2,240	800	300	1,000	--	--	--	--	4,340
6612	Black's Gulch	400	800	2,800	528	--	--	--	--	--	4,528
6613	Upper Smith Gulch	--	--	2,880	964	--	--	--	--	--	3,844
6616	Goff Camp Gulch	--	--	--	--	--	--	--	--	--	0
6620	Jordan Gulch	--	--	1,040	600	--	--	--	--	--	1,640
6621	Lower Smith Gulch	--	200	600	440	--	--	--	--	--	1,240
6622	Windy Gulch	216	--	--	400	--	--	--	--	--	616
6625	Smith-Crawford	--	--	1,840	--	--	--	--	800	Mech. 4/	2,640
	Total	6,628	27,747	76,762	37,619	5,104	16,760	9,110	6,580		186,310

1/ Ground spraying with 2, 4-D to control houndstongue.
2/ Burning of a stagnated crested wheatgrass seeding.
3/ Broadcast application of Atrazine pellets followed by reseeding.
4/ Disc plow and reseed grassland parks.

TABLE A-3
PROPOSED IMPLEMENTATION SCHEDULE
ALTERNATIVE A - ACTION PROPOSAL

Allot. No.	Allotment Name	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
6001	Puckett Gulch		*					
6002	Pine Knot Gulch		*					
6003	Wood Road Gulch					*		
6005	North Dry Fork	W-8 F-3	M-334 *					
6006	Little Hills		W-18 F-19 M-4868	M-940	M-1510 *			
6007	Main Dry Fork	W-7 M-2000	M-1500 *					
6008	Segar Gulch		W-10	M-1676 *				
6009	Hyberger			W-9 F-1 M-170 *				
6010	Little Rancho				W-5 M-600 *			
6011	Thirteen Mile			W-7 F-5	M-960 *			
6012	Fourteen Mile Gulch				M-140 *			
6014	Lower Fourteen Mile			W-3 F-4 *				
6015	Gordon Gulch			W-3 F-4 M-760 *				
6016	Davis Creek				W-6 F-2 M-580 *			
6017	Coyote-Schutte				W-3 F-3 M-500	M-528 *		
6019	Cow Creek			W-16	M-2200 *			
6021	Naval Oil Shale					F-2 W-3 M-280 *		
6022	Davis Canyon					*		
6023	Piceance Mountain	W-20 M-1500	F-10 M-7800	M-5712	M-6000	M-2650 *		
6024	Fawn Creek		W-14 F-3	M-1032	M-800 *			
6025	Skinner Ridge		*					
6026	Reagles	W-11 F-3 M-2600	M-2200	M-876 *				
6027	Square S		W-13 F-4	M-3144	M-2200	M-3700 *		
6028	Hatch Gulch			W-8	M-1006 *			
6029	Black Sulphur					W-10 F-9	M-1100	M-872 *
6030	Yellow Creek			W-12 F-7 M-1500	M-1500	M-1560	M-3100	M-2700 *
6031	Duck Creek			W-10 F-10	M-1308	M-2400	M-1200 *	
6032	Spring Creek		W-17 F-9	M-3024	M-2952 *			
6033	E. Fork Spring Creek					M-180 *		
6036	Greasewood		W-7 F-5	M-1330	M-1860 *			
6038	Little Spring Creek		W-10 F-5	M-1000	M-1220	M-1200 *		
6039	Hammond Draw		W-10 F-5	M-492 *				
6040	Upper Fletcher			W-7 F-3	M-1310 *			
6041	Lower Fletcher		W-9 F-8	M-1052 *				
6042	Boise Draw		W-10 F-4 M-920	M-1070 *				
6300	Cricket		*					
6301	Cottonwood Draw		*					
6302	Roundtop				W-8	M-1370 *		
6303	Mud Springs Draw		*					
6304	Basin Springs				W-6 F-4	M-960 *		
6305	Martha's Hole		W-9 F-2 M-590 *					
6306	Turner Creek				W-5 F-2	M-1000 *		
6307	K Ranch	W-13 M-2408 *						
6308	Artesia		W-15 M-3520	M-1960 *				
6310	Bonanza		*					
6311	Stateline		*					
6312	Raven Ridge					W-3 *		
6313	Coal Oil		*					
6314	Raven Park					W-10	M-840 *	
6316	Spooky Mountain		W-11 M-1948	W-10 M-3000 *				
6320	Red Wash		W-16 M-1800 *					
6321	Rock Wall Draw		*					
6322	Skull Creek			W-10 M-1800 *				
6323	Wolf Creek			W-24 M-800	M-2120	M-3000	M-1040 *	
6324	Massadona			W-8 M-600	M-300 *			
6325	Bear Valley				W-4 *			
6326	Elk Springs					W-25	M-1840 *	
6329	Winter Valley Gulch							*
6330	Upper Coal Creek			W-4 M-100 *				
6331	Baking Powder					W-6 *		

TABLE A-3
PROPOSED IMPLEMENTATION SCHEDULE
ALTERNATIVE A - ACTION PROPOSAL

Allot. No.	Allotment Name	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
6332	Horse Draw					W-4 M-500 *		
6333	Pinyon Ridge			W-16	M-540 *			
6334	Coal Reef					W-5 M-400 *		
6335	Hall Draw			W-7	M-1120 *			
6337	Cathedral Bluffs	W-20 F-11 M-2400	W-15 M-2200	M-2300	M-1500 *			
6338	Johnson-Trujillo			W-8 F-2 M-300 *				
6340	Shavetail Gulch			W-10 M-172 *				
6341	Banta		*					
6342	Douglas Creek					W-5 M-500 *		
6343	Gilsonite			W-9 M-280 *				
6344	Weaver Draw		*					
6346	Twin Buttes	W-10 F-13	W-7 M-2960	M-4140 *				
6353	Park Canyon/Bitter Crk							M-800 *
6354	East Douglas Creek		W-13 F-7	M-3260	M-2300	M-1500	M-1500 *	
6357	Evacuation Creek		W-22 F-5	M-2390	M-1820 *			
6359	E. Evacuation Creek		*					
6361	Foundation Creek					W-5 F-5	M-700	M-320 *
6367	Cathedral Creek			W-4 F-7 M-480	M-740 *			
6371	Miller Creek					W-6 *		
6600	McAndrews Gulch			W-14 M-1920	M-1300	M-700 *		
6602	River		*					
6603	Little Tom's Draw			W-5 F-4	M-800	M-208 *		
6604	West Shutte				M-800 *			
6605	Keystone Ranch		W-16 F-5	M-2140	M-1300	M-900 *		
6607	N. Fork Price Creek		*					
6608	S. Fork Price Creek					*		
6609	Chokecherry		*					
6610	Gower Gulch		*					
6612	Black's Gulch		W-12 F-3	M-928	M-2600	M-1000 *		
6613	Upper Smith Gulch			W-9 F-6	M-2880	M-964 *		
6614	West Strawberry		*					
6615	Strawberry Peak			*				
6616	Goff Camp Gulch		*					
6617	Cave Gulch			*				
6618	Cabin Gulch		*					
6619	Villa Individual		*					
6620	Jordon Gulch			W-8	M-1040	M-600 *		
6621	Lower Smith Gulch			W-9 F-5	M-800	M-440 *		
6622	Windy Gulch						M-616 *	
6623	Anderson Individual		*					
6624	Willow Springs		*					
6625	Smith-Crawford				W-7 F-3 M-800	M-1840 *		
6626	Isolated Tract			*				
6627	Ryan Draw		*					
6800-6837	Section 15's	*						
	No. of Allotments Implemented	36	28	19	19	26	6	5
	Acreage at Full Implementation	61,498	75,102	350,697	366,698	356,888	159,424	138,389
	No. of Water Developments	89	254	230	44	82	0	0
	Miles of Fence	30	94	58	14	16	0	0
	Acres of Vegetation Manipulations	10,908	30,640	50,348	49,406	28,380	11,936	4,692

W = Water Developments
F = Fences (miles)
M = Vegetation Manipulation (acres)
* = Year of Full Implementation

TABLE A-4
PROPOSED RANGE IMPROVEMENTS - SUPPORT FACILITIES
ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE USES

Allot. No.	Allotment Name	Fences (Mi.)	Reservoirs (No.)	Wells (No.)	Springs (No.)	Watering Troughs (No.)	Storage Tanks (No.)
6005	North Dry Fork	3	7	--	--	--	--
6006	Little Hills	19	10	2	6	8	2
6017	Coyote-Schutte	--	2	--	1	1	--
6023	Piceance Mountain	10	14	3	--	6	3
6026	Reagles	--	4	--	3	3	--
6027	Square S	4	6	1	4	4	1
6030	Yellow Creek	--	5	--	--	--	--
6036	Greasewood	5	3	2	--	4	2
6038	Little Spring Creek	5	7	1	--	1	1
6300	Cricket	--	1	--	--	--	--
6302	Roundtop	--	1	--	--	--	--
6307	K Ranch	--	11	1	--	1	1
6316	Spooky Mountain	--	1	--	--	--	--
6323	Wolf Creek	--	12	2	8	10	2
6326	Elk Springs	--	1	--	--	--	--
6330	Upper Coal Creek	--	1	--	--	--	--
6332	Horse Draw	--	1	--	--	--	--
6333	Pinyon Ridge	--	3	--	--	--	--
6337	Cathedral Bluffs	--	3	--	5	5	--
6346	Twin Buttes	13	10	2	4	6	2
6612	Black's Gulch	3	9	--	3	3	--
	Total	62	112	14	34	52	14

TABLE A-5
PROPOSED RANGE IMPROVEMENTS - VEGETATION MANIPULATIONS
ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE USES

Allotment No. Name	SAGEBRUSH/MTN. BROWSE (Acres) Mechanical	SAGEBRUSH/MTN. BROWSE (Acres) Prescribed Burning	PINYON-JUNIPER (Acres) Mehanical	TOTAL
6005 North Dry Fork	--	--	430	430
6006 Little Hills	--	640	520	1,160
6007 Main Dry Fork	640	--	--	640
6008 Segar Mountian	--	300	520	820
6015 Gordon Gulch	--	100	--	100
6017 Coyote-Schutte	--	120	--	120
6022 Davis Canyon	--	120	--	120
6023 Piceance Mountain	--	1,600	2,270	3,870
6024 Fawn Creek	--	1,280	1,310	2,590
6026 Reagles	--	760	1,490	2,250
6027 Square S	--	1,500	3,240	4,740
6029 Black Sulphur	--	--	1,180	1,180
6030 Yellow Creek	--	3,000	2,760	5,760
6031 Duck Creek	--	--	2,590	2,590
6032 Spring Creek	100	--	1,440	1,540
6033 E. Fork Spring Creek	--	--	350	350
6036 Greasewood	--	--	1,310	1,310
6038 Little Spring Creek	--	1,280	1,380	2,660
6039 Hammond Draw	--	--	3,400	3,400
6040 Upper Fletcher	--	--	1,950	1,950
6041 Lower Fletcher	--	--	1,310	1,310
6042 Boise Draw	--	--	130	130
6300 Cricket	--	370	--	370
6302 Roundtop	--	190	--	190
6304 Basin Springs	--	280	--	280
6305 Martha's Hole	--	190	--	190
6306 Turner Creek	--	530	--	530
6307 K Ranch	--	600	300	900
6308 Artesia	600	1,080	420	2,100
6310 Bonanza	--	--	60	60
6312 Raven Ridge	--	--	60	60
6314 Raven Park	--	--	180	180
6316 Spooky Mountain	--	--	370	370
6320 Red Wash	--	--	120	120
6322 Skull Creek	--	--	210	210
6323 Wolf Creek	--	600	820	1,420
6324 Massadona	--	--	140	140
6326 Elk Springs	--	--	370	370
6329 Winter Valley Gulch	--	--	120	120
6333 Pinyon Ridge	--	--	300	300
6334 Coal Reef	--	--	20	20
6337 Cathedral Bluffs	--	500	1,970	2,470
6338 Johnson-Trujillo	--	--	370	370
6343 Gilsonite	--	--	240	240
6344 Weaver Draw	--	--	120	120
6346 Twin Buttes	400	2,960	2,790	6,150
6353 Park Canyon/Bitter Creek	--	230	90	320
6354 E. Douglas Creek	2,400	4,850	950	8,200
6357 Evacuation Creek	--	--	800	800
6359 E. Evacuation Creek	--	--	80	80
6361 Foundation Creek	--	470	270	740
6367 Cathedral Creek	140	--	60	200
6600 McAndrews Gulch	--	--	1,680	1,680
6602 River	--	--	200	200
6603 Little Tom's Draw	--	--	1,110	1,110
6604 West Shutta	--	--	330	330
6605 Keystone	--	1,280	2,440	3,720
6609 Chokecherry	--	40	--	40
6612 Black's Gulch	200	1,040	1,590	2,830
6613 Upper Smith Gulch	--	260	460	720
6615 Strawberry Peak	--	--	60	60
6619 Villa Individual	--	--	160	160
6620 Jordan Gulch	--	500	650	1,150
6621 Lower Smith Gulch	--	--	1,200	1,200
6622 Windy Gulch	--	--	510	510
6625 Smith-Crawford	--	1,280	320	1,600
6821 Wilber	--	200	--	200
6829 Seeley	--	780	--	780
6831 Jolley	--	640	--	640
6832 Cox	--	160	--	160
6833 Jewell	--	160	--	160
Total	4,480	29,890	49,520	83,890

APPENDIX B

VEGETATION ALLOCATION AND GRAZING MANAGEMENT

Vegetation Allocation and Grazing Management

Appendix B presents the allotment specific vegetation allocation levels and livestock grazing management recommendations for the various alternatives.

Table B-1 Vegetation allocation for Alternative A and Alternative F (allotments without wild horses) and proposed livestock grazing management levels for Alternatives A, D and F.

Table B-2 Vegetation allocation and livestock grazing management for Alternative B, No Action.

Table B-3 Vegetation allocation for Alternative D, Optimize Livestock Grazing.

Table B-4 Vegetation allocation and livestock grazing management levels for Alternative E, Emphasis on Other Resource Uses.

TABLE B-1
PROPOSED ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE A - ACTION PROPOSAL

Allotment No. Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Actual Livestock Use 2/ (AUMs)	Initial Vegetation Allocation 3/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Actual vs. Initial Livestock Use (AUMs)	Minimum Rest Requirement Period	(Yrs.) Cycle	No. & Kind of Livestock	Maximum Period of Use	Projected Vegetation Allocation 4/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
EXISTING INTENSIVE MANAGEMENT																					
Cattle Spring/Summer/Fall																					
6008 Segar Gulch	20,382	2,636	3,499	2,543	2,500	1,269	112	0	0	3,881	- 43	4/1-7/15	1 in 4	700 C	6/1-10/31	3,425	1,418	121	0	0	4,964
6300 Cricket	2,977	170	380	380	250	89	0	0	0	339	- 130	4/25-6/30	1 in 3	100 C	5/15-10/2	250	110	0	0	0	360
Total	23,359	2,806	3,879	2,923	2,750	1,358	112	0	0	4,220						3,675	1,528	121	0	0	5,324
Cattle Spring/Summer/Fall/Winter																					
6026 Reagles	22,898	2,440	1,266	1,489	2,064	865	26	0	0	2,955	+ 575	3/25-6/15	1 in 2	168 C	3/1-12/15	2,077	977	29	0	0	3,083
												4/20-7/15	1 in 2								
6027 Square S	70,001	11,687	4,390	4,070	4,422	3,952	42	0	375	8,791	+ 352	3/25-6/15	1 in 3	500 C	5/1-12/15	6,622	6,416	45	0	483	13,566
6612 Black's Gulch	24,770	3,580	2,138	2,022	2,293	1,661	84	0	0	4,038	+ 271	3/15-6/10	1 in 3	395 C	4/15-12/31	3,683	1,669	92	0	0	5,444
												4/15-7/10	1 in 3								
6353 Park Canyon/Bitter Creek	15,443	6,176	2,447	2,442	2,442	464	72	0	0	2,978	0	4/10-7/15	1 in 3	356 C	6/1-10/31	2,442	570	78	0	0	3,090
														687 C	11/10-2/28						
Total	133,112	23,883	10,241	10,023	11,221	6,942	224	0	375	18,762						14,824	9,632	244	0	483	25,183
PROPOSED INTENSIVE MANAGEMENT																					
Cattle Spring																					
6038 Little Spring Creek	14,877	2,553	1,183	385	802	894	0	0	0	1,696	+ 417	3/15-6/1	2 in 3	286 C	4/20-7/1	1,374	1,033	0	0	0	2,407
6039 Hammond Draw	7,097	271	215	162	318	75	0	0	0	393	+ 156	3/15-6/1	1 in 2	200 C	5/1-7/1	447	75	0	0	0	522
6333 Pinyon Ridge	15,511	1,170	700	680	631	711	21	2	0	1,365	- 49	3/5-6/1	1 in 2	175 C	4/16-6/30	933	875	21	2	0	1,831
6613 Upper Smith Gulch	8,657	2,776	898	629	627	609	29	0	0	1,265	- 2	4/15-6/28	1 in 4	614 C	5/1-6/30	947	639	31	0	0	1,617
Total	46,142	6,770	2,996	1,856	2,378	2,289	50	2	0	4,719						3,701	2,622	52	2	0	6,377
Cattle Spring/Summer																					
6003 Wood Road Gulch	1,669	450	143	84	35	107	4	0	0	146	- 49	3/20-7/1	1 in 2	176 C	6/2-7/11	43	131	4	0	0	178
6011 Thirteen Mile	7,367	672	1,020	896	330	442	27	0	0	799	- 566	4/10-6/1	Yearly	147 C	6/1-9/30	387	486	30	0	0	903
												6/1-7/15	1 in 2								
Total	9,036	1,122	1,163	980	365	549	31	0	0	945						430	617	34	0	0	1,081
Cattle Spring/Summer/Fall																					
6012 Fourteen Mile	3,066	1,483	850	773	245	203	16	0	0	464	- 528	4/10-6/1	Yearly	100 C	6/1-11/30	326	211	17	0	0	554
												6/1-7/15	1 in 3								
6022 Davis Canyon	906	626	195	195	67	46	6	0	0	119	- 128	4/28-7/25	1 in 2	62 C	6/1-10/31	149	56	6	0	0	211
6024 Fawn Creek	20,978	13,470	2,465	2,461	1,371	1,201	47	0	0	2,619	- 1,090	3/25-6/15	1 in 2	955 C	5/1-10/31	2,254	1,258	51	0	0	3,563
												4/25-7/20	1 in 2								
6030 Yellow Creek	72,485	4,180	3,618	3,118	3,095	4,712	51	0	525	8,383	- 23	3/15-6/1	1 in 2	400 C	4/15-1/30	6,357	4,927	55	0	809	12,148
												3/25-6/15	1 in 2								
												4/20-7/15	1 in 2								
6031 Duck Creek	21,859	1,359	1,490	1,488	1,533	1,143	29	0	0	2,705	+ 45	3/25-6/20	1 in 2	348 C	6/16-10/6	1,998	1,211	35	0	0	3,244
												4/20-7/15	1 in 2								
6032 Spring Creek	38,884	2,177	4,567	4,570	2,209	692	93	0	0	2,994	- 2,361	3/25-6/1	1 in 2	737 C	5/1-11/15	3,346	796	102	0	0	4,244
												4/10-6/20	1 in 3								
												4/20-7/15	1 in 3								
6033 E. Fork Spring Creek	2,927	960	321	322	226	56	0	0	0	282	- 96	4/20-7/25	1 in 2	100 C	5/10-10/10	260	56	0	0	0	316
6040 Upper Fletcher	6,250	1,270	680	513	519	176	0	0	0	695	+ 6	4/20-7/15	1 in 2	140 C	4/20-10/30	606	176	0	0	0	782
6302 Roundtop	7,162	3,365	845	800	597	222	2	0	0	821	- 203	4/20-7/15	1 in 2	260 C	5/8-11/7	848	273	2	0	0	1,123
6304 Basin Springs	6,225	6,740	1,562	1,350	778	319	31	0	0	1,128	- 572	4/1-7/15	1 in 3	520 C	5/1-10/15	1,168	392	33	0	0	1,593
6306 Turner Creek	3,749	1,040	389	388	234	115	0	0	0	349	- 154	4/10-7/15	1 in 2	84 C	5/1-10/31	806	141	0	0	0	947
6361 Foundation Creek	9,703	920	297	295	318	251	103	0	0	672	+ 24	3/25-6/15	1 in 2	129 C	6/1-10/30	540	309	111	0	0	960
6608 S. Fork Price Creek	2,266	2,843	156	189	246	117	26	0	0	389	+ 57	4/15-7/1	1 in 2	200 C	6/1-11/30	252	117	27	0	0	396
6620 Jordan Gulch	6,350	1,248	413	413	376	433	24	0	0	833	- 37	4/15-7/15	1 in 2	123 C	5/10-11/30	526	469	29	0	0	1,024
															8/16-11/30						
Total	202,810	41,681	17,848	16,875	11,814	9,686	428	0	525	22,453						19,436	10,392	468	0	809	31,105

TABLE B-1
PROPOSED ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE A - ACTION PROPOSAL

Allotment No. Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Actual Livestock Use 2/ (AUMs)	Initial Vegetation Allocation 3/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Actual vs. Initial Livestock Use (AUMs)	Minimum Rest Requirement Period	(Yrs.) Cycle	No. & Kind of Livestock	Maximum Period of Use	Projected Vegetation Allocation 4/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
Cattle Spring/Summer/Fall/Winter																					
6006 Little Hills	53,055	1,767	5,691	5,076	3,337	4,903	0	0	0	8,240	- 1,739	3/15-6/20	Yearly	465 C	6/20-10/30	4,548	4,903	0	0	0	9,451
												4/10-7/5	1 in 2	1,580 C	11/1-1/30						
6023 Piceance Mountain	104,585	51,506	14,716	14,586	10,564	6,325	602	0	0	17,491	- 4,022	3/25-6/15	1 in 3	3,834 C	5/1-11/15	14,152	6,548	650	0	0	21,350
												4/20-7/10	1 in 3	150 C	11/15-1/30						
												4/25-8/1	1 in 3								
6029 Black Sulphur	18,750	15,978	1,921	1,916	1,803	1,034	15	0	0	2,852	- 113	3/25-6/15	1 in 2	755 C	5/1-12/15	2,190	1,126	17	0	0	3,333
												4/20-7/15	1 in 2								
6036 Greasewood	27,810	3,391	1,687	1,685	1,527	1,870	0	0	0	3,397	- 158	3/25-6/15	1 in 2	360 C	5/1-12/7	1,987	2,066	0	0	0	4,053
6307 K Ranch	37,039	13,580	3,512	2,405	2,890	822	109	0	0	3,821	+ 485	3/15-6/1	1 in 4	600 C	3/1-2/20	3,602	1,011	117	0	0	4,730
6323 Wolf Creek	53,155	24,259	4,362	4,083	3,241	1,171	4	1	0	4,417	- 842	3/15-6/1	1 in 2	735 C	3/1-2/28	6,558	1,441	4	3	0	8,006
												4/1-6/20	1 in 2								
												4/20-7/15	1 in 3								
6337 Cathedral Bluffs	76,943	11,200	5,071	5,071	3,022	1,224	71	0	450	4,767	- 2,049	3/20-6/15	1 in 2	1,200 C	3/1-2/15	4,824	1,488	77	0	809	7,198
												4/1-6/25	1 in 2								
												4/25-7/15	1 in 3								
6346 Twin Buttes	134,602	8,617	11,371	9,008	6,338	1,587	142	0	0	8,067	- 2,670	3/15-6/10	1 in 2	1,035 C	3/1-2/28	9,818	1,952	160	0	0	11,930
												4/1-6/25	1 in 2								
												4/25-7/15									
6354 E. Douglas Creek	45,848	2,086	2,354	2,354	1,992	536	160	0	0	2,688	- 362	3/20-6/15	2 in 3	275 C	3/1-2/28	3,016	651	173	0	0	3,840
												3/20-6/15	1 in 2								
												4/25-7/15	1 in 3								
6357 Evacuation Creek	54,668	8,262	3,904	3,216	2,453	1,040	71	0	0	3,564	- 758	3/25-6/20	1 in 2	584 C	3/1-2/28	4,799	1,279	77	0	0	6,155
												4/25-7/25	1 in 2								
6367 Cathedral Creek	9,910	2,490	1,470	1,384	438	329	21	0	0	788	- 946	4/1-6/25	1 in 2	186 C	5/1-12/31	842	329	23	0	0	1,194
												4/25-7/15	1 in 2								
6605 Keystone	27,871	1,690	3,859	3,089	2,466	2,241	154	4	0	4,865	- 623	3/15-6/1	1 in 3	451 C	3/1-2/28	3,974	2,241	165	4	0	6,384
												3/20-6/15	1 in 3								
												4/5-7/1	1 in 3								
6625 Smith-Crawford	12,114	11,616	2,808	2,214	1,154	1,191	224	0	0	2,569	- 1,060	3/20-7/11	1 in 2	706 C	5/15-6/30	1,489	1,191	241	0	0	2,921
														367 C	7/1-9/30						
														487 C	10/1-11/15						
												7/1-8/15	1 in 2	137 C	11/15-12/15						
Total	656,350	156,442	62,726	56,087	41,225	24,273	1,573	5	450	67,526						61,799	26,226	1,704	7	809	90,545
Cattle Spring/Fall/Winter																					
6005 North Dry Fork	12,103	10,938	1,005	1,005	672	1,289	8	0	0	1,969	- 333	3/15-6/20	2 in 3	224 C	4/16-6/30	894	1,289	8	0	0	2,191
														200 C	11/1-12/15						
6041 Lower Fletcher	9,687	952	612	311	426	95	0	0	0	521	+ 115	3/15-6/1	2 in 3	200 C	5/1-6/1	635	105	0	0	0	740
															12/1-2/20						
6322 Skull Creek	8,724	6,528	911	744	476	204	0	0	0	680	- 268	4/1-6/20	2 in 3	50 C	3/1-5/20	658	223	0	0	0	881
														105 C	11/1-2/28						
6329 Winter Valley Gulch	1,630	320	200	200	144	4	21	0	0	169	- 56	3/20-6/20	1 in 2	287 C	5/1-5/30	201	15	21	0	0	237
															12/1-12/31						
6600 McAndrews Gulch	12,785	1,260	1,630	1,543	770	927	20	17	0	1,734	- 773	3/15-6/1	1 in 2	441 C	11/2-4/30	1,599	973	22	17	0	2,611
6621 Lower Smith Gulch	8,570	130	391	402	391	790	0	0	0	1,181	- 11	3/20-6/15	3 in 4	224 C	5/8-5/25	707	790	0	0	0	1,497
															11/16-1/15						
6622 Windy Gulch	2,367	40	138	50	149	198	0	0	0	347	+ 99	3/20-6/15	3 in 4	50 C	5/6-6/5	270	198	0	0	0	468
															11/10-1/9						
Total	55,866	20,168	4,887	4,255	3,028	3,507	49	17	0	6,601						4,964	3,593	51	17	0	8,625
Cattle Summer/Fall																					
6007 Main Dry Fork	9,705	1,440	1,536	1,536	1,078	637	23	0	0	1,738	- 458	4/10-7/1	Yearly	384 C	7/1-10/31	1,732	782	29	0	0	2,543
6009 Hyberger	1,873	0	390	391	146	73	10	0	0	229	- 245	4/10-6/10	Yearly	71 C	6/10-10/31	204	89	10	0	0	303
												6/10-7/15	1 in 2								
6010 Little Rancho	1,330	800	260	260	106	50	6	0	0	162	- 154	4/10-7/15	Yearly	52 C	7/15-10/31	190	76	6	0	0	272
6305 Martha's Hole	3,871	1,220	323	227	232	117	0	0	0	349	+ 5	4/10-7/15	1 in 2	135 C	6/15-10/15	315	144	0	0	0	459
6325 Bear Valley	1,019	1,800	112	102	60	85	0	0	0	145	- 42	4/10-7/15	1 in 2	125 C	8/12-9/30	70	104	0	0	0	174
6615 Strawberry Peak	900	2,679	60	32	67	43	4	0	0	114	+ 35	4/15-7/10	1 in 2	50 C	7/1-10/30	68	45	4	0	0	117
6617 Cave Gulch	1,675	872	1,050	585	279	97	55	0	0	431	- 306	4/5-7/15	2 in 3	420 C	7/1-10/10	329	97	59	0	0	485
6626 Isolated Tract	450	0	35	35	44	18	8	0	0	70	+ 9	3/20-6/15	Yearly	72 C	6/16-10/15	45	22	8	0	0	75
Total	20,823	8,811	3,766	3,168	2,012	1,120	106	0	0	3,238						2,953	1,359	116	0	0	4,428

TABLE B-1
PROPOSED ALLOCATION AND GRAZINC MANAGEMENT
ALTERNATIVE A - ACTION PROPOSAL

Allotment No.	Name	Acres Public Land	Acres Other Owner-ship 1/	Present Authorized Livestock Use (AUMs)	Actual Livestock Use 2/ (AUMs)	Initial Vegetation Allocation 3/: Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Actual vs. Initial Livestock Use (AUMs)	Minimum Rest Requirement: Period	(Yrs.) Cycle	No. & Kind of Livestock	Maximum Period of Use	Projected Vegetation Allocation 4/: Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
Cattle Fall/Winter																						
6028	Hatch Gulch	8,583	1,310	760	762	557	652	0	0	0	1,209	- 205	3/25-6/15	Yearly	300 C	11/1-1/31	864	652	0	0	0	1,516
6334	Coal Reef	3,837	450	357	355	325	8	0	1	0	334	- 30	3/15-6/1	Yearly	357 C	12/1-12/31	398	9	0	1	0	408
	Total	12,420	1,760	1,117	1,117	882	660	0	1	0	1,543						1,262	661	0	1	0	1,924
Sheep Spring																						
6335	Hall Draw	9,070	720	758	451	507	18	0	1	0	526	+ 56	3/5-6/1	1 in 2	2,200 S	4/5-5/20	784	21	0	1	0	806
	Total	9,070	720	758	451	507	18	0	1	0	526						784	21	0	1	0	806
Sheep Spring/Fall/Winter																						
6015	Cordon Culch	2,660	1,387	150	150	137	190	14	0	0	341	- 13	4/10-7/15	1 in 2	500 S	6/1-6/30 10/1-10/30	285	200	15	0	0	500
6016	Davis Creek	4,583	1,712	546	378	388	275	22	0	0	685	+ 10	4/20-7/20	1 in 2	2,200 S	5/1-6/30 9/16-11/15	567	285	23	0	0	875
6017	Coyote-Schutte	6,551	410	578	561	452	351	25	0	0	828	- 109	4/20-7/20	2 in 3	1,200 S	5/10-7/2 9/15-11/17	662	368	27	0	0	1,057
6021	Naval Oil Shale	2,786	0	300	300	309	106	8	0	0	423	+ 9	4/28-7/25	1 in 2	1,000 S	6/1-6/30 10/1-10/30	404	112	8	0	0	524
6042	Boise Draw	8,246	577	1,023	899	750	91	0	0	0	841	- 149	3/16-6/1	1 in 2	1,900 S	4/27-6/5 11/10-12/10	1,030	91	0	0	0	1,121
6326	Elk Springs	19,673	7,140	2,607	1,512	1,562	365	119	7	0	2,053	+ 50	3/6-6/20	1 in 3	1,300 S	3/1-6/10 11/10-2/28	2,635	449	126	7	0	3,217
6604	West Shutta	2,319	130	384	384	384	190	0	0	0	574	0	3/15-6/1	1 in 3	800 S	4/16-5/15 11/1-12/21	423	200	0	0	0	623
	Total	46,818	11,356	5,588	4,184	3,982	1,568	188	7	0	5,745						6,006	1,705	199	7	0	7,917
Sheep Spring/Winter																						
6308	Artesia	41,364	2,700	5,208	3,712	2,393	306	4	78	0	2,781	- 1,319	3/15-6/1	1 in 2	1,635 S	3/1-4/15 12/1-2/28	3,481	376	4	80	0	3,941
6312	Raven Ridge	8,466	1,860	1,124	340	359	19	0	0	0	378	+ 19	3/15-6/1	1 in 2	1,250 S	3/1-4/15 12/1-2/28	696	23	0	0	0	719
6314	Raven Park	16,522	7,680	1,946	763	769	23	0	4	0	796	+ 6	3/5-6/1	2 in 3	2,000 S	3/1-5/20 12/1-2/28	1,203	28	0	4	0	1,235
6316	Spooky Mountain	31,082	3,230	3,249	2,465	1,480	46	0	49	0	1,575	- 985	3/15-6/1	2 in 3	2,500 S	3/1-5/25 11/23-2/28	2,436	56	0	51	0	2,543
6324	Massadona	8,478	2,810	1,291	800	847	19	0	5	0	871	+ 47	3/5-6/1	1 in 2	1,800 S	5/1-5/20 12/1-4/1	1,334	23	0	5	0	1,362
6330	Upper Coal Creek	5,355	1,665	880	417	582	12	17	4	0	615	+ 165	3/15-6/1	1 in 2	2,000 S	3/1-4/7 1/18-2/28	718	12	20	4	0	754
6332	Horse Draw	11,690	1,000	1,522	1,269	759	26	4	12	0	801	- 510	3/15-6/1	1 in 2	1,600 S	3/1-4/14 12/10-2/28	813	26	4	13	0	856
6338	Johnson-Trujillo	21,798	925	3,221	1,519	1,055	107	0	0	0	1,162	- 464	3/20-6/10	1 in 2	2,150 S	3/1-4/25 12/12-2/20	1,925	132	0	0	0	2,057
6340	Shavetail	7,389	860	1,441	802	323	72	0	0	0	395	- 479	3/20-6/10	1 in 2	3,850 S	3/1-4/25 11/25-1/21	771	72	0	0	0	843
6342	Douglas Creek	5,518	0	1,225	628	438	46	0	0	0	484	- 190	3/20-6/10	1 in 2	2,500 S	4/16-4/25 12/6-1/3	581	56	0	0	0	637
	Total	157,662	22,730	21,107	12,715	9,005	676	25	152	0	9,858						13,958	804	28	157	0	14,947
Sheep Winter																						
6014	Lower Fourteen Mile	2,910	721	150	150	137	219	12	0	0	368	- 13	4/10-7/15	1 in 2	500 S	11/16-12/15	193	230	12	0	0	435
6320	Red Wash	8,724	80	1,099	880	447	17	0	6	0	470	- 433	3/15-6/1	Yearly	2,000 S	1/25-3/15	1,053	21	0	6	0	1,080
6331	Baking Powder	3,640	430	600	491	175	8	2	4	0	189	- 316	3/15-6/1	Yearly	1,050 S	12/9-1/24	182	8	2	4	0	196
6343	Cilsonite	24,180	252	1,934	1,723	1,919	340	0	0	0	2,259	+ 196	3/20-6/10	1 in 2	2,400 S	12/7-3/14	2,486	418	0	0	0	2,904
6371	Miller Creek	2,859	942	202	202	202	0	0	3	0	205	0	3/15-6/1	Yearly	1,400 S	12/20-1/22	202	0	0	4	0	206
	Total	42,313	2,425	3,985	3,446	2,880	584	14	13	0	3,491						4,116	677	14	14	0	4,821

TABLE B-1
PROPOSED ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE A - ACTION PROPOSAL

Allotment No. Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Actual Livestock Use 2/ (AUMs)	Initial Vegetation Allocation 3/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Actual vs. Initial Livestock Use (AUMs)	Minimum Rest Requirement Period	(Yrs.) Cycle	No. & Kind of Livestock	Maximum Period of Use	Projected Vegetation Allocation 4/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
Cattle & Sheep Spring/Summer/Fall																					
6019 Cow Creek	17,144	10,994	2,083	1,647	1,633	775	86	0	0	2,494	- 14	4/28-7/25	1 in 2	400 C 3,000 S	5/1-10/30	2,068	813	93	0	0	2,974
Total	17,144	10,994	2,083	1,647	1,633	775	86	0	0	2,494						2,068	813	93	0	0	2,974
Cattle & Sheep Spring/Summer/Fall/Winter																					
6603 Little Tom's Draw	14,100	456	1,622	1,541	1,306	1,194	4	0	0	2,504	- 235	3/15-6/1	1 in 2	72 C 22 C 1,730 S	5/1-5/30 6/1-11/30 12/1-5/4	2,003	1,194	4	0	0	3,201
Total	14,100	456	1,622	1,541	1,306	1,194	4	0	0	2,504						2,003	1,194	4	0	0	3,201
PROPOSED LESS INTENSIVE MANAGEMENT AREAS																					
Cattle Spring																					
6627 Ryan Draw	1,229	3,460	60	60	67	79	20	0	0	166	+ 7	3/20-6/15	1 in 2	100 C	5/16-6/30	72	79	22	0	0	173
Total	1,229	3,460	60	60	67	79	20	0	0	166						72	79	22	0	0	173
Cattle Summer																					
6001 Puckett Gulch	1,040	3,216	21	21	60	63	6	0	0	129	+ 36	3/20-7/1	Yearly	140 C	7/1-9/30	60	78	6	0	0	144
Total	1,040	3,216	21	21	60	63	6	0	0	129						60	78	6	0	0	144
Cattle Spring/Summer																					
6618 Cabin Gulch	905	2,607	95	95	62	59	21	0	0	142	- 33	4/5-7/15	2 in 3	222 C	5/23-9/30	63	61	25	0	0	149
6619 Villa Individual	620	2,903	63	63	51	44	4	0	0	99	- 12	4/5-7/1	1 in 2	82 C	5/16-7/16	53	50	4	0	0	107
6811 Moore, W. C.	40	1,760	11	11	11	3	0	0	0	14	0	3/1-6/1	Yearly	325 C	6/15-8/3	11	3	0	0	0	14
6816 Bar Bell Ranch	1,266	5,600	317	317	317	82	44	0	0	443	0	3/1-6/1	Yearly	400 C	6/1-9/28	317	82	44	0	0	443
Total	2,831	12,870	486	486	441	188	69	0	0	698						444	196	73	0	0	713
Cattle Spring/Summer/Fall																					
6025 Skinner Ridge	1,539	1,687	286	284	212	63	4	0	0	279	- 72	4/25-7/20	1 in 2	210 C	6/16-10/31	216	69	4	0	0	289
6301 Cottonwood Draw	2,518	3,463	301	302	331	92	0	0	0	423	+ 29	4/10-6/20	1 in 3	285 C	5/15-10/31	331	112	0	0	0	443
6303 Mud Springs Draw	549	2,160	40	40	65	19	0	0	0	84	+ 25	4/10-10/15	1 in 3	80 C	5/16-9/20	65	24	0	0	0	89
6607 N. Fork Price Creek	750	441	90	50	78	73	14	0	0	165	+ 28	4/5-6/25	Yearly	36 C	6/25-10/14	78	73	14	0	0	165
6610 Gower Gulch	1,903	740	502	328	181	154	43	0	0	378	- 147	4/15-7/1	2 in 3	85 C	5/16-10/15	188	154	45	0	0	387
6623 Anderson Individual	877	3,380	6	6	57	86	0	0	0	143	+ 51	3/20-6/15	1 in 2	100 C	5/1-10/31	61	90	0	0	0	151
6624 Willow Springs	750	3,353	108	108	85	63	37	0	0	185	- 23	3/20-6/15	1 in 2	180 C	4/6-10/30	90	63	41	0	0	194
6807 Sheridan, F. & I.	993	4,500	332	332	332	39	62	0	0	433	0	3/1-6/1	Yearly	260 C	6/1-11/15	332	39	62	0	0	433
6809 Rineau, B.	240	886	60	60	60	11	15	0	0	86	0	3/1-6/1	Yearly	40 C	6/20-7/19 10/1-10/15	60	11	15	0	0	86
6810 Kritsas	614	2,160	154	154	154	46	10	0	0	210	0	3/1-6/1	Yearly	30 C	6/1-10/31	154	46	10	0	0	210
6814 Smith, C.	341	400	138	138	138	14	23	0	0	175	0	3/1-6/1	Yearly	43 C	6/1-10/31	138	14	23	0	0	175
6817 Wheeler & Phillips	919	5,451	409	409	409	37	13	0	0	459	0	3/1-6/1	Yearly	400 C	6/1-10/25	409	37	13	0	0	459
6818 Dodo, J.	120	6,100	44	44	44	5	3	0	0	52	0	3/1-6/1	Yearly	100 C	6/15-11/8	44	5	3	0	0	52
6821 Wilber, G.	760	4,680	288	288	288	233	134	0	0	655	0	3/1-6/1	Yearly	250 C	6/1-10/31	288	233	134	0	0	655
6823 Raley, R.	120	1,200	30	30	30	9	4	0	0	43	0	3/1-6/1	Yearly	30 C	6/1-10/26	30	9	4	0	0	43
6824 Amick	758	6,000	253	252	252	68	47	0	0	367	0	3/1-6/1	Yearly	100 C	6/1-6/30 9/1-10/30	252	68	47	0	0	367
6826 Barney	40	750	7	7	7	4	2	0	0	13	0	3/1-6/1	Yearly	5 C	6/1-10/31	7	4	2	0	0	13
6827 Dorrell, C.	197	1,300	33	33	33	22	15	0	0	70	0	3/1-6/1	Yearly	50 C	6/1-10/31	33	22	15	0	0	70
6828 Sprod, R.	320	1,570	107	107	107	27	6	0	0	140	0	3/1-6/1	Yearly	50 C	6/1-10/18	107	27	6	0	0	140
Total	14,308	50,221	3,188	2,972	2,863	1,065	432	0	0	4,360						2,883	1,100	438	0	0	4,421
Cattle Spring/Summer/Fall/Winter																					
6825 LaGrange, R.	680	800	248	248	248	63	6	0	0	317	0	3/1-6/1	Yearly	40 C	6/1-12/1	248	63	6	0	0	317
Total	680	800	248	248	248	63	6	0	0	317						248	63	6	0	0	317

TABLE B-1
PROPOSED ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE A - ACTION PROPOSAL

Allotment No. Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Actual Livestock Use 2/ (AUMs)	Initial Vegetation Allocation 3/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Actual vs. Initial Livestock Use (AUMs)	Minimum Rest Requirement Period	(Yrs.) Cycle	No. & Kind of Livestock	Maximum Period of Use	Projected Vegetation Allocation 4/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
Cattle Summer/Fall																					
6002 Pine Knot Gulch	1,035	1,429	96	98	75	63	2	0	0	140	- 23	3/20-7/1	Yearly	54 C	7/1-11/30	75	78	2	0	0	155
6359 E. Evacuation Creek	6,250	2,951	488	488	488	231	13	0	0	732	0	5/1-7/25	1 in 3	497 C	7/1-10/25	488	284	15	0	0	787
6614 West Strawberry	390	720	336	71	39	12	2	0	0	53	- 32	4/15-7/1	Yearly	56 C	7/1-10/30	40	12	2	0	0	54
6616 Goff Camp Gulch	2,074	864	1,025	572	196	194	47	0	0	437	- 376	4/5-7/1	Yearly	149 C	7/1-10/15	201	194	51	0	0	446
Total	9,749	5,964	1,945	1,229	798	500	64	0	0	1,362						804	568	70	0	0	1,442
Cattle Fall/Winter																					
6602 River	860	106	45	45	50	86	0	0	0	136	+ 5	3/15-6/1	Yearly	54 C	11/1-11/30	50	86	2	0	0	138
Total	860	106	45	45	50	86	0	0	0	136						50	86	2	0	0	138
Sheep Spring/Summer																					
6806 Rosenlund, B.	872	2,080	174	174	174	27	47	0	0	248	0	3/1-6/1	Yearly	800 S	6/16-9/30	174	27	47	0	0	248
6833 Jewell et al	280	480	124	124	124	19	6	0	0	149	0	3/1-6/1	Yearly	400 S	6/1-7/31	124	19	6	0	0	149
Total	1,152	2,560	298	298	298	46	53	0	0	397						298	46	53	0	0	397
Sheep Spring/Summer/Fall																					
6609 Chokecherry	1,423	2,303	262	186	161	138	24	0	0	323	- 25	4/15-7/1	1 in 2	670 S	6/1-10/31	161	168	25	0	0	354
6800 Kourlis, H.	574	4,200	164	164	164	23	27	0	0	214	0	3/1-6/1	Yearly	2,500 S	6/1-10/21	164	23	27	0	0	214
6802 Livingston, L.	497	1,630	125	125	125	19	34	0	0	178	0	3/1-6/1	Yearly	2,800 S	6/1-6/15	125	19	34	0	0	178
												3/1-6/1	Yearly		9/15-10/14						
6803 Zingheim & Jones	790	2,840	221	221	221	21	46	0	0	288	0	3/1-6/1	Yearly	1,000 S	6/1-11/16	221	21	46	0	0	288
6805 Theos, M.	95	4,440	24	24	24	2	8	0	0	34	0	3/1-6/1	Yearly	2,250 S	6/1-10/18	24	2	8	0	0	34
6812 Theos, T.	566	9,000	178	178	178	23	50	0	0	251	0	3/1-6/1	Yearly	2,600 S	6/1-11/15	178	23	50	0	0	251
6830 Jensen, W.	929	2,400	310	310	310	145	19	0	0	474	0	3/1-6/1	Yearly	1,400 S	6/1-11/1	310	145	19	0	0	474
6831 Jolley, H.	2,240	6,560	815	810	810	284	46	0	0	1,140	0	3/1-6/1	Yearly	2,000 S	6/1-6/30	810	284	46	0	0	1,140
															9/1-11/15						
6834 Robinson, J.	640	6,397	285	283	283	96	15	0	0	394	0	3/1-6/1	Yearly	1,000 S	6/1-6/30	283	96	15	0	0	394
6836 Wilcoxson, F.	200	1,120	27	27	27	87	4	0	0	118	0	3/1-6/1	Yearly	255 S	6/1-10/24	27	87	4	0	0	118
6837 Halandras	347	675	122	122	122	28	6	0	0	156	0	3/1-6/1	Yearly	122 S	6/1-10/19	122	28	6	0	0	156
Total	8,301	41,565	2,533	2,450	2,425	866	279	0	0	3,570						2,425	896	280	0	0	3,601
Sheep Spring/Summer/Fall/Winter																					
6801 Jensen, H.	369	6,000	124	128	124	14	31	0	0	169	0	3/1-6/1	Yearly	1,400 S	6/1-12/6	124	14	31	0	0	169
6813 Theos, N.	1,543	6,844	565	563	563	63	124	0	0	750	0	3/1-6/1	Yearly	2,600 S	6/1-11/23	563	63	124	0	0	750
6829 Seeley, D. & J.	3,310	2,282	678	677	677	467	120	0	0	1,264	0	3/1-6/1	Yearly	1,000 S	6/1-11/18	677	467	120	0	0	1,264
6832 Mace Cox et al	520	3,600	190	190	190	138	8	0	0	336	0	3/1-6/1	Yearly	1,000 S	6/1-11/24	190	138	8	0	0	336
Total	5,742	18,726	1,557	1,558	1,554	682	283	0	0	2,519						1,554	682	283	0	0	2,519
Sheep Summer/Fall																					
6804 Cook, F.	450	1,760	113	113	113	18	8	0	0	139	0	3/1-6/1	Yearly	500 S	7/15-11/15	113	18	8	0	0	139
Total	450	1,760	113	113	113	18	8	0	0	139						113	18	8	0	0	139
Sheep Spring/Winter																					
6310 Bonanza	1,549	600	122	122	76	12	0	0	0	88	- 46	4/10-7/15	2 in 3	1,430 S	3/1-3/31	76	15	0	0	0	91
															12/1-2/28						
6311 Stateline	3,310	4,122	425	425	179	7	0	0	0	186	- 246	4/10-7/15	2 in 3	2,205 S	3/1-4/20	179	9	0	0	0	188
															12/1-2/28						
6313 Coal Oil	4,456	3,500	315	164	242	8	0	0	0	250	+ 78	3/5-6/1	2 in 3	1,500 S	3/1-3/15	243	8	0	0	0	251
															11/15-1/25						
6341 Banta	630	170	24	24	24	27	0	0	0	51	0	3/20-6/10	Yearly	40 S	1/29-3/20	53	27	0	0	0	80
Total	9,945	8,392	886	735	521	54	0	0	0	575						551	59	0	0	0	610

TABLE B-1
PROPOSED ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE A - ACTION PROPOSAL

Allotment No. Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Actual Livestock Use 2/ (AUMs)	Initial Vegetation Allocation 3/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Actual vs. Initial Livestock Use (AUMs)	Minimum Rest Requirement Period	(Yrs.) Cycle	No. & Kind of Livestock	Maximum Period of Use	Projected Vegetation Allocation 4/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
Sheep Winter																					
6321 Rock Wall Draw	1,160	2,280	85	43	69	1	0	1	0	71	+ 26	3/15-6/1	Yearly	106 S	12/1-3/15	69	1	0	1	0	71
6344 Weaver Draw	1,905	59	65	64	70	20	0	0	0	90	+ 6	3/20-6/15	1 in 3	2,400 S	1/1-1/10	70	25	0	0	0	95
Total	3,065	2,339	150	107	139	21	0	1	0	161						139	26	0	1	0	166
Cattle & Sheep Spring/Summer/Fall																					
6808 Russell, J.	1,360	2,400	303	303	303	90	72	0	0	465	0	3/1-6/1	Yearly	200 S 104 C	6/1-12/31	303	90	72	0	0	465
6835 Woodward, T.	1,080	840	360	360	360	11	19	0	0	390	0	3/1-6/1	Yearly	1,500 S 200 C	6/1-10/31	360	11	19	0	0	390
Total	2,440	3,240	663	663	663	101	91	0	0	855						663	101	91	0	0	855
Horses Spring/Summer/Fall																					
6815 Lennon, D.	149	160	25	25	25	6	4	0	0	35	0	3/1-6/1	Yearly	30 H	6/1-10/27	25	6	4	0	0	35
Total	149	160	25	25	25	6	4	0	0	35						25	6	4	0	0	35
Unalloted	3,240	--	0	0	0	540	540	0	0	1,080						0	540	540	0	0	1,080
Stock Driveways	9,600	--	3,750	3,750	3,750	0	0	0	0	3,750						3,750	0	0	0	0	3,750
Grand Total	1,521,806	467,503	159,734	136,028	109,003	59,577	4,745	199	1,350	174,874						156,058	66,388	5,004	207	2,101	229,758

1/ Includes private and state land within the allotment
2/ Actual livestock use = Average active licensed livestock use
3/ Initial vegetation allocation = Short term (8 year implementation period)
4/ Projected vegetation allocation = Long term (12 years after implementation)

TABLE B-2
PRESENT VEGETATION USE AND GRAZING MANAGEMENT
ALTERNATIVE B - NO ACTION

Allotment No.	Allotment Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Kind and Number of Livestock	Period of Use	Present Vegetation Demand: Livestock Actual Use 2/ (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total
EXISTING INTENSIVE MANAGEMENT AREAS												
Cattle Spring/Summer/Fall												
6008	Segar Gulch	20,382	2,636	3,499	700 C	6/1-10/31	2,543	1,269	112	0	0	3,924
6300	Cricket	2,977	170	380	100 C	5/15-10/2	380	89	0	0	0	469
	Total	23,359	2,806	3,879	800 C		2,923	1,358	112	0	0	4,393
Cattle Spring/Summer/Fall/Winter												
6026	Reagles	22,898	2,440	1,266	168 C	3/1-2/28	1,489	865	26	0	0	2,380
6027	Square S	70,001	11,687	4,390	500 C	5/1-12/15	4,070	3,952	42	0	2,190	10,254
6612	Black's Gulch	24,770	3,580	2,138	395 C	4/15-12/31	2,022	1,661	84	0	0	3,767
6353	Park Canyon/Bitter Crk	15,443	6,176	2,447	687 C 356 C	6/1-10/31 11/10-2/28	2,442	464	72	0	0	2,978
	Total	133,112	23,883	10,241	2,106 C		10,023	6,942	224	0	2,190	19,379
EXISTING LESS INTENSIVE MANAGEMENT AREAS												
Cattle Spring												
6038	Little Spring Creek	14,877	2,553	1,183	286 C	4/20-5/30	385	894	0	0	240	1,519
6039	Hammond Draw	7,097	271	215	200 C	4/16-5/18	162	75	0	0	195	432
6333	Pinyon Ridge	15,511	1,170	700	175 C	4/6-6/30	680	711	21	2	0	1,414
6334	Coal Reef	3,837	450	357	357 C	5/1-6/10	355	8	0	1	0	364
6613	Upper Smith Gulch	8,657	2,776	898	614 C	5/1-6/30	629	609	29	0	0	1,267
6627	Ryan Draw	1,229	3,460	60	100 C	5/16-6/30	60	79	20	0	0	159
	Total	51,208	10,680	3,413	1,732 C		2,271	2,376	70	3	435	5,155
Cattle Spring/Summer												
6001	Puckett Gulch	1,040	3,216	21	140 C	5/1-9/30	21	63	6	0	0	90
6003	Wood Road Gulch	1,669	450	143	176 C	6/2-7/11	84	107	4	0	0	195
6011	Thirteen Mile	7,367	672	1,020	147 C	5/17-9/30	896	442	27	0	0	1,365
6301	Cottonwood Draw	2,518	3,463	301	285 C	5/15-10/30	302	92	0	0	0	394
6303	Mud Springs Draw	549	2,160	40	80 C	5/16-9/20	40	19	0	0	0	59
6618	Cabin Gulch	905	2,607	95	222 C	5/23-9/30	95	59	21	0	0	175
6619	Villa Individual	620	2,903	63	82 C	5/16-7/16	63	44	4	0	0	111
6811	Moore W. C.	40	1,760	11	325 C	6/15-8/3	11	3	0	0	0	14
6814	Smith C.	341	400	138	43 C	4/20-10/30	138	14	23	0	0	175
6816	Bar Bell Ranch	1,266	5,600	317	400 C	6/1-9/28	317	82	44	0	0	443
	Total	16,315	23,231	2,149	1,900 C		1,967	925	129	0	0	3,021
Cattle Spring/Summer/Fall												
6002	Pine Knot Gulch	1,035	1,429	96	54 C	5/1-11/30	98	63	2	0	0	163
6009	Hyberger	1,873	0	390	71 C	5/16-10/31	391	73	10	0	0	474
6010	Little Rancho	1,330	800	260	52 C	6/1-10/31	260	50	6	0	0	316
6012	Fourteen Mile	3,066	1,483	850	100 C	5/16-11/31	773	203	16	0	0	992

TABLE B-2
PRESENT VEGETATION USE AND GRAZING MANAGEMENT
ALTERNATIVE B - NO ACTION

Allotment No.	Allotment Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Kind and Number of Livestock	Period of Use	Present Vegetation Demand: Livestock Actual Use 2/ (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total
Cattle Spring/Summer/Fall (continued)												
6022	Davis Canyon	906	626	195	62 C	6/1-10/30	195	46	6	0	0	247
6024	Fawn Creek	20,978	13,470	2,465	955 C	5/1-11/15	2,461	1,201	47	0	0	3,709
6025	Skinner Ridge	1,539	1,687	286	210 C	6/16-10/31	284	63	4	0	0	351
6031	Duck Creek	21,859	1,359	1,490	348 C	6/16-11/15	1,488	1,143	29	0	231	2,891
6032	Spring Creek	38,884	2,177	4,567	737 C	5/1-11/15	4,570	692	93	0	1,005	6,360
6033	E. Fork Spring Creek	2,927	960	321	100 C	5/10-10/10	322	56	0	0	0	378
6040	Upper Fletcher	6,250	1,270	680	140 C	4/20-10/30	513	176	0	0	165	854
6302	Roundtop	7,162	3,365	845	260 C	5/18-11/7	800	222	2	0	0	1,024
6304	Basin Springs	6,225	6,740	1,562	520 C	5/1-10/15	1,350	319	31	0	0	1,700
6305	Martha's Hole	3,871	1,220	323	135 C	6/15-10/15	227	117	0	0	0	344
6306	Turner Creek	3,749	1,040	389	84 C	5/1-10/31	388	115	0	0	0	503
6361	Foundation Creek	9,703	920	297	129 C	6/1-10/30	295	251	103	0	0	649
6607	N. Fork Price Creek	750	441	90	36 C	5/15-10/14	50	73	14	0	0	137
6608	S. Fork Price Creek	2,266	2,843	156	200 C	6/1-11/30	189	117	26	0	0	332
6610	Gower Gulch	1,903	740	502	85 C	5/16-10/15	328	154	43	0	0	525
6614	West Strawberry	390	720	336	56 C	5/16-10/31	71	12	2	0	0	85
6616	Goff Camp Gulch	2,074	864	1,025	149 C	5/15-10/15	572	194	47	0	0	813
6620	Jordan Gulch	6,350	1,248	413	123 C	5/16-11/30	413	433	24	0	0	870
6623	Anderson Individual	877	3,380	6	100 C	5/1-10/31	6	86	0	0	0	92
6624	Willow Springs	750	3,353	108	180 C	4/6-10/30	108	63	37	0	0	208
6807	Sheridan F. & I.	993	4,500	332	260 C	5/1-11/15	332	39	62	0	0	433
6809	Rienau B.	240	886	60	40 C	6/20-7/19 10/1-10/15	60	11	15	0	0	86
6810	Kritsas	614	2,160	154	30 C	5/27-10/31	154	46	10	0	0	210
6817	Wheeler & Phillips	919	5,451	409	400 C	5/15-10/25	409	37	13	0	0	459
6818	Dodo J.	120	6,100	44	100 C	6/15-11/8	44	5	3	0	0	52
6821	Wilber G.	760	4,680	288	250 C	6/1-10/31	288	233	134	0	0	655
6823	Raley R.	120	1,200	30	30 C	5/1-10/26	30	9	4	0	0	43
6824	Amick	758	6,000	253	100 C	5/15-6/30 9/1-10/30	252	68	47	0	0	367
6826	Barney	40	750	7	5 C	5/1-10/31	7	4	2	0	0	13
6827	Dorrell C.	197	1,300	33	50 C	5/1-10/31	33	22	15	0	0	70
6828	Sprod R.	320	1,570	107	50 C	5/1-10/18	107	27	6	0	0	140
	Total	151,798	86,732	19,369	6,201 C		17,868	6,423	853	0	1,401	26,545
Cattle Spring/Summer/Fall/Winter												
6006	Little Hills	53,055	1,767	5,691	1,580 C 465 C	11/1-1/30 5/1-10/30	5,076	4,903	0	0	0	9,979
6023	Piceance Mountain	104,585	51,506	14,716	3,834 C 150 C	5/1-11/15 11/15-1/30	14,586	6,325	602	0	0	21,513
6029	Black Sulphur	18,750	15,978	1,921	755 C	5/1-12/15	1,916	1,034	15	0	0	2,965
6030	Yellow Creek	72,485	4,180	3,618	400 C	4/15-1/30	3,118	4,712	51	0	1,992	9,873
6036	Greasewood	27,810	3,391	1,687	360 C	5/1-12/7	1,685	1,870	0	0	510	4,065
6307	K Ranch	37,039	13,580	3,512	600 C	3/1-2/20	2,405	822	109	0	0	3,336
6323	Wolf Creek	53,155	24,259	4,362	735 C	3/1-2/28	4,083	1,171	4	1	0	5,259
6337	Cathedral Bluffs	76,943	11,200	5,071	1,200 C	3/1-2/15	5,071	1,224	71	0	1,305	7,671
6346	Twin Buttes	134,602	8,617	11,371	1,035 C	3/1-2-28	9,008	1,587	142	0	1,080	11,817
6354	E. Douglas Creek	45,848	2,086	2,354	275 C	3/1-2/28	2,354	536	160	0	165	3,215

TABLE B-2
PRESENT VEGETATION USE AND GRAZING MANAGEMENT
ALTERNATIVE B - NO ACTION

Allotment No.	Allotment Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Kind and Number of Livestock	Period of Use	Present Vegetation Demand: Livestock Actual Use 2/ (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total
Cattle Spring/Summer/Fall/Winter (continued)												
6357	Evacuation Creek	54,668	8,262	3,904	584 C	3/1-2/28	3,216	1,040	71	0	0	4,327
6367	Cathedral Creek	9,910	2,490	1,470	186 C	5/1-12/31	1,384	329	21	0	0	1,734
6605	Keystone	27,871	1,690	3,859	451 C	3/1-2/28	3,089	2,241	154	4	0	5,488
6625	Smith-Crawford	12,114	11,616	2,808	706 C	5/15-9/30	2,214	1,191	224	0	0	3,629
					487 C	10/1-11/15						
					137 C	11/15-12/15						
6825	LaGrange R.	680	800	248	40 C	5/1-12/1	248	63	6	0	0	317
	Total	729,515	161,422	66,592	13,980 C		59,453	29,048	1,630	5	5,052	95,188
Cattle Spring/Fall/Winter												
6005	North Dry Fork	12,103	10,938	1,005	224 C	4/16-6/30	1,005	1,289	8	0	0	2,302
					200 C	11/1-12/15						
6041	Lower Fletcher	9,687	952	612	200 C	5/1-6/1	311	95	0	0	95	501
						12/1-2/20						
6322	Skull Creek	8,724	6,528	911	105 C	11/1-2/28	744	204	0	0	0	948
					50 C	3/1-5/20						
6329	Winter Valley Gulch	1,630	320	200	287 C	5/1-5/30	200	4	21	0	0	225
						12/1-12/30						
6600	McAndrews Gulch	12,785	1,260	1,630	441 C	3/1-4/30	1,543	927	20	17	0	2,507
						11/2-2/28						
6621	Lower Smith Gulch	8,570	130	391	224 C	5/8-5/25	402	790	0	0	0	1,192
						11/16-1/15						
6622	Windy Gulch	2,367	40	138	50 C	5/1-6/5	50	198	0	0	0	248
						11/10-1/9						
	Total	55,866	20,168	4,887	1,781 C		4,255	3,507	49	17	95	7,923
Cattle Summer/Fall												
6007	Main Dry Fork	9,705	1,440	1,536	384 C	7/1-10/31	1,536	637	23	0	0	2,196
6325	Bear Valley	1,019	1,800	112	125 C	8/12-9/30	102	85	0	0	0	187
6359	E. Evacuation Creek	6,250	2,951	488	497 C	5/1-10/15	488	231	13	0	0	732
6615	Strawberry Peak	900	2,679	60	50 C	7/1-10/31	32	43	4	0	0	79
6617	Cave Gulch	1,675	872	1,050	420 C	7/1-10/10	585	97	55	0	0	737
6626	Isolated Tract	450	0	35	72 C	6/16-10/15	35	18	8	0	0	61
	Total	19,999	9,742	3,281	1,548 C		2,778	1,111	103	0	0	3,992
Cattle Fall/Winter												
6028	Hatch Gulch	8,583	1,310	760	300 C	11/1-1/31	762	652	0	0	0	1,414
6602	River	860	106	45	54 C	11/1-11/30	45	86	0	0	0	131
	Total	9,443	1,416	805	354 C		807	738	0	0	0	1,545

TABLE B-2
PRESENT VEGETATION USE AND GRAZING MANAGEMENT
ALTERNATIVE B - NO ACTION

Allotment No.	Allotment Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Kind and Number of Livestock	Period of Use	Present Vegetation Demand: Livestock Actual Use 2/ (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total
Sheep Spring												
6335	Hall Draw	9,070	720	758	2,200 S	4/5-5/20	451	18	0	1	0	470
	Total	9,070	720	758	2,200 S		451	18	0	1	0	470
Sheep Spring/Summer												
6806	Rosenlund, B.	872	2,080	174	800 S	6/16-9/30	174	27	47	0	0	248
6833	Jewell et al.	280	480	124	400 S	6/1-7/31	124	19	6	0	0	149
	Total	1,152	2,560	298	1,200 S		298	46	53	0	0	397
Sheep Spring/Summer/Fall												
6609	Chokecherry	1,423	2,303	262	670 S	6/1-10/31	186	138	24	0	0	348
6800	Kourlis, H.	574	4,200	164	2,500 S	6/1-10/21	164	23	27	0	0	214
6802	Livingston, L.	497	1,630	125	2,800 S	5/1-6/15 9/15-10/14	125	19	34	0	0	178
6803	Zingheim & Jones	790	2,840	221	1,000 S	5/1-11/16	221	21	46	0	0	288
6805	Theos, M.	95	4,440	24	2,250 S	5/15-10/18	24	2	8	0	0	34
6812	Theos, T.	566	9,000	178	2,600 S	5/1-11/25	178	23	50	0	0	251
6830	Jensen, W.	929	2,400	310	1,400 S	6/1-11/1	310	145	19	0	0	474
6831	Jolley, H.	2,240	6,560	815	2,000 S	5/1-6/30 9/1-11/15	810	284	46	0	0	1,140
6834	Robinson, J.	640	6,397	285	1,000 S	5/15-6/30 9/15-11/16	283	96	15	0	0	394
6836	Wilcoxson, F.	200	1,120	27	255 S	6/1-10/24	27	87	4	0	0	118
6837	Halandras	347	675	122	122 S	6/1-10/19	122	28	6	0	0	156
	Total	8,301	41,565	2,533	16,597 S		2,450	866	279	0	0	3,595
Sheep Spring/Summer/Fall/Winter												
6801	Jensen, H.	369	6,000	124	1,400 S	5/1-12/6	128	14	31	0	0	173
6813	Theos, N.	1,543	6,844	565	2,600 S	5/1-11/23	563	63	124	0	0	750
6829	Seeley, D & J	3,310	2,282	678	1,000 S	5/1-11/18	677	467	120	0	0	1,264
6832	Mace Cox et al	520	3,600	190	1,000 S	5/15-11/24	190	138	8	0	0	336
	Total	5,742	18,726	1,557	6,000 S		1,558	682	283	0	0	2,523
Sheep Summer/Fall												
6804	Cook, F.	450	1,760	113	500 S	7/15-11/15	113	18	8	0	0	139
	Total	450	1,760	113	500 S		113	18	8	0	0	139

TABLE B-2
PRESENT VEGETATION USE AND GRAZING MANAGEMENT
ALTERNATIVE B - NO ACTION

Allotment No.	Allotment Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Kind and Number of Livestock	Period of Use	Present Vegetation Demand: Livestock Actual Use 2/ (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total
Sheep Spring/Fall/Winter												
6015	Gordan Gulch	2,660	1,387	150	500 S	6/1-6/30 10/1-10/30	150	190	14	0	0	354
6016	Davis Creek	4,583	1,712	546	2,200 S	5/1-6/30 9/16-11/15	378	275	22	0	0	675
6017	Coyote-Schutte	6,551	410	578	1,200 S	5/10-7/2 9/15-11/17	561	351	25	0	0	937
6021	Naval Oil Shale	2,786	0	300	1,000 S	6/1-6/30 10/1-10/30	300	106	8	0	0	414
6042	Boise Draw	8,246	577	1,023	1,900 S	4/27-6/5 11/10-12/10	899	91	0	0	116	1,106
6326	Elk Springs	19,673	7,140	2,607	1,300 S	3/1-6/10 11/10-2/28	1,512	365	119	7	0	2,003
6604	West Shutta	2,319	130	384	800 S	4/16-5/15 11/1-12/21	384	190	0	0	0	574
	Total	46,818	11,356	5,588	8,900 S		4,184	1,568	188	7	116	6,063
Sheep Spring/Winter												
6308	Artesia	41,364	2,700	5,208	1,635 S	3/1-4/15 12/1-2/28	3,712	306	4	78	0	4,100
6310	Bonanza	1,549	600	122	1,430 S	3/1-3/31 12/1-2/28	122	12	0	0	0	134
6311	Stateline	3,310	4,122	425	2,205 S	3/1-4/20 12/1-2/28	425	7	0	0	0	432
6312	Raven Ridge	8,466	1,860	1,124	1,250 S	3/1-4/15 12/1-2/28	340	19	0	0	0	359
6313	Coal Oil	4,456	3,500	315	1,500 S	3/1-3/15 11/5-1/25	164	8	0	0	0	172
6314	Raven Park	16,522	7,680	1,946	2,000 S	3/1-5/20 11/15-1/25	763	23	0	4	0	790
6316	Spooky Mountain	31,082	3,230	3,249	2,500 S	3/1-6/25 11/23-2/28	2,465	46	0	49	0	2,560
6320	Red Wash	8,724	80	1,099	2,000 S	3/1-4/15 1/25-2/28	880	17	0	6	0	903
6321	Rock Wall Draw	1,160	2,280	85	106 S	3/1-3/31 1/25-2/28	43	1	0	1	0	45
6324	Massadona	8,478	2,810	1,291	1,800 S	5/1-5/20 12/1-4/1	800	19	0	5	0	824
6330	Upper Coal Creek	5,355	1,665	880	2,000 S	3/1-4/7 1/18-2/28	417	12	17	4	0	450
6332	Horse Draw	11,690	1,000	1,522	1,600 S	3/1-4/14 2/10-2/28	1,269	26	4	12	0	1,311
6338	Johnson-Trujillo	21,798	925	3,221	2,150 S	3/1-4/25 12/12-2/20	1,519	107	0	0	75	1,701
6340	Shavetail Gulch	7,389	860	1,441	3,850 S	3/1-4/25 11/25-1/21	802	72	0	0	0	874
6341	Banta	630	170	24	40 S	3/1-5/30 11/29-2/28	24	27	0	0	0	51

TABLE B-2
PRESENT VEGETATION USE AND GRAZING MANAGEMENT
ALTERNATIVE B - NO ACTION

Allotment No.	Allotment Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Kind and Number of Livestock	Period of Use	Present Vegetation Demand: Livestock Actual Use 2/ (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total
Sheep Spring/Winter (continued)												
6342	Douglas Creek	5,518	0	1,225	2,500 S	4/16-4/25 12/6-1/3	628	46	0	0	0	674
6343	Gilsonite	24,180	252	1,934	2,400 S	3/1-3/14 12/7-2/28	1,723	340	0	0	0	2,063
	Total	201,671	33,734	25,111	30,966 S		16,096	1,088	25	159	75	17,443
Sheep Winter												
6014	Lower Fourteen Mile	2,910	721	150	500 S	11/16-12/15	150	219	12	0	0	381
6331	Baking Powder	3,640	430	600	1,050 S	12/9-1/24	491	8	2	4	0	505
6344	Weaver Draw	1,905	59	65	2,400 S	1/6-1/9	64	20	0	0	0	84
6371	Miller Creek	2,859	942	202	1,400 S	12/20-1/22	202	0	0	3	0	205
	Total	11,314	2,152	1,017	5,350 S		907	247	14	7	0	1,175
Cattle & Sheep Spring/Summer/Fall												
6019	Cow Creek	17,144	10,994	2,083	400 C 3,000 S	5/1-11/20 5/15-10/31	1,647	775	86	0	0	2,508
6808	Russell, J.	1,360	2,400	303	104 C 200 S	6/1-12/31	303	90	72	0	0	465
6835	Woodward, T.	1,080	840	360	1,500 S 200 C	5/1-10/31	360	11	19	0	0	390
	Total	19,584	14,234	2,746	704 C 4,700 S		2,310	876	177	0	0	3,363
Cattle & Sheep Spring/Summer/Fall/Winter												
6603	Little Tom's Draw	14,100	456	1,622	72 C 22 C 1,730 S	5/1-5/30 6/1-11/30 12/1-5/4	1,541	1,194	4	0	0	2,739
	Total	14,100	456	1,622	94 C 1,730 S		1,541	1,194	4	0	0	2,739
Horses Spring/Summer/Fall												
6815	Lennon, D.	149	160	25	30 H	6/1-10/27	25	6	4	0	0	35
	Total	149	160	25	30 H		25	6	4	0	0	35
	Unallotted	3,240	--	0			0	540	540	0	0	1,080
	Stock Driveways	9,600	--	3,750			3,750	0	0	0	0	3,750
	Grand Total	1,521,806	467,503	159,734	31,200 C 78,143 S 30 H		136,028	59,577	4,745	199	9,364	209,913

1/ Private and state land within the allotment

2/ Actual use = Average active licensed livestock use

TABLE B-3
PROPOSED VEGETATION ALLOCATION
ALTERNATIVE D - OPTIMIZE LIVESTOCK GRAZING

Allotment No. Name	Initial Vegetation Allocation 1/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Ante-lope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Present vs. Proposed Livestock Use (AUMs) Authorized	Actual 2/	Projected Vegetation Allocation 3/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Ante-lope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
EXISTING INTENSIVE MANAGEMENT														
Cattle Spring/Summer/Fall														
6008 Segar Gulch	2,768	1,036	77	0	0	3,881	- 681	+ 225	3,723	1,120	84	0	0	4,927
6300 Cricket	286	53	0	0	0	339	- 94	- 94	294	66	0	0	0	360
Total	3,054	1,089	77	0	0	4,220			4,017	1,186	84	0	0	5,287
Cattle Spring/Summer/Fall/Winter														
6026 Reagles	2,459	487	9	0	0	2,955	+ 1,193	+ 970	2,533	560	10	0	0	3,103
6027 Square S	7,370	2,083	21	0	220	9,694	+ 2,980	+ 3,300	8,900	4,393	23	0	240	13,556
6612 Black's Gulch	2,847	1,114	43	0	0	4,004	+ 709	+ 825	4,275	1,122	47	0	0	5,444
6353 Park Canyon/Bitter Creek	2,442	464	72	0	0	2,978	- 361	- 356	2,442	570	78	0	0	3,090
Total	15,118	4,148	145	0	220	19,631			18,150	6,645	158	0	240	25,193
PROPOSED INTENSIVE MANAGEMENT														
Cattle Spring														
6038 Little Spring Creek	991	791	0	0	0	1,782	- 192	+ 606	1,493	914	0	0	0	2,407
6039 Hammond Draw	440	52	0	0	0	492	+ 225	+ 308	470	52	0	0	0	522
6333 Pinyon Ridge	704	649	11	1	0	1,365	+ 4	+ 24	1,082	797	11	1	0	1,891
6613 Upper Smith Gulch	781	467	17	0	0	1,265	- 117	+ 152	1,108	491	18	0	0	1,617
Total	2,916	1,959	28	1	0	4,904			4,153	2,254	29	1	0	6,437
Cattle Spring/Summer														
6003 Wood Road Gulch	51	92	3	0	0	146	- 92	- 33	63	113	2	0	0	178
6011 Thirteen Mile	469	316	14	0	0	799	- 551	- 427	540	348	15	0	0	903
Total	520	408	17	0	0	945			603	461	17	0	0	1,081
Cattle Spring/Summer/Fall														
6012 Fourteen Mile	286	164	2	0	0	452	- 564	- 487	377	169	7	0	0	553
6022 Davis Canyon	77	38	4	0	0	119	- 118	- 118	159	46	4	0	0	209
6024 Fawn Creek	1,722	869	28	0	0	2,619	- 743	- 739	2,622	911	30	0	0	3,563
6031 Duck Creek	2,103	747	11	0	0	2,861	+ 613	+ 615	2,440	790	14	0	0	3,244
6032 Spring Creek	2,696	550	4	0	0	3,250	- 1,871	- 1,874	3,549	632	63	0	0	4,244
6033 E. Fork Spring Creek	238	44	0	0	0	282	- 83	- 84	279	37	0	0	0	316
6040 Upper Fletcher	570	137	0	0	0	707	- 110	+ 57	645	137	0	0	0	782
6302 Roundtop	671	149	1	0	0	821	- 174	- 129	938	183	2	0	0	1,123
6304 Basin Springs	909	207	12	0	0	1,128	- 653	- 441	1,326	255	12	0	0	1,593
6306 Turner Creek	282	67	0	0	0	349	- 107	- 106	865	82	0	0	0	947
6361 Foundation Creek	450	172	50	0	0	672	+ 153	+ 155	694	212	53	0	0	959
6608 S. Fork Price Creek	282	91	15	0	0	388	+ 126	+ 93	289	91	16	0	0	396
6620 Jordan Gulch	493	326	14	0	0	833	+ 80	+ 80	654	353	17	0	0	1,024
Total	10,779	3,561	141	0	0	14,481			14,837	3,898	218	0	0	18,953
Cattle Spring/Summer/Fall/Winter														
6006 Little Hills	4,337	3,903	0	0	0	8,240	- 1,354	- 639	5,548	3,903	0	0	0	9,451
6023 Piceance Mountain	13,176	4,054	261	0	0	17,491	- 1,540	- 1,410	16,721	4,189	455	0	0	21,365

TABLE B-3
PROPOSED VEGETATION ALLOCATION
ALTERNATIVE D - OPTIMIZE LIVESTOCK GRAZING

Allotment No. Name	Initial Vegetation Allocation 1/						Change in Present vs. Proposed Livestock Use (AUMs)		Projected Vegetation Allocation 3/					
	Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Ante-lope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Authorized	Actual 2/	Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Ante-lope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
Cattle Spring/Summer/Fall/Winter (cont.)														
6029 Black Sulphur	2,125	719	8	0	0	2,852	+ 204	+ 209	2,549	775	9	0	0	3,333
6030 Yellow Creek	4,344	3,312	1	0	270	7,927	+ 726	+ 1,226	8,393	3,457	21	0	287	12,148
6036 Greasewood	1,926	1,568	0	0	0	3,494	+ 239	+ 241	2,321	1,732	0	0	0	4,053
6307 K Ranch	2,918	469	64	0	0	3,451	- 594	+ 513	4,084	577	69	0	0	4,730
6323 Wolf Creek	3,653	762	2	0	0	4,417	- 709	- 430	7,064	939	2	1	0	8,006
6337 Cathedral Bluffs	3,647	802	20	0	270	4,739	- 1,424	- 1,424	5,650	974	21	0	270	6,915
6346 Twin Buttes	7,831	936	56	0	0	8,823	- 3,540	- 1,177	10,717	1,150	63	0	0	11,930
6354 E. Douglas Creek	2,319	374	71	0	0	2,764	- 35	- 35	3,331	431	78	0	0	3,840
6357 Evacuation Creek	2,872	665	27	0	0	3,564	- 1,032	- 144	5,307	818	30	0	0	6,155
6367 Cathedral Creek	550	227	10	0	0	787	- 920	- 834	955	227	11	0	0	1,193
6605 Keystone	3,300	1,490	73	2	0	4,865	- 559	+ 211	4,812	1,490	80	2	0	6,384
6625 Smith-Crawford	1,386	1,012	171	0	0	2,569	- 822	- 828	1,726	1,012	183	0	0	2,921
Total	54,384	20,293	764	2	540	75,983			79,178	21,674	1,022	3	557	102,434
Cattle Spring/Fall/Winter														
6005 North Dry Fork	909	1,055	5	0	0	1,969	- 96	- 96	1,131	1,055	5	0	0	2,191
6041 Lower Fletcher	534	63	0	0	0	597	- 78	+ 223	678	62	0	0	0	740
6322 Skull Creek	565	117	0	1	0	683	- 255	- 179	753	130	0	1	0	884
6329 Winter Valley Gulch	155	3	11	0	0	169	- 45	- 45	215	11	11	0	0	237
6600 McAndrews Gulch	1,052	663	8	11	0	1,734	- 578	- 491	1,896	696	10	11	0	2,613
6621 Lower Smith Gulch	503	678	0	0	0	1,181	+ 112	+ 101	819	678	0	0	0	1,497
6622 Windy Gulch	187	149	0	0	0	336	+ 49	+ 137	319	149	0	0	0	468
Total	3,905	2,728	24	12	0	6,669			5,811	2,781	26	12	0	8,630
Cattle Summer/Fall														
6007 Main Dry Fork	1,218	505	15	0	0	1,738	- 318	- 318	1,905	620	18	0	0	2,543
6009 Hyberger	173	51	5	0	0	229	- 217	- 218	235	62	6	0	0	303
6010 Little Rancho	126	33	3	0	0	162	- 134	- 134	227	50	3	0	0	280
6305 Martha's Hole	273	76	0	0	0	349	- 50	+ 46	365	94	0	0	0	459
6325 Bear Valley	94	51	0	0	0	145	- 18	- 8	112	62	0	0	0	174
6615 Strawberry Peak	83	29	2	0	0	114	+ 23	+ 51	86	29	2	0	0	117
6616 Cave Gulch	303	76	6	0	0	385	- 747	- 282	371	76	38	0	0	485
6626 Isolated Tract	54	12	4	0	0	70	+ 19	+ 19	56	15	4	0	0	75
Total	2,324	833	35	0	0	3,192			3,357	1,008	71	0	0	4,436
Cattle Fall/Winter														
6028 Hatch Gulch	826	383	0	0	0	1,209	+ 66	+ 64	1,133	383	0	0	0	1,516
6334 Coal Reef	328	6	0	0	0	334	- 29	- 27	400	6	0	1	0	407
Total	1,154	389	0	0	0	1,543			1,533	389	0	1	0	1,923
Sheep Spring														
6335 Hall Draw	516	10	0	0	0	526	- 242	+ 65	793	12	0	0	0	805
Total	516	10	0	0	0	526			793	12	0	0	0	805
Sheep Spring/Fall/Winter														
6015 Gordon Gulch	202	132	7	0	0	341	+ 52	+ 52	355	138	7	0	0	500
6016 Davis Creek	526	151	8	0	0	685	- 20	+ 148	714	153	8	0	0	875

TABLE B-3
PROPOSED VEGETATION ALLOCATION
ALTERNATIVE D - OPTIMIZE LIVESTOCK GRAZING

Allotment No. Name	Initial Vegetation Allocation 1/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Present vs. Proposed Livestock Use (AUMs) Authorized	Actual 2/	Projected Vegetation Allocation 3/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
Sheep Spring/Fall/Winter (cont.)														
6017 Coyote-Schutte	624	199	5	0	0	828	+ 46	+ 63	843	208	6	0	0	1,057
6021 Naval Oil Shale	370	50	3	0	0	423	+ 70	+ 70	468	53	3	0	0	524
6042 Boise Draw	848	62	0	0	0	910	- 175	- 51	1,066	55	0	0	0	1,121
6326 Elk Springs	1,842	184	24	3	0	2,053	- 765	+ 330	3,019	169	26	3	0	3,217
6604 West Shutta	511	63	0	0	0	574	+ 127	+ 127	556	67	0	0	0	623
Total	4,923	841	47	3	0	5,814			7,021	843	50	3	0	7,917
Sheep Spring/Winter														
6308 Artesia	2,638	113	1	29	0	2,781	- 2,570	- 1,074	3,602	40	1	31	0	3,674
6312 Raven Ridge	370	8	0	0	0	378	- 754	+ 30	710	9	0	0	0	719
6314 Raven Park	783	12	0	1	0	796	- 1,163	+ 14	1,225	9	0	1	0	1,235
6316 Spooky Mountain	1,538	18	0	19	0	1,575	- 1,711	- 927	2,500	22	0	19	0	2,541
6324 Massadona	1,302	10	0	3	0	1,315	+ 11	+ 502	1,347	12	0	3	0	1,362
6330 Upper Coal Creek	605	4	4	2	0	615	- 275	+ 188	742	4	5	3	0	754
6332 Horse Draw	788	8	0	5	0	801	- 734	- 481	843	8	0	5	0	856
6338 Johnson-Trujillo	986	39	0	0	0	1,025	- 2,235	- 533	2,009	48	0	0	0	2,057
6340 Shavetail	367	28	0	0	0	395	- 773	- 435	815	35	0	0	0	850
6342 Douglas Creek	460	24	0	0	0	484	- 765	- 168	607	29	0	0	0	636
Total	9,837	264	5	59	0	10,165			14,400	216	6	62	0	14,684
Sheep Winter														
6014 Lower Fourteen Mile	211	151	6	0	0	368	+ 61	+ 61	270	159	6	0	0	435
6320 Red Wash	461	6	0	3	0	470	- 638	- 419	1,071	7	0	2	0	1,080
6331 Baking Powder	184	3	0	2	0	189	- 416	- 307	191	3	0	2	0	196
6343 Gilsonite	2,051	208	0	0	0	2,259	+ 117	+ 328	2,649	255	0	0	0	2,904
6371 Miller Creek	202	0	0	3	0	205	0	0	202	0	0	3	0	205
Total	3,109	368	6	8	0	3,491			4,383	424	6	7	0	4,820
Cattle & Sheep Spring/Summer/Fall														
6019 Cow Creek	1,887	554	53	0	0	2,494	- 196	+ 240	2,335	582	57	0	0	2,974
Total	1,887	554	53	0	0	2,494			2,335	582	57	0	0	2,974
Cattle & Sheep Spring/Summer/Fall/Winter														
6603 Little Tom's Draw	1,946	557	1	0	0	2,504	+ 324	+ 405	2,643	557	1	0	0	3,201
Total	1,946	557	1	0	0	2,504			2,643	557	1	0	0	3,201
PROPOSED LESS INTENSIVE MANAGEMENT AREAS														
Cattle Spring														
6627 Ryan Draw	87	67	16	0	0	170	+ 27	+ 27	93	63	17	0	0	173
Total	87	67	16	0	0	170			93	63	17	0	0	173
Cattle Summer														
6001 Puckett Gulch	67	57	5	0	0	129	+ 46	+ 46	68	71	5	0	0	144
Total	67	57	5	0	0	129			68	71	5	0	0	144

TABLE B-3
PROPOSED VEGETATION ALLOCATION
ALTERNATIVE D - OPTIMIZE LIVESTOCK GRAZING

Allotment No. Name	Initial Vegetation Allocation 1/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Present vs. Proposed Livestock Use (AUMs) Authorized	Actual 2/	Projected Vegetation Allocation 3/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
Cattle Spring/Summer														
6618 Cabin Gulch	70	55	17	0	0	142	- 25	- 25	79	49	21	0	0	149
6619 Villa Individual	65	32	2	0	0	99	+ 2	+ 2	67	38	2	0	0	107
6811 Moore, W. C.	14	1	0	0	0	15	+ 3	+ 3	14	1	0	0	0	15
6816 Bar Bell Ranch	379	50	15	0	0	444	+ 62	+ 62	379	50	15	0	0	444
Total	528	138	34	0	0	700			539	138	38	0	0	715
Cattle Spring/Summer/Fall														
6025 Skinner Ridge	237	40	2	0	0	279	- 49	- 47	241	50	2	0	0	293
6301 Cottonwood Draw	367	56	0	0	0	423	+ 66	+ 65	373	70	0	0	0	443
6303 Mud Springs Draw	73	11	0	0	0	84	+ 33	+ 33	162	145	0	0	0	307
6607 N. Fork Price Creek	81	72	12	0	0	165	- 9	+ 31	81	72	12	0	0	165
6610 Gower Gulch	228	123	27	0	0	378	- 274	- 100	236	123	28	0	0	387
6623 Anderson Individual	81	62	0	0	0	143	+ 75	+ 75	85	66	0	0	0	151
6624 Willow Springs	123	40	22	0	0	185	+ 15	+ 15	139	40	15	0	0	194
6807 Sheridan, F. & I.	371	22	21	0	0	414	+ 39	+ 39	371	22	21	0	0	414
6809 Rienau, G.	76	7	4	0	0	87	+ 16	+ 16	76	7	4	0	0	87
6810 Kritsas	186	17	2	0	0	205	+ 32	+ 32	186	17	2	0	0	205
6814 Smith, C.	160	8	7	0	0	175	+ 22	+ 22	160	8	7	0	0	175
6817 Wheeler & Phillips	434	22	5	0	0	461	+ 25	+ 25	434	22	5	0	0	461
6818 Dodo, J.	49	2	1	0	0	52	+ 5	+ 5	49	2	1	0	0	52
6821 Wilber, G.	484	187	43	0	0	714	+ 196	+ 196	484	187	43	0	0	714
6823 Raley, R.	38	5	1	0	0	44	+ 8	+ 8	38	5	1	0	0	44
6824 Amick	305	39	16	0	0	360	+ 52	+ 52	305	39	16	0	0	360
6826 Barney	11	2	0	0	0	13	+ 4	+ 4	11	2	0	0	0	13
6827 Dorrell, C.	49	11	5	0	0	65	+ 16	+ 16	49	11	5	0	0	65
6802 Sprod, R.	121	18	2	0	0	141	+ 14	+ 14	121	18	2	0	0	141
Total	3,474	744	170	0	0	4,388			3,601	906	164	0	0	4,671
Cattle Spring/Summer/Fall/Winter														
6825 LaGrange, R.	277	29	1	0	0	307	+ 29	+ 29	277	29	1	0	0	307
Total	277	29	1	0	0	307			277	29	1	0	0	307
Cattle Summer/Fall														
6002 Pine Knot Gulch	81	58	1	0	0	140	- 15	- 17	82	72	1	0	0	155
6359 E. Evacuation Creek	560	165	7	0	0	732	+ 72	+ 72	576	167	8	0	0	751
6614 West Strawberry	43	9	1	0	0	53	- 293	- 28	44	0	1	0	0	45
6616 Goff Camp Gulch	223	176	38	0	0	437	- 802	- 349	230	176	40	0	0	446
Total	907	408	47	0	0	1,362			932	415	50	0	0	1,397
Cattle Fall/Winter														
6602 River	77	59	0	0	0	136	+ 32	+ 32	77	59	0	0	0	136
Total	77	59	0	0	0	136			77	59	0	0	0	136
Sheep Spring/Summer														
6806 Rosenlund, B.	232	5	10	0	0	247	+ 58	+ 58	232	5	10	0	0	247
6833 Jewell et al.	147	4	0	0	0	151	+ 23	+ 23	147	4	0	0	0	151
Total	379	9	10	0	0	398			379	9	10	0	0	398

TABLE B-3
PROPOSED VEGETATION ALLOCATION
ALTERNATIVE D - OPTIMIZE LIVESTOCK GRAZING

Allotment No. Name	Initial Vegetation Allocation 1/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Present vs. Proposed Livestock Use (AUMs) Authorized	Actual 2/	Projected Vegetation Allocation 3/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
Sheep Spring/Summer/Fall														
6609 Chokecherry	242	71	10	0	0	323	- 20	+ 56	259	85	10	0	0	354
6800 Kourlis, H.	205	5	5	0	0	215	+ 41	+ 41	205	5	5	0	0	215
6802 Livingston, L.	169	5	6	0	0	180	+ 44	+ 44	169	5	6	0	0	180
6803 Zingheim & Jones	282	7	8	0	0	297	+ 61	+ 61	282	7	8	0	0	297
6805 Theos, M.	34	0	1	0	0	35	+ 10	+ 10	34	0	1	0	0	35
6812 Theos, T.	235	5	7	0	0	247	+ 57	+ 57	235	5	7	0	0	247
6830 Jensen, W.	426	54	4	0	0	484	+ 116	+ 116	426	54	4	0	0	484
6831 Jolley, H.	1,069	71	5	0	0	1,145	+ 254	+ 259	1,069	71	5	0	0	1,145
6834 Robinson, J.	375	23	0	0	0	398	+ 90	+ 92	375	23	0	0	0	398
6836 Wilcoxson, F.	101	18	0	0	0	119	+ 74	+ 74	101	18	0	0	0	119
6837 Halandras	152	6	0	0	0	158	+ 30	+ 30	152	6	0	0	0	158
Total	3,290	265	46	0	0	3,601			3,307	279	46	0	0	3,632
Sheep Spring/Summer/Fall/Winter														
6801 Jensen, H.	164	3	2	0	0	169	+ 40	+ 36	164	3	2	0	0	169
6813 Theos, N.	694	4	11	0	0	709	+ 129	+ 131	694	4	11	0	0	709
6829 Seeley, D. & J.	1,015	155	21	0	0	1,191	+ 337	+ 338	1,015	155	21	0	0	1,191
6832 Mace Cox et al.	310	29	0	0	0	339	+ 120	+ 120	310	29	0	0	0	339
Total	2,183	191	34	0	0	2,408			2,183	191	34	0	0	2,408
Sheep Summer/Fall														
6804 Cook, F.	136	3	1	0	0	140	+ 23	+ 23	136	3	1	0	0	140
Total	136	3	1	0	0	140			136	3	1	0	0	140
Sheep Spring/Winter														
6310 Bonanza	84	4	0	0	0	88	- 38	- 38	86	5	0	0	0	91
6311 Stateline	183	3	0	0	0	186	-242	- 242	184	4	0	0	0	188
6313 Coal Oil	246	4	0	0	0	250	- 69	+ 82	247	4	0	0	0	251
6314 Banta	67	9	0	0	0	76	+ 43	+ 43	71	9	0	0	0	80
Total	580	20	0	0	0	600			588	22	0	0	0	610
Sheep Winter														
6321 Rock Wall Draw	71	0	0	0	0	71	- 14	+ 28	71	0	0	0	0	71
6344 Weaver Draw	75	15	0	0	0	90	+ 10	+ 11	77	18	0	0	0	95
Total	146	15	0	0	0	161			148	18	0	0	0	166
Cattle & Sheep Spring/Summer/Fall														
6808 Russell, J.	403	46	15	0	0	464	+ 100	+ 100	403	46	15	0	0	464
6835 Woodward, T.	388	2	1	0	0	391	+ 28	+ 28	388	2	1	0	0	391
Total	791	48	16	0	0	855			791	48	16	0	0	855
Horses Spring/Summer/Fall														
6815 Lennon, D.	31	4	1	0	0	36	+ 6	+ 6	31	4	1	0	0	36
Total	31	4	1	0	0	36			31	4	1	0	0	36

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PROPOSED VEGETATION ALLOCATION
ALTERNATIVE D - OPTIMIZE LIVESTOCK GRAZING

Allotment No.	Name	Initial Vegetation Allocation 1/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Present vs. Proposed Livestock Use (AUMs) Authorized	Actual 2/	Projected Vegetation Allocation 3/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
	Unallotted	0	540	540	0	0	1,080			0	540	540	0	0	1,080
	Stock Driveways	3,750	0	0	0	0	3,750			3,750	0	0	0	0	3,750
	Grand Total	133,075	40,599	2,264	85	760	176,783			180,114	45,725	2,668	89	797	229,393

1/ Initial allocation = short term (8 year implementation period)

2/ Actual = Average active licensed livestock use

3/ Projected allocation = Long term (12 years after implementation)

TABLE B-4
PROPOSED VEGETATION ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE USES

Allotment No. Name	Acres Public Land	Acres Other Owner-ship 1/	Present Authorized Livestock Use (AUMs)	Actual Livestock Use 2/ (AUMs)	Initial Vegetation Allocation 3/: Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Present vs. Proposed Livestock Use (AUMs): Authorized	Actual	Minimum Rest Requirement: Period	(Yrs.) Cycle	No. & Kind of Livestock	Maximum Period of Use	Projected Vegetation Allocation (AUMs): Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
EXISTING INTENSIVE MANAGEMENT																						
Cattle Summer/Fall																						
6008 Segar Gulch	20,382	2,636	3,499	2,543	1,500	1,269	112	0	0	2,881	-1,999	-1,043	4/1-7/1	yearly	700 C	7/1-10/30	1,951	1,719	191	0	0	3,861
6300 Cricket	2,977	170	380	380	143	89	0	0	0	232	-237	-237	4/25-6/30	yearly	100 C	7/1-9/30	143	110	0	0	0	253
Total	23,359	2,806	3,879	2,923	1,643	1,358	112	0	0	3,113							2,094	1,829	191	0	0	4,114
Cattle Summer/Fall/Winter																						
6026 Reagles	22,898	2,440	1,266	1,489	1,238	865	26	0	0	2,129	-28	-251	3/20-7/15	yearly	168 C	7/15-12/15	1,238	990	29	0	0	2,257
6027 Square S	70,001	11,687	4,390	4,070	2,385	3,952	42	0	1,680	8,059	-2,005	-1,685	3/20-7/1	yearly	1,000 C	7/1-12/15	3,781	7,206	60	0	2,355	13,402
6353 Park Canyon/ Bitter Creek	15,443	6,176	2,447	2,442	1,251	464	72	0	0	1,787	-1,196	-1,191	4/10-7/25	yearly	356 C 687 C	11/1-2/28 7/25-10/30	1,251	570	78	0	0	1,899
Total	108,342	20,303	8,103	8,001	4,874	5,281	140	0	1,680	11,975							6,270	8,766	167	0	2,355	17,558
Cattle Spring/Summer/Fall/Winter																						
6612 Black's Gulch	24,770	3,580	2,138	2,022	1,221	1,661	84	0	0	2,966	-917	-801	3/15-6/15	yearly	395 C	6/15-12/31	2,015	2,253	104	0	0	4,372
Total	24,770	3,580	2,138	2,022	1,221	1,661	84	0	0	2,966							2,015	2,253	104	0	0	4,372
PROPOSED INTENSIVE MANAGEMENT																						
Cattle Spring/Summer/Fall/Winter																						
6307 K Ranch	37,039	13,580	3,512	2,405	1,734	822	109	0	0	2,665	-1,778	-671	3/15-7/1	yearly	500 C	6/1-3/15	2,139	1,282	153	0	0	3,574
6346 Twin Buttes	134,602	8,617	11,371	9,008	3,803	1,587	142	0	0	5,532	-7,568	-5,205	3/15-6/15 6/15-7/15	yearly 1 in 2	1,035 C	6/15-3/15	5,383	3,622	400	0	0	9,405
Total	171,641	22,197	14,883	11,413	5,537	2,409	251	0	0	8,197							7,522	4,904	553	0	0	12,979
Cattle Spring/Fall/Winter																						
6005 North Dry Fork	12,103	10,938	1,005	1,005	367	1,289	8	0	0	1,664	-638	-638	3/15-6/20	yearly	224 C 200 C	6/20-6/30 11/1-12/15	510	1,444	17	0	0	1,971
6038 Little Spring Crk	14,877	2,553	1,183	385	264	894	0	0	0	1,158	-919	-121	10/30-12/30 10/30-12/30	2 in 3* yearly	286 C 286 C	4/15-5/31 10/1-10/30	647	1,222	0	0	0	1,869
Total	26,980	13,491	2,188	1,390	631	2,183	8	0	0	2,822							1,157	2,666	17	0	0	3,840
Cattle Summer/Fall																						
6036 Greasewood	27,810	3,391	1,687	1,685	916	1,870	0	0	0	2,786	-771	-769	3/15-7/1 10/30-12/30	yearly yearly	360 C	7/1-10/30	1,210	2,232	0	0	0	3,442
Total	27,810	3,391	1,687	1,685	916	1,870	0	0	0	2,786							1,210	2,232	0	0	0	3,442
Cattle Summer/Fall/Winter																						
6006 Little Hills	53,055	1,767	5,691	5,076	1,638	4,903	0	0	0	6,541	-4,053	-3,438	3/15-7/1 11/1-1/30	1 in 2 1 in 2	465 C 1,580 C	7/1-10/30 11/1-1/30	2,328	6,289	0	0	0	8,617
6023 Piceance Mt.	104,585	51,506	14,716	14,586	6,338	6,325	602	0	0	13,265	-8,378	-8,248	4/20-7/1 7/1-8/1	yearly 1 in 3*	3,834 C 150 C	7/1-11/15 12/1-1/30	8,161	7,972	991	0	0	17,124
6323 Wolf Creek	53,155	24,259	4,362	4,083	1,945	1,171	4	1	0	3,121	-2,417	-2,138	3/1-7/1 7/1-7/15	yearly 2 in 3	735 C	7/1-2/28	3,704	2,933	37	36	0	6,710
Total	210,795	77,532	24,769	23,745	9,921	12,399	606	1	0	22,927							14,193	17,194	1,028	36	0	32,451
PROPOSED LESS INTENSIVE MANAGEMENT																						
Cattle Spring																						
6039 Hammond Draw	7,097	271	215	162	154	75	0	0	0	229	-61	-8	3/15-6/1	yearly	200 C	6/1-7/1	241	117	0	0	0	358

TABLE B-4
PROPOSED VEGETATION ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE USES

					Initial Vegetation Allocation 3/						Change in Present vs. Proposed Livestock Use (AUMs)		Minimum Rest Requirement				Projected Vegetation Allocation (AUMs)					
Allotment No. Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Actual Livestock Use 2/ (AUMs)	Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Authorized	Actual	Period	(Yrs.) Cycle	No. & Kind of Livestock	Maximum Period of Use	Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
Cattle Spring (Continued)																						
6041 Lower Fletcher	9,687	952	612	311	205	95	0	0	0	300	-407	-106	3/15-6/1 12/1-2/20	2 in 3* yearly	200 C	5/1-6/1	324	195	0	0	0	519
6333 Pinyon Ridge	15,511	1,170	700	680	379	711	21	2	0	1,113	-321	-291	3/15-6/1	yearly	175 C	6/1-6/30	576	975	25	3	0	1,579
6627 Ryan Draw	1,229	3,460	60	60	41	79	20	0	0	140	-21	-21	3/20-6/15	yearly	100 C	6/15-6/30	44	80	23	0	0	147
Total	33,524	5,853	1,587	1,213	779	960	41	2	0	1,782							1,185	1,367	48	3	0	2,603
Cattle Spring/Summer																						
6613 Upper Smith Gulch	8,657	2,776	898	629	376	609	29	0	0	1,014	-525	-253	4/15-6/15	yearly	614 C	6/15-7/15	585	747	34	0	0	1,366
Total	8,657	2,776	898	629	376	609	29	0	0	1,014							585	747	34	0	0	1,366
Cattle Spring/Summer/Fall																						
6301 Cottonwood Draw	2,518	3,463	301	302	199	92	0	0	0	291	-102	-103	4/10-6/20	yearly	285 C	6/20-10/30	199	118	0	0	0	317
6607 N Fork Price Crk	750	441	90	50	47	73	14	0	0	134	-43	-3	4/5-6/25	yearly*	36 C	6/25-10/14	47	73	14	0	0	134
6623 Anderson Individual	877	3,380	6	6	34	86	0	0	0	120	+28	+28	3/20-6/15	yearly	100 C	6/15-10/30	36	92	0	0	0	128
6624 Willow Springs	750	3,353	108	108	51	63	37	0	0	151	-57	-57	3/20-6/15	yearly	180 C	6/15-10/30	54	64	42	0	0	160
Total	4,895	10,637	505	466	331	314	51	0	0	696							336	347	56	0	0	739
Cattle Spring/Summer/Fall/Winter																						
6354 E. Douglas Creek	45,848	2,086	2,354	2,354	1,195	536	160	0	0	1,891	-1,129	-1,129	3/20-6/15 6/15-7/15	yearly 1 in 2	275 C	6/15-3/20	1,646	979	418	0	0	3,043
6357 Evacuation Creek	54,668	8,262	3,904	3,216	1,432	1,040	71	0	0	2,543	-2,472	-1,784	3/15-6/15 6/15-7/15	yearly 1 in 2	584 C	6/15-3/20	2,563	2,285	286	0	0	5,134
6605 Keystone	27,871	1,690	3,859	3,089	1,480	2,241	154	4	0	3,879	-2,379	-1,609	3/15-6/15 6/15-7/1	yearly 1 in 2	451 C	6/15-3/15	2,296	2,827	269	6	0	5,398
Total	128,387	12,038	10,117	8,659	4,107	3,817	385	4	0	8,313							6,505	6,091	973	6	0	13,575
Cattle Summer																						
6001 Puckett Gulch	1,040	3,216	21	21	44	63	6	0	0	113	+23	+23	3/20-7/1	yearly*	140 C	7/1-9/30	44	78	6	0	0	128
6003 Wood Road Gulch	1,669	450	143	84	15	107	4	0	0	126	-128	-69	3/20-7/1	yearly	129 C	7/1-7/30	23	131	4	0	0	158
6011 Thirteen Mile	7,367	672	1,020	896	152	442	27	0	0	621	-868	-744	4/10-7/1	yearly	147 C	7/1-9/30	185	506	34	0	0	725
6303 Mud Springs Draw	549	2,160	40	40	39	19	0	0	0	58	-1	-1	4/10-6/30	yearly	80 C	7/1-9/20	39	26	0	0	0	65
6325 Bear Valley	1,019	1,800	112	102	36	85	0	0	0	121	-76	-66	4/10-7/15	yearly	125 C	8/12-9/30	42	108	0	0	0	150
6610 Gower Gulch	1,903	740	502	328	89	154	43	0	0	286	-413	-239	4/15-7/15	yearly	85 C	7/15-9/30	92	156	47	0	0	295
6616 Goff Camp Gulch	2,074	864	1,025	572	114	194	47	0	0	355	-911	-458	4/5-7/15	yearly	149 C	7/15-9/30	116	196	52	0	0	364
6617 Cave Gulch	1,675	872	1,050	585	167	97	55	0	0	319	-883	-418	4/5-7/15	yearly	40 C	7/15-9/30	196	114	63	0	0	373
6618 Cabin Gulch	905	2,607	95	95	33	59	21	0	0	113	-62	-62	4/5-7/15	yearly	222 C	7/15-9/30	33	62	25	0	0	120
6619 Villa Individual	620	2,903	63	63	18	44	4	0	0	66	-45	-45	4/5-7/1	yearly	82 C	7/1-7/16	18	51	5	0	0	74
6811 Moore, W C	40	1,760	11	11	7	3	0	0	0	10	-4	-4	3/1-7/1	yearly	325 C	7/1-8/3	7	4	0	0	0	11
6816 Bar Bell Ranch	1,266	5,600	317	317	190	82	44	0	0	316	-127	-127	3/1-7/1	yearly	400 C	7/1-9/30	190	116	61	0	0	367
Total	20,127	23,644	4,399	3,114	904	1,349	251	0	0	2,504							985	1,548	297	0	0	2,830
Cattle Summer/Fall																						
6007 Main Dry Fork	9,705	1,440	1,536	1,536	757	637	23	0	0	1,417	-779	-779	4/10-7/1	yearly*	384 C	7/1-10/30	1,003	1,354	89	0	0	2,446
6009 Hyberger	1,873	0	390	391	88	73	10	0	0	171	-302	-303	4/10-7/15	yearly	71 C	7/15-10/30	119	109	17	0	0	245
6010 Little Rancho	1,330	800	260	260	97	50	6	0	0	153	-163	-163	4/10-7/15	yearly*	52 C	7/15-10/30	146	110	15	0	0	271
6022 Davis Canyon	906	626	195	195	31	46	6	0	0	83	-164	-164	4/20-7/15	yearly	62 C	7/15-10/30	80	69	16	0	0	165
6024 Fawn Creek	20,978	13,470	2,465	2,461	657	1,201	47	0	0	1,905	-1,808	-1,804	4/20-7/1	yearly	955 C	7/1-11/15	1,190	1,577	82	0	0	2,849
6025 Skinner Ridge	1,539	1,687	286	284	172	63	4	0	0	239	-114	-112	3/15-7/25	yearly	497 C	7/25-10/30	172	71	5	0	0	592

TABLE B-4
PROPOSED VEGETATION ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE USES

Allotment No.	Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Actual Livestock Use 2/ (AUMs)	Initial Vegetation Allocation 3/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Present vs. Proposed Livestock Use (AUMs) Authorized	Actual	Minimum Rest Requirement Period	(Yrs.) Cycle	No. & Kind of Livestock	Maximum Period of Use	Projected Vegetation Allocation (AUMs) Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
Cattle Summer/Fall (Continued)																							
6031	Duck Creek	21,859	1,359	1,490	1,488	920	1;143	29	0	0	2,092	-570	-568	3/15-7/15	yearly	348 C	7/15-11/15	1,203	1,388	40	0	0	2,631
6032	Spring Creek	38,884	2,177	4,567	4,570	1,366	692	93	0	0	2,151	-3,201	-3,204	3/15-7/15	yearly	737 C	7/15-11/15	2,064	1,202	135	0	0	3,401
6033	E. Fork Spgs. Crk	2,927	960	321	322	139	56	0	0	0	195	-182	-183	4/20-7/15	yearly	100 C	7/15-10/15	159	69	0	0	0	228
6040	Upper Fletcher	6,250	1,270	680	513	335	176	0	0	0	676	-345	-178	4/20-7/15	yearly	140 C	7/15-10/30	391	207	0	0	0	598
6302	Roundtop	7,162	3,365	845	800	358	222	2	0	0	582	-487	-442	4/20-7/15	yearly	260 C	7/15-11/7	501	327	5	0	0	833
6304	Basin Springs	6,225	6,740	1,562	1,350	467	319	31	0	0	817	-1,095	-883	4/1-7/15	yearly	520 C	7/14-10/14	690	549	43	0	0	1,282
6305	Martha's Hole	3,871	1,220	323	227	139	117	0	0	0	256	-184	-88	4/10-7/15	yearly	135 C	7/15-10/15	187	179	0	0	0	366
6306	Turner Creek	3,749	1,040	389	388	142	115	0	0	0	257	-247	-246	4/10-7/15	yearly	84 C	7/15-10/30	474	381	0	0	0	855
6337	Cathedral Bluffs	76,943	11,200	5,071	5,071	1,449	1,224	71	0	990	3,734	-3,622	-3,622	3/20-7/1	yearly	1,200 C	7/1-10/15	2,343	2,239	234	0	1,815	6,631
														10/15-11/15	yearly								
6359	E. Evacuation Crk	6,250	2,951	488	488	293	231	13	0	0	537	-195	-195	3/15-7/25	yearly	497 C	7/25-10/30	293	284	15	0	0	592
6361	Foundation Creek	9,703	920	297	295	191	251	103	0	0	545	-106	-104	3/25-7/1	yearly	129 C	7/1-10/30	310	364	168	0	0	842
6614	West Strawberry	390	720	336	71	23	12	2	0	0	37	-313	-48	4/15-7/1	yearly*	56 C	7/1-10/30	23	13	2	0	0	38
6615	Strawberry Peak	900	2,679	60	32	40	43	4	0	0	87	-20	+8	4/15-7/10	yearly	50 C	7/0-10/30	40	46	4	0	0	90
6620	Jordan Gulch	6,350	1,248	413	413	223	433	24	0	0	680	-190	-190	4/15-7/15	yearly	123 C	7/15-10/15	320	519	32	0	0	871
6626	Isolated Tract	450	0	35	35	26	18	8	0	0	52	-9	-9	3/20-7/15	yearly	72 C	7/15-10/15	26	23	8	0	0	57
6807	Sheridan, F & I	993	4,500	332	332	199	39	62	0	0	300	-133	-133	3/1-7/1	yearly	260 C	7/1-11/15	199	54	97	0	0	350
6809	Rienau, B	240	886	60	60	36	11	15	0	0	62	-24	-24	3/1-7/1	yearly	40 C	7/1-7/19	36	15	21	0	0	72
																	10/1-10/15						
6810	Kritsas	614	2,160	154	154	92	46	10	0	0	148	-62	-62	3/1-7/1	yearly	30 C	7/1-10/30	92	51	30	0	0	173
6814	Smith, C F	341	400	138	138	83	14	23	0	0	120	-55	-55	3/1-7/1	yearly	43 C	7/1-10/30	83	21	38	0	0	142
6817	Wheeler & Phillips	919	5,451	409	409	245	37	13	0	0	295	-164	-164	3/1-7/1	yearly	400 C	7/1-10/25	245	77	29	0	0	351
6818	Dodo, J	120	6,100	44	44	26	5	3	0	0	34	-18	-18	3/1-7/1	yearly	100 C	7/1-11/8	26	9	6	0	0	41
6821	Wilber, G	760	4,680	288	288	173	233	134	0	0	540	-115	-115	3/1-7/1	yearly	250 C	7/1-10/30	173	265	148	0	0	586
6823	Raley, R	120	1,200	30	30	18	9	4	0	0	31	-12	-12	3/1-7/1	yearly	30 C	7/1-10/26	18	12	6	0	0	36
6824	Amick	758	6,000	253	252	152	68	47	0	0	267	-101	-100	3/1-7/1	yearly	100 C	9/1-10/30	152	93	63	0	0	308
6826	Barney	40	750	7	7	4	4	2	0	0	10	-3	-3	3/1-7/1	yearly	5 C	7/1-10/30	4	4	3	0	0	11
6827	Dorrell, C	197	1,300	33	33	20	22	15	0	0	57	-13	-13	3/1-7/1	yearly	50 C	7/1-10/30	20	25	17	0	0	62
6828	Sprod, R	320	1,570	107	107	64	27	6	0	0	97	-43	-43	3/1-7/1	yearly	50 C	7/1-10/18	64	40	10	0	0	114
	Total	233,666	90,869	23,864	23,044	9,025	7,637	810	0	990	18,462							12,846	11,746	1,378	0	1,815	27,785
Cattle Summer/Fall/Winter																							
6002	Pine Knot Gulch	1,035	1,429	96	98	45	63	2	0	0	110	-51	-53	3/20-7/1	yearly*	54 C	9/1-11/30	45	78	2	0	0	125
6012	Fourteen Mile	3,066	1,483	850	773	217	203	16	0	0	436	-633	-566	4/10-7/1	yearly	100 C	7/1-11/30	265	229	23	0	0	517
6029	Black Sulphur	18,750	15,978	1,921	1,916	1,059	1,034	15	0	0	2,108	-862	-857	3/20-7/15	yearly	755 C	7/15-12/15	1,264	1,302	23	0	0	2,589
6030	Yellow Creek	72,485	4,180	3,618	3,118	1,754	4,712	51	0	1,530	8,047	-1,864	-1,364	3/15-7/1	yearly	400 C	7/1-1/30	3,829	6,075	94	0	2,580	12,578
6367	Cathedral Creek	9,910	2,490	1,470	1,384	263	329	21	0	0	613	-1,207	-1,121	4/1-7/15	yearly	186 C	7/15-12/31	453	509	56	0	0	1,018
6608	S. Fork Price Crk	2,266	2,843	156	189	148	117	26	0	0	291	-8	-41	4/15-7/1	yearly	200 C	7/1-11/30	151	119	28	0	0	298
6625	Smith-Crawford	12,114	11,616	2,808	2,214	645	1,191	224	0	0	2,060	-2,163	-1,569	3/20-7/1	yearly	367 C	7/1-9/30	924	1,339	314	0	0	2,577
														7/1-8/15	1 in 2*	487 C	10/1-11/15						
														10/1-12/15	1 in 2	137 C	11/15-12/15						
6825	LaGrange, R	680	800	248	248	149	63	6	0	0	218	-99	-99	3/1-7/1	yearly	40 C	7/1-11/20	149	99	9	0	0	257
	Total	120,306	40,819	11,167	9,940	4,280	7,712	361	0	1,530	13,883							7,080	9,750	549	0	2,580	19,959
Cattle Fall/Winter																							
6028	Hatch Gulch	8,583	1,310	760	762	279	652	0	0	0	931	-481	-483	3/25-6/15	yearly*	300 C	11/1-1/30	408	830	0	0	0	1,238
														11/1-1/30	1 in 2								
6322	Skull Creek	8,724	6,528	911	744	286	204	0	0	0	490	-625	-458	4/1-6/20	yearly	105 C	11/1-2/28	340	347	0	0	0	687
6600	McAndrews Gulch	12,785	1,260	1,630	1,543	393	927	20	17	0	1,357	-1,237	-1,150	3/15-6/1	yearly	441 C	11/2-3/15	942	1,221	46	26	0	2,235
6602	River	860	106	45	45	30	86	0	0	0	116	-15	-15	3/15-6/1	yearly*	54 C	11/1-11/30	30	86	0	0	0	116
6622	Windy Gulch	2,367	40	138	50	89	198	0	0	0	287	-49	+39	3/20-6/15	yearly	25 C	11/10-1/20	152	256	0	0	0	408
	Total	33,319	9,244	3,484	3,144	1,077	2,067	20	17	0	3,181							1,872	2,740	46	26	0	4,684
Cattle Winter																							
6329	Winter Valley Gulch	1,630	320	200	200	86	4	21	0	0	111	-114	-114	3/20-6/20	yearly	287 C	12/1-12/31	110	21	48	0	0	179
6334	Coal Reef	3,837	450	357	355	195	8	0	1	0	204	-162	-160	3/15-6/1	yearly*	357 C	12/1-12/31	245	27	0	6	0	278
6621	Lower Smith Gulch	8,570	130	391	402	185	790	0	0	0	975	-206	-217	3/20-6/15	yearly	224 C	11/16-1/25	349	942	0	0	0	1,291
														10/1-2/28	1 in 2								
	Total	14,037	900	948	957	466	802	21	1	0	1,290							704	990	48	6	0	1,748

TABLE B-4
PROPOSED VEGETATION ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE USES

Allotment No. Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Actual Livestock Use 2/ (AUMs)	Initial Vegetation Allocation 3/ Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Present vs. Proposed Livestock Use (AUMs) Authorized	Actual	Minimum Rest Requirement Period	(Yrs.) Cycle	No. & Kind of Livestock	Maximum Period of Use	Projected Vegetation Allocation (AUMs) Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
Sheep Spring/Winter																						
6310 Bonanza	1,549	600	122	122	46	12	0	0	0	58	-76	-76	4/1-7/15	yearly*	1,430 S	12/1-3/31	46	12	0	0	0	58
6311 Stateline	3,310	4,122	425	425	81	7	0	0	0	88	-344	-344	4/1-7/15	yearly	2,205 S	12/1-3/31	81	9	0	0	0	90
Total	4,859	4,722	547	547	127	19	0	0	0	146							127	21	0	0	0	148
Sheep Spring/Summer/Fall/Winter																						
6802 Livingston, L	497	1,630	125	125	75	19	34	0	0	128	-50	-50	3/1-7/1	yearly	2,800 S	7/1-6/15 9/15-10/14	75	29	49	0	0	153
Total	497	1,630	125	125	75	19	34	0	0	128							75	29	49	0	0	153
Sheep Summer																						
6806 Rosenlund	872	2,080	174	174	118	27	47	0	0	192	-56	-56	3/1-7/1	yearly	800 S	7/1-9/30	118	39	63	0	0	220
6833 Jewell et al.	280	480	124	124	74	19	6	0	0	99	-50	-50	3/1-7/1	yearly	400 S	7/1-7/31	74	35	10	0	0	119
Total	1,152	2,560	298	298	192	46	53	0	0	291							192	74	73	0	0	339
Sheep Summer/Fall																						
6016 Davis Creek	4,583	1,712	546	378	216	275	22	0	0	513	-330	-162	4/20-7/15	yearly	2,200 S	9/16-11/15	284	371	37	0	0	692
6017 Coyote-Schutte	6,551	410	578	561	271	351	25	0	0	647	-307	-290	4/20-7/15	yearly	1,200 S	9/15-11/14	342	487	28	0	0	857
6609 Chokecherry	1,423	2,303	262	186	97	138	24	0	0	259	-165	-89	4/15-7/1	yearly	670 S	7/1-10/30	97	168	25	0	0	290
6800 Kourlis, H	574	4,200	164	164	98	23	27	0	0	148	-66	-66	3/1-7/1	yearly	2,500 S	7/1-10/21	98	33	38	0	0	169
6804 Cook, F	450	1,760	113	113	68	18	8	0	0	94	-45	-45	3/1-7/1	yearly	500 S	7/15-11/15	68	30	14	0	0	112
6805 Theos, M	95	4,440	24	24	14	2	8	0	0	24	-10	-10	3/1-7/1	yearly	2,250 S	7/1-10/15	14	3	11	0	0	28
6812 Theos, T	566	9,000	178	178	107	23	50	0	0	180	-71	-71	3/1-7/1	yearly	2,600 S	7/1-11/15	107	33	68	0	0	208
6830 Jensen, W	929	2,400	310	310	186	145	19	0	0	350	-124	-124	3/1-7/1	yearly	1,400 S	7/1-10/30	186	189	25	0	0	400
6831 Jolley, H	2,240	6,560	815	810	489	284	46	0	0	819	-326	-321	3/1-7/1	yearly	2,000 S	9/1-11/15	489	399	61	0	0	949
6836 Wilcoxson, F	200	1,120	27	27	16	87	4	0	0	107	-11	-11	3/1-7/1	yearly	255 S	7/1-10/24	16	91	4	0	0	111
6837 Halandras	347	675	122	122	73	28	6	0	0	107	-49	-49	3/1-7/1	yearly	122 S	7/1-10/19	73	44	10	0	0	127
Total	17,958	34,580	3,139	2,873	1,635	1,374	239	0	0	3,248							1,774	1,848	321	0	0	3,943
Sheep Summer/Fall/Winter																						
6801 Jensen, H	369	6,000	124	128	74	14	31	0	0	119	-52	-54	3/1-7/1	yearly	1,400 S	7/1-12/6	74	24	46	0	0	144
6803 Zingheim & Jones	790	2,840	221	221	132	21	46	0	0	199	-89	-89	3/1-7/1	yearly	1,000 S	7/1-11/16	132	35	76	0	0	243
6813 Theos, N	1,543	6,844	565	563	339	63	124	0	0	526	-226	-224	3/1-7/1	yearly	2,600 S	7/1-11/23	339	93	184	0	0	616
6829 Seeley, D & J	3,310	2,282	678	677	407	467	120	0	0	994	-271	-270	3/1-7/1	yearly	1,000 S	7/1-11/18	407	555	140	0	0	1,102
6832 Mace Cox et al.	520	3,600	190	190	114	138	8	0	0	260	-76	-76	3/1-7/1	yearly	1,000 S	7/1-11/24	114	164	12	0	0	290
6834 Robinson, J	640	6,397	285	283	171	96	15	0	0	282	-114	-112	3/1-7/1	yearly	1,000 S	9/15-11/16	171	134	23	0	0	328
Total	7,172	27,963	2,063	2,062	1,237	799	344	0	0	2,380							1,237	1,005	481	0	0	2,723
Sheep Fall/Winter																						
6015 Gordon Gulch	2,660	1,387	150	150	81	190	14	0	0	285	-69	-69	4/10-7/15	yearly	500 S	10/1-10/30	122	289	22	0	0	433
6021 Naval Oil Shale	2,786	0	300	300	195	106	8	0	0	309	-105	-105	4/20-7/1	yearly	1,000 S	10/1-10/30	217	172	15	0	0	404
6326 Elk Springs	19,673	7,140	2,607	1,512	937	365	119	7	0	1,428	-1,670	-575	3/6-6/20	yearly	1,300 S	11/10-3/6	1,238	1,071	244	39	0	2,592
6604 West Shutta	2,319	130	384	384	230	190	0	0	0	420	-154	-154	3/15-6/1	yearly	800 S	11/1-12/21	239	230	0	0	0	469
Total	27,438	8,657	3,441	2,346	1,443	851	141	7	0	2,442							1,816	1,762	281	39	0	3,898
Sheep Winter																						
6014 Lower Fourteen	2,910	721	150	150	122	219	12	0	0	353	-28	-28	4/10-7/15	yearly	500 S	11/16-12/15	138	256	15	0	0	409
6042 Boise Draw	8,246	577	1,023	899	499	91	0	0	116	706	-524	-400	3/16-6/1	yearly	1,900 S	11/10-12/10	669	201	0	0	0	870
6308 Artesia	41,364	2,700	5,208	3,712	1,436	306	4	78	0	1,824	-3,772	-2,276	3/15-6/1	yearly	1,635 S	12/1-3/1	1,789	811	15	369	0	2,984

TABLE B-4
PROPOSED VEGETATION ALLOCATION AND GRAZING MANAGEMENT
ALTERNATIVE E - EMPHASIS ON OTHER RESOURCE USES

Allotment No.	Name	Acres Public Land	Acres Other Ownership 1/	Present Authorized Livestock Use (AUMs)	Actual Livestock Use 2/ (AUMs)	Initial Vegetation Allocation 3/: Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)	Change in Present vs. Proposed Livestock Use (AUMs): Authorized	Actual	Minimum Rest Requirement: Period	(Yrs.) Cycle	No. & Kind of Livestock	Maximum Period of Use	Projected Vegetation Allocation (AUMs) 4/: Livestock (AUMs)	Deer (AUMs)	Elk (AUMs)	Antelope (AUMs)	Wild Horses (AUMs)	Total (AUMs)
Sheep Winter (Continued)																							
6312	Raven Ridge	8,466	1,860	1,124	340	215	19	0	0	0	234	-909	-125	3/15-6/1	yearly	1,250 S	12/1-3/15	323	252	0	0	0	575
6313	Coal Oil	4,456	3,500	315	164	145	8	0	0	0	153	-170	-19	3/5-6/1	yearly	1,500 S	12/1-3/5	145	8	0	0	0	153
6314	Raven Park	16,522	7,680	1,946	763	333	23	0	4	0	360	-1,613	-430	3/5-6/1	yearly	2,000 S	12/1-3/5	481	253	0	65	0	799
6316	Spooky Mountain	31,082	3,230	3,249	2,465	888	46	0	49	0	983	-2,361	-1,577	3/15-6/1	yearly	2,500 S	11/23-3/15	1,222	276	0	453	0	1,951
6320	Red Wash	8,724	80	1,099	880	268	17	0	6	0	291	-831	-612	3/15-6/1	yearly*	2,000 S	1/25-3/15	486	245	0	170	0	901
6321	Rock Wall Draw	1,160	2,280	85	43	41	1	0	1	0	43	-44	-2	3/15-6/1	yearly*	106 S	12/1-3/5	41	1	0	1	0	43
6324	Massadona	8,478	2,810	1,291	800	508	19	0	5	0	532	-783	-192	3/5-6/1	yearly	1,800 S	12/1-3/5	766	169	0	88	0	1,023
6330	Upper Coal Crk	5,355	1,665	880	417	349	12	17	4	0	382	-531	-68	3/15-6/1	yearly	2,000 S	1/18-3/15	390	50	50	31	0	521
6331	Baking Powder	3,640	430	600	491	105	8	2	4	0	119	-495	-386	3/15-6/1	yearly*	1,950 S	12/9-1/24	107	10	3	6	0	126
6332	Horse Draw	11,690	1,000	1,522	1,269	455	26	4	12	0	497	-1,067	-814	3/15-6/1	yearly	1,600 S	12/10-3/15	474	43	5	30	0	552
6335	Hall Draw	9,070	720	758	451	304	18	0	1	0	323	-454	-147	3/5-6/1	yearly	2,200 S	12/1-12/31	448	141	0	14	0	603
6338	Johnson-Trujillo	21,798	925	3,221	1,519	633	107	0	0	0	740	-2,588	-886	3/15-6/10	yearly	2,150 S	12/12-3/15	912	723	0	0	0	1,635
6340	Shavetail	7,389	860	1,441	802	194	72	0	0	0	266	-1,247	-608	3/15-6/10	yearly	3,840 S	11/20-1/20	337	377	0	0	0	714
6341	Banta	630	170	24	24	11	27	0	0	0	38	-13	-13	3/20-6/10	yearly*	40 S	11/30-3/20	20	47	0	0	0	67
6342	Douglas Creek	5,518	0	1,225	628	263	46	0	0	0	309	-962	-365	3/20-6/10	yearly	2,500 S	12/1-1/8	309	153	0	0	0	462
6343	Gilsonite	24,180	252	1,934	1,723	1,151	340	0	0	0	1,491	-783	-562	3/1-6/10	yearly	2,400 S	12/7-2/28	1,332	804	0	0	0	2,136
6344	Weaver Draw	1,905	59	65	64	42	20	0	0	0	62	-23	-22	3/20-6/10	yearly	2,400 S	1/1-1/10	42	25	0	0	0	67
6371	Miller Creek	2,859	942	202	202	121	0	0	3	0	124	-81	-81	3/15-6/1	yearly*	1,400 S	12/20-1/22	121	0	0	4	0	125
	Total	225,442	32,461	27,362	17,806	8,083	1,425	39	167	0	9,714							10,552	4,845	88	1,231	0	16,716
Cattle & Sheep Spring/Summer/Fall/Winter																							
6603	Little Tom's Draw	14,100	456	1,622	1,541	714	1,194	4	0	0	1,912	-908	-827	3/15-6/1	yearly	72 C 22 C 1,730 S	6/1-6/15 6/1-11/30 12/1-3/15	1,125	1,474	10	0	0	2,609
	Total	14,100	456	1,622	1,541	714	1,194	4	0	0	1,912							1,125	1,474	10	0	0	2,609
Cattle & Sheep Summer/Fall/Winter																							
6019	Cow Creek	17,144	10,994	2,083	1,647	985	775	86	0	0	1,846	-1,098	-662	4/20-7/1	yearly	499 C 3,000 S	7/1-10/30 9/16-11/20	1,225	933	123	0	0	2,281
6808	Russell, J	1,360	2,400	303	303	182	90	72	0	0	344	-121	-121	3/1-7/1	yearly	104 C 200 S	7/1-12/31	182	120	90	0	0	392
	Total	18,504	13,394	2,386	1,950	1,167	865	158	0	0	2,190							1,407	1,053	213	0	0	2,673
Cattle & Sheep Summer/Fall																							
6835	Woodward, T	1,080	840	360	360	216	11	19	0	0	246	-144	-144	3/1-7/1	yearly	1,500 S 200 C	7/1-10/30 7/1-10/30	216	32	56	0	0	304
	Total	1,080	840	360	360	216	11	19	0	0	246							216	32	56	0	0	304
Horse Summer/Fall																							
6815	Lennon, D	149	160	25	25	15	6	4	0	0	25	-10	-10	3/1-7/1	yearly	30 H	7/1-10/27	15	8	6	0	0	29
	Total	149	160	25	25	15	6	4	0	0	25							15	8	6	0	0	29
Unallotted		3,240	--	0	0	0	540	540	0	0	1,080							0	540	540	0	0	1,080
Stock Driveways		9,600	--	3,750	3,750	3,750	0	0	0	0	3,750							3,750	0	0	0	0	3,750
Grand Total		1,521,806	467,503	159,734	136,028	64,742	59,577	4,745	199	4,200	133,463							88,845	87,861	7,607	1,347	6,750	192,410

1/ Includes private and state land within the allotment
2/ Actual livestock use = Average active licensed livestock use
3/ Initial vegetation allocation = Short term (8 year implementation period)
4/ Projected vegetation allocation = Long term (12 years after implementation)

APPENDIX C

VEGETATION ALLOCATION AND PRODUCTION

Vegetation Allocation and Production

APPENDIX C

Vegetation Allocation and Production

VEGETATION PRODUCTION

Estimates of livestock forage production were compiled from ocular reconnaissance range surveys conducted from 1941 to 1973. Sampling methodology was based on BLM Manual 4412 guidelines. The following procedures were used to determine livestock forage production for the White River EIS area.

Range survey data was used as originally recorded with the exception of proper use factors (PUF), which have since been updated. 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 range condition. Revision of PUF values was based on professional judgement and current literature. Revision of these values necessarily required recalculations to determine new grazing capacities. Proper use factors varied depending upon period of use and kind of livestock.

The proper use factors used in estimating current livestock grazing capacities were based upon continuous livestock grazing use during the existing authorized use periods. The changes proposed in the various alternatives, especially changes in the period of use as influenced by scheduled rest periods, would alter existing use periods and use patterns and would require recalculation of the livestock grazing capacities after development of allotment management plans and grazing systems.

The basic information provided by each transect summary was vegetation composition. The transect involves determining existence of vegetation at 100 points along a line. If a species occurs at 25 points along the transect line, then that species represents 25 percent of the vegetation composition.

Values and terminology, other than PUFs used in calculating grazing capacities, are shown on Form 4412-1 (Example 1). In Example 1, average density is the percent of vegetation cover occurring along the transect line. The forage acre factor (FAF) represents the percent of the total area that is covered with usable forage in the transect area. The utilization factor represents the percent of the area usable by a particular kind of livestock. The forage acre requirement (FAR) is that portion of an acre covered with sufficient forage to sustain one cow and calf or their equivalent for one month. Calculations using these various values are shown at the bottom of Form 4412-1 in Example 1. The final product of the calculations is a grazing capacity rate (Ac/AUM) which is the number of acres required to provide enough forage to sustain one cow and calf or their equivalent for one month. Transect sheets were then categorized by vegetation type and by allotment.

Soil surveys have been conducted on about 40 percent of the EIS area, on which range sites have been delineated on maps. The remaining 60 percent of the EIS area has not been surveyed and soils are grouped into soil associations. Transects by vegetation type were correlated with range sites on areas having had a soil survey, or with soil associations on areas where no range sites have been identified. Transect locations were plotted on range site maps to determine productivity of a given vegetation type occurring within a particular range site. After productivity levels of each vegetation type was determined, acreage of the vegetation type was determined and used to calculate the portion of total allotment productivity contributed by that vegetation type occurring in that particular range site. This process was carried out over the entire allotment on all vegetation types and range sites with the exception of those areas considered unsuitable for livestock grazing.

A range suitability analysis considered the interacting factors of percent slope, distance from water, erosion susceptibility, current erosion condition class, and low forage production rates to determine areas unsuitable for livestock grazing. Criteria used to identify areas that are unsuitable for livestock grazing were: (1) slopes in excess of 50 percent, (2) areas in critical erosion condition, and (3) areas which produce less than 25 pounds of air-dry useable forage per acre. Areas in excess of two miles from water were considered potentially suitable with the development of water facilities.

Estimates of future forage production were developed in the following manner. Current levels of forage production by range site were compared with potential production by range site, as defined by the Soil Conservation Service (SCS). Estimates were calculated as to what degree current forage production levels would approach SCS range site potentials, based on increased forage production in response to proposed grazing management practices, range improvements, and vegetation manipulations.

Form 4412-1
(November 1970)

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

FORAGE SURVEY TYPE WRITEUP
(OCULAR RECONNAISSANCE METHOD)

EXAMPLE 1
Writeup No. 5-15
Date 8-2-63
Aerial Photo No.

Examiner	KIND OF GRAZING ANIMAL *	SEASON OF USE	SECTIONS	TWP.	RGE.	MER.
Type 9-Pinyon Juniper	Cattle	Spring	12	2N	97W	6th
Ac/AUM 9.7		Fall				

	SPECIES	TOTAL ALLOWABLE PUF	% COMPOSITION	CATTLE PUF	COMP. X C PUF	SHEEP PUF	COMP. X S PUF	DEER PUF	COMP. X D PUF	PUF	COMP. X ___ PUF
GRASSES	Pose		11	40	.044						
	Kocr		4	30	.012						
	Brte		9	0	--						
	Sihy		6	40	.024						
	Orhy		7	20	.014						
	Elam		10	30	.030						
	Agtr		5	40	.020						
	SUBTOTAL										
FORBS	Phl		4	0	--						
	Asr		7	0	--						
	Sph		1	40	.004						
	SUBTOTAL										
SHRUBS	Jun		12	0	--						
	Artr		9	40	.036						
	Cemo		4	40	.016						
	Putr		1	40	.004						
	Gusa		4	0	--						
	Save		1	20	.002						
	SUBTOTAL										
	TOTALS		100		.206						

Av C PUF .206 × Av Den .20 = FAF .0412 × 100 % Util = Net FAF .0412 ; FAR .40 ÷ Net FAF .0412 = 9.7 Ac/AUM

Av S PUF ____ × Av Den ____ = FAF ____ × ____ % Util = Net FAF ____ ; FAR ____ ÷ Net FAF ____ = ____ Ac/AUM

Av D PUF ____ × Av Den ____ = FAF ____ × ____ % Util = Net FAF ____ ; FAR ____ ÷ Net FAF ____ = ____ Ac/AUM

Av PUF ____ × Av Den. ____ = FAF ____ × ____ % Util = Net FAF ____ ; FAR ____ ÷ Net FAF ____ = ____ Ac/AUM

Total Net FAF ____ ; FAR ____ ÷ Net FAF ____ = ____ Ac/AUM

* Livestock and major game species. *(Other game species making inappreciable use are:*

Appendix C

Table C-1 is a range survey summary of vegetation productivity by soil association on the Keystone allotment (6605). The productivity or carrying capacity rate (Ac/AUM) for soil association 6 was determined by averaging carrying capacity rates contributed by all vegetation types occurring within that soil association after all acreage unsuitable for livestock grazing had been deducted. A total of 7,909 acres were determined to be unsuitable on the Keystone allotment. The carrying capacity rate (9.7 Ac/AUM) for the pinyon-juniper vegetation type (type 9) on Form 4412-1 (Example 1) was one of the rates used to determine the average rate for soil association number 6.

TABLE C-1
ALLOTMENT SURVEY SUMMARY
LIVESTOCK FORAGE PRODUCTION FOR
KEYSTONE ALLOTMENT (6605)

Soil Association	Suitable Acres	Acres/AUM	AUMs
4	9,779	6.05	1,617
6	7,261	6.1	1,190
8	970	9.8	99
9	980	9.9	99
17	972	4.2	231
Total	19,962	7.1	3,236

After carrying capacity rates were determined for each soil association, the acres per soil association was divided by the rate to determine the AUMs of forage provided by each soil association. The sum of AUMs provided by all soil associations on the Keystone allotment is the estimated allotment carrying capacity (3,236 AUMs) for cattle.

VEGETATION ALLOCATION

Big Game and Wild Horse Forage Production

The calculation of big game forage production by allotment was based on Colorado Division of Wildlife (CDOW) estimates of big game populations in 1978, periods of use, and conversion factors to equate big game and wild horse AUMs with livestock AUMs. Table C-2 shows big game-livestock AUM equivalents.

TABLE C-2
BIG GAME AND WILD HORSE AUMS PER LIVESTOCK AUM

Species	Winter	Summer	Yearlong
Deer	6.06	4.97	--
Elk	3.07	2.72	--
Antelope	10.7	14.4	--
Wild Horse	--	--	0.8

Total big game forage demand was determined by multiplying estimated big game populations by the length of period of use on given allotments and then dividing by forage consumption equivalency ratios (Table C-2), as shown in Table C-3.

TABLE C-3
DETERMINATION OF TOTAL BIG GAME FORAGE NEEDS (AUMS)
FOR KEYSTONE ALLOTMENT (6605)

Species	Seasonal Range	Pop.	X	Period of Use	=	Big Game Unit Months	÷	Forage Consumption Equivalency Ratio	=	Total Big Game Forage Requirement (AUMs)
Deer	Winter	2,075	x	6 months	=	12,450	÷	6.06	=	2,055
	Cr. Winter	108	x	"	=	648	÷	6.06	=	107
	Summer	65	x	"	=	390	÷	4.97	=	79
Elk	Winter	57	x	"	=	342	÷	3.07	=	112
	Summer	19	x	"	=	114	÷	2.72	=	42
Ante.	Winter	5	x	"	=	30	÷	10.7	=	3
	Summer	1	x	"	=	6	÷	14.4	=	1

The number of livestock AUMs (range survey results) used by big game (competitive AUMs) was estimated for each allotment by multiplying total big game forage consumption - AUMs (Table C-3), by percent range suitability and percent dietary overlap between big game species and kind of livestock (Table C-5). The seasonal dietary preferences (derived from various literature sources) shown in Table C-4 were used in estimating big game-livestock dietary overlaps. Cattle and wild horses were assigned a 70 percent yearlong dietary overlap based on several locally conducted studies (on file in BLM White River Resource Area office).

TABLE C-4
SEASONAL DIETARY PREFERENCE (%) FOR WILDLIFE AND LIVESTOCK 1/

	PERIOD OF USE											
	SPRING			SUMMER			FALL			WINTER		
Species	Grass	Forb	Shrub	Grass	Forb	Shrub	Grass	Forb	Shrub	Grass	Forb	Shrub
Mule Deer	23	27	50	20	37	43	10	22	68	9	11	80
Elk	61	13	26	33	36	31	42	25	33	36	10	54
Antelope	17	35	48	2	38	60	4	18	78	7	1	92
Cattle	78	12	10	80	12	8	71	14	15	54	10	36
Sheep	58	22	20	37	40	23	36	27	37	37	3	60

1/ Data sources are listed in the References Cited Section

TABLE C-5
DETERMINATION OF COMPETITIVE LIVESTOCK/WILDLIFE AUMS 1/
FOR KEYSTONE ALLOTMENT (6605)

Species	Seasonal Range	Total Big Game Forage Consumption (AUMs) from Table C-3	X	% Suitable Range 2/	X	% Seasonal Dietary Overlap with livestock 3/	=	Big Game-Livestock Competitive AUMs
Deer	Winter	2,055	X	73	X	43	=	645
	Cr. Winter	107	X	40	X	43	=	19
	Summer	79	X	61	X	50	=	24
Elk	Winter	112	X	76	X	72	=	61
	Summer	42	X	64	X	70	=	19
Antelope	Winter	3	X	92	X	42	=	1
	Summer	1	X	92	X	41	=	1
	Total							770

1/ The amount of forage which can be utilized by either livestock of big game wildlife.
2/ Rangeland suitable for livestock grazing.
3/ Determined from Table C-4.

The number of AUMs used only by big game (noncompetitive AUMs) was calculated by subtracting the number range survey AUMs used by big game (competitive AUMs) from the total number of AUMs used by big game (Table C-6).

TABLE C-6
DETERMINATION OF NONCOMPETITIVE BIG GAME FORAGE (AUMS)
FOR KEYSTONE ALLOTMENT (6605)

Species	Total Big Game Forage Needs (AUMs) from Table C-3	-	Big Game-Livestock Competitive AUMs from Table C-5	=	AUMs of noncompetitive forage Big Game
Deer	2,241	-	688	=	1,690
Elk	154	-	80	=	74
Antelope	4	-	2	=	2
Total					1,629

Vegetation Allocation

Total forage production per allotment (Table C-7) was allocated by differing orders of preference among alternatives (see Section 2). In the initial allocation, big game received first preference in Alternatives A (Action Proposal), E (Emphasis on Other Resource Uses) and F (Optimize Wild Horses), since their forage requirements, based on 1978 populations, were allocated for first. Under these alternatives, livestock received the remaining available forage from the range survey results. In Alternative D (Optimization of Livestock), livestock were given first preference in the allocation, followed by big game and wild horses.

TABLE C-7
DETERMINATION OF TOTAL LIVESTOCK/BIG GAME FORAGE PRODUCTION (AUMS)
FOR KEYSTONE ALLOTMENT (6605)

Livestock Forage Production (range survey AUMs) (Table C-1)	+	Noncompetitive Big Game AUMs from Table C-6	=	Total Estimated Forage Production
3,299	+	1,629	=	4,928

In the long term, the same order of preference was applied to anticipated additional forage production resulting from improved management by the 20th year. Current browse condition and trend information and current big game populations per allotment were compared with cumulative impacts resulting from the different proposed alternatives to determine long term big game carrying capacities. Where forage production used exclusively by big game species (noncompetitive AUMs) was expected to increase (in conjunction with the competitive AUM fraction of their diets), long term big game allocations were increased to the extent of estimated forage production increases (up to a maximum 23 percent population increase for deer, 8 percent for elk, and 2 percent for antelope). On the Keystone allotment (6605) and others listed in Table 4-6, poor deer habitat conditions are expected to continue through the long term, thus, no long term increased deer population was allocated. On these allotments, competitive forage production would increase but noncompetitive AUMs would not, thus, the noncompetitive portion of their diets would limit any future population increase.

TABLE C-8
VEGETATION ALLOCATION FOR
KEYSTONE ALLOTMENT (6605)

a). INITIAL ALLOCATION (Short Term)

Big Game Allocation		=	Competitive AUMs from Table C-5	+	Noncompetive AUMs from Table C-6
Deer	2,241 AUMs	=	688 AUMs	+	1,553 AUMs
Elk	154 AUMs	=	80 AUMs	+	80 AUMs
Antelope	4 AUMs	=	2 AUMs	+	2 AUMs

Livestock Allocation		=	Livestock Forage Production (Table C-1)	-	Competitive AUMs from Table C-5
Cattle	2,466 AUMs	=	3,236 AUMs	-	770 AUMs

b). PROJECTED ALLOCATION (Long Term) 1/

Big Game Allocation		=	Competitive AUMs	+	Noncompetitive AUMs
Deer	2,241 AUMs	=	688 AUMs	+	1,553 AUMs
Elk	165 AUMs	=	85 AUMs	+	80 AUMs
Antelope	4 AUMs	=	2 AUMs	+	2 AUMs

Livestock Allocation		=	Future Livestock Forage Production	-	Competitive AUMs
Cattle	3,974 AUMs	=	4,749 AUMs	-	775 AUMs

1/ Long term deer allocations were not increased above the initial level, because long term increases in noncompetitive forage are not expected.

APPENDIX D

SOIL AND WATER RESOURCES

Soil and Water Resources

Appendix D presents the projected sheet erosion and runoff for various alternatives and existing allotment erosion conditions.

Table D-1 Sheet erosion by representative allotments for all alternatives.

Table D-2 Projected runoff by representative allotments for all alternatives.

Table D-3 Present soil erosion susceptibility for each allotment.

Table D-4 Sediment yield by representative allotments for all alternatives.

Methodology for determining sheet erosion.

Methodology for hydrologic predictions.

TABLE D-1
SHEET EROSION BY REPRESENTATIVE ALLOTMENTS 1/

			Alternative A		Alternative B		Alternative C		Alternative D		Alternative E		Alternative F	
Allotment No.	Name	Present	Action Proposal	% Change	No Action	% Change	Elimination of Livestock	% Change	Minimum Constraints on Livestock	% Change	Enhancement of Other Resources	% Change	Minimum Constraints on Wild Horses	% Change
6003	Wood Road Gulch	17	16	-8	17	0	14	-17	16	-8	14	-12	16	-8
6005	North Dry Fork	47	45	-4	47	0	42	-11	45	-4	43	-8	45	-4
6006	Little Hills	34	33	-3	35	+4	30	-10	33	-3	31	-8	33	-3
6007	Main Dry Fork	22	21	-4	29	+33	20	-9	21	-4	21	-6	21	-4
6008	Segar Gulch	30	29	-4	32	+5	27	-10	29	-4	28	-7	29	-4
6023	Piceance Mountain	32	30	-7	33	+1	28	-14	30	-7	29	-11	30	-7
6024	Fawn Creek	40	38	-4	41	+3	36	-10	38	-4	37	-7	38	-4
6030	Yellow Creek	43	40	-6	44	+1	37	-13	40	-6	39	-10	40	-6
6032	Spring Creek	27	26	-3	27	+3	24	-9	26	-3	25	-6	26	-3
6036	Greasewood	25	24	-3	26	+3	23	-9	24	-3	24	-6	24	-3
6302	Roundtop	20	19	-6	21	+6	18	-11	19	-6	18	-8	19	-6
6307	K Ranch	25	21	-16	22	-10	19	-21	21	-16	20	-19	21	-16
6308	Artesia	29	28	-5	30	+3	25	-13	28	-6	26	-10	28	-6
6312	Raven Ridge	29	28	-4	29	0	26	-9	28	-4	27	-7	28	-2
6316	Spooky Mountain	20	18	-6	20	+2	17	-11	18	-6	18	-9	18	-6
6323	Wolf Creek	21	20	-5	21	-2	19	-10	20	-5	20	-8	20	-5
6330	Upper Coal Creek	18	18	-2	18	0	16	-9	18	-2	17	-6	18	-2
6337	Cathedral Bluffs	30	29	-4	32	+4	27	-11	29	-4	28	-8	29	-4
6346	Twin Buttes	33	32	-5	34	+3	30	-11	33	-1	30	-8	33	-1
6354	E. Douglas Creek	35	35	-1	36	0	33	-7	35	-1	33	-6	35	-1
6357	Evacuation Creek	36	35	-3	39	+9	33	-9	35	-3	34	-6	35	-3
6605	Keystone	31	30	-4	33	+5	28	-11	30	-4	29	-7	30	-4
6612	Black's Gulch	32	31	-4	32	0	29	-9	31	-4	30	-7	31	-4
6621	Lower Smith Gulch	41	40	-1	44	+6	38	-8	40	-1	39	-5	40	-1
6625	Smith-Crawford	50	49	-4	54	+7	45	-11	49	-4	47	-7	49	-4
	Weighted Average	31.8	30.2	-5	32.6	+3	28.2	-11	30.4	-4	29.1	-8	30.4	-4

1/ On-site erosion in tons/acre/year from a 2 year frequency 30 minute rainfall estimated by use of the Musgrave Equation.

TABLE D-2

PROJECTED IMPACTS ON RUNOFF BY REPRESENTATIVE ALLOTMENTS 1/

Allotment No.	Name	Present	Alternative A Action Proposal	Alternative A % Change	Alternative B No Action	Alternative B % Change	Alternative C Elimination of Livestock	Alternative C % Change	Alternative D Minimum Constraints on Livestock	Alternative D % Change	Alternative E Enhancement of Other Resources	Alternative E % Change	Alternative F Minimum Constraints on Wild Horses	Alternative F % Change
6003	Wood Road Gulch	.49	.48	-1	.49	0	.46	-6	.48	-2	.47	-4	.48	-2
6005	North Dry Fork	.61	.59	-4	.61	0	.56	-8	.59	-4	.58	-6	.59	-4
6006	Little Hills	.27	.26	-4	.32	+19	.24	-12	.26	-4	.25	-8	.26	-4
6007	Main Dry Fork	.14	.13	-7	.24	+74	.11	-19	.13	-7	.12	-13	.13	-7
6008	Segar Gulch	.42	.40	-4	.54	+28	.38	-9	.41	-3	.39	-6	.41	-3
6023	Piceance Mountain	.19	.17	-10	.19	+1	.15	-20	.17	-9	.16	-15	.17	-9
6024	Fawn Creek	.40	.39	-3	.41	+1	.28	-31	.41	+1	.38	-6	.41	+1
6030	Yellow Creek	.47	.45	-5	.47	-1	.42	-11	.45	-5	.45	-6	.45	-5
6032	Spring Creek	.33	.32	-4	.35	+4	.30	-10	.32	-4	.32	-4	.32	-4
6036	Greasewood	.37	.36	-2	.38	+2	.34	-8	.36	-2	.35	-5	.36	-2
6302	Roundtop	.31	.29	-6	.33	+8	.27	-14	.29	-6	.28	-11	.29	-6
6307	K Ranch	.53	.50	-5	.54	+2	.48	-10	.50	-5	.49	-8	.50	-5
6308	Artesia	.74	.71	-4	.75	+2	.67	-8	.71	-4	.69	-7	.71	-4
6312	Raven Ridge	.89	.88	-1	.89	0	.86	-3	.88	-1	.87	-2	.88	-1
6323	Wolf Creek	.41	.39	-5	.39	-4	.37	-10	.39	-5	.38	-7	.39	-5
6330	Upper Coal Creek	.90	.89	-1	.90	0	.88	-1	.89	-1	.88	-1	.89	-1
6316	Spooky Mountain	.49	.45	-8	.50	+1	.42	-14	.45	-8	.43	-12	.45	-8
6337	Cathedral Bluffs	.72	.69	-4	.74	+2	.66	-8	.69	-4	.68	-5	.69	-4
6346	Twin Buttes	.34	.32	-6	.36	+4	.30	-12	.32	-6	.31	-10	.32	-6
6354	E. Douglas Creek	.98	.97	-1	.98	0	.95	-3	.97	-1	.96	-2	.97	-1
6357	Evacuation Creek	.34	.33	-1	.34	+1	.32	-6	.34	-1	.33	-4	.34	-1
6605	Keystone	.58	.56	-3	.60	+5	.54	-7	.56	-3	.55	-5	.56	-3
6612	Black's Gulch	.29	.28	-5	.29	0	.26	-12	.28	-5	.27	-8	.28	-5
6621	Lower Smith Gulch	.58	.57	-1	.60	+4	.54	-6	.57	-1	.56	-3	.57	-1
6625	Smith-Crawford	.44	.42	-5	.47	+7	.36	-17	.42	-5	.40	-8	.42	-5
	Weighted Averages	.45	.43	-4	.46	+3	.41	-10	.43	-4	.42	-7	.43	-4

1/ Runoff in area inches from a 50 year 24 hour event estimated by use of the Soil Conservation Service curve number method.

TABLE D-3
SOIL EROSION SUSCEPTIBILITY BY ALLOTMENT

Allotment Number	Allotment Name	Acres Public Land	Soil Erosion Susceptibility 1/ Slight (Acres)	Slight-Moderate (Acres)	Moderate (Acres)	Moderate-Severe (Acres)	Severe (Acres)
6001	Puckett Gulch	1,040	223	466	132	13	206
6002	Pine Knot Gulch	1,035	0	457	0	225	353
6003	Wood Road Gulch	1,669	0	492	107	1,070	0
6005	North Dry Fork	12,103	473	5,439	105	2,316	3,770
6006	Little Hills	53,055	1,865	40,390	9,864	0	936
6007	Main Dry Fork	9,705	2,833	2,419	3,062	111	1,280
6008	Segar Gulch	20,382	5,380	5,974	3,738	1,496	3,794
6009	Hyberger	1,873	953	136	752	0	32
6010	Little Rancho	1,330	475	718	137	0	0
6011	Thirteen Mile	7,367	1,192	3,935	1,765	0	475
6012	Fourteen Mile	3,066	330	1,771	764	0	201
6014	Lower Fourteen Mile	2,910	14	2,019	460	0	417
6015	Gordon Gulch	2,660	260	1,400	690	0	310
6016	Davis Creek	4,583	1,249	1,334	1,023	148	829
6017	Coyote-Schutte	6,551	396	2,866	2,437	0	852
6019	Cow Creek	17,144	8,781	704	7,055	141	463
6021	Naval Oil Shale	2,786	1,532	0	1,254	0	0
6022	Davis Canyon	906	498	0	408	0	0
6023	Piceance Mountain	104,585	23,417	40,696	35,413	0	5,059
6024	Fawn Creek	20,978	2,557	10,973	6,925	0	523
6025	Skinner Ridge	1,539	846	0	693	0	0
6026	Reagles	22,898	4,900	7,405	3,268	2,768	4,557
6027	Square S	70,001	13,371	24,075	6,900	11,187	14,468
6028	Hatch Gulch	8,583	1,017	2,901	387	1,990	2,288
6029	Black Sulphur	18,750	1,685	12,274	3,775	0	1,016
6030	Yellow Creek	72,485	5,509	50,069	7,039	1,881	7,987
6031	Duck Creek	21,859	3,379	11,562	3,823	0	3,095
6032	Spring Creek	38,884	6,488	19,050	4,216	353	8,777
6033	E. Fork Spring Creek	2,927	7	317	118	0	2,485
6036	Greasewood	27,810	1,793	17,545	1,132	2,723	4,617
6038	Little Spring Creek	14,877	900	6,628	699	3,197	3,453
6333	Pinyon Ridge	15,511	487	4,654	982	4,200	5,188
6334	Coal Reef	3,837	265	1,226	0	1,281	1,065
6335	Hall Draw	9,070	1,223	2,350	0	3,454	2,043
6337	Cathedral Bluffs	76,943	11,156	25,022	8,230	12,671	19,864
6338	Johnson-Trujillo	21,798	1,487	11,167	827	1,447	6,870
6340	Shavetail Gulch	7,389	715	2,947	451	662	2,614
6341	Banta	630	79	242	45	54	210
6342	Douglas Creek	5,518	0	1,966	182	221	3,149
6343	Gilsonite	24,180	1,149	9,405	0	3,958	9,668
6344	Weaver Draw	1,905	29	738	0	417	721
6346	Twin Buttes	134,602	17,952	60,966	8,767	14,903	32,014
6353	Park Canyon/Bitter Creek	15,443	5,340	2,626	3,949	1,624	1,904
6354	East Douglas Creek	45,848	9,706	12,140	6,253	8,170	9,579
6357	Evacuation Creek	54,668	13,300	19,742	8,458	3,744	9,424
6359	E. Evacuation Creek	6,250	3,438	0	2,812	0	0
6361	Foundation Creek	9,703	2,601	2,850	1,395	1,315	1,542
6367	Cathedral Creek	9,910	2,796	1,994	1,910	1,477	1,733
6371	Miller Creek	2,859	161	0	579	925	1,194
6600	McAndrews Gulch	12,785	110	2,581	1,262	3,976	4,856
6602	River	860	0	330	0	244	286
6603	Little Tom's Draw	14,100	2,065	4,602	676	3,271	3,486
6604	West Shutta	2,319	804	448	345	332	390
6605	Keystone	27,871	4,406	4,667	6,054	6,669	6,075
6607	N. Fork Price Creek	750	213	497	20	20	0
6608	S. Fork Price Creek	2,266	512	1,194	560	0	0
6609	Chokecherry	1,423	306	970	0	0	147
6610	Gower Gulch	1,903	571	1,332	0	0	0
6612	Black's Gulch	24,770	3,873	11,980	690	3,062	5,165
6613	Upper Smith Gulch	8,657	1,545	5,598	36	126	1,352
6614	West Strawberry	390	0	247	0	0	143
6039	Hammond Draw	7,097	651	4,495	172	888	891
6040	Upper Fletcher	6,250	130	933	0	0	5,187
6041	Lower Fletcher	9,687	885	5,041	190	1,889	1,682
6042	Boise Draw	8,246	936	2,379	572	1,435	2,924
6300	Cricket	2,977	2,698	0	0	0	279
6301	Cottonwood Draw	2,518	2,046	0	0	0	472
6302	Roundtop	7,162	6,337	0	0	74	751
6303	Mud Springs Draw	549	328	0	0	0	221
6304	Basin Springs	6,225	5,553	0	0	0	672
6305	Martha's Hole	3,871	3,373	0	0	267	231
6306	Turner Creek	3,749	3,749	0	0	0	0
6307	K Ranch	37,039	16,622	0	417	504	19,496

TABLE D-3
SOIL EROSION SUSCEPTIBILITY BY ALLOTMENT

Allotment Number	Allotment Name	Acres Public Land	Soil Erosion Susceptibility 1/ Slight (Acres)	Slight-Moderate (Acres)	Moderate (Acres)	Moderate-Severe (Acres)	Severe (Acres)
6308	Artesia	41,364	3,342	7,398	5,017	7,762	17,845
6310	Bonanza	1,549	503	461	302	283	0
6311	Stateline	3,310	290	1,176	0	405	1,439
6312	Raven Ridge	8,466	300	3,408	0	749	4,009
6313	Coal Oil	4,456	235	1,291	197	910	1,823
6314	Raven Park	16,522	1,388	1,751	2,127	4,916	6,340
6316	Spooky Mountain	31,082	838	7,122	2,717	7,574	12,831
6320	Red Wash	8,724	2,456	542	331	4,241	1,154
6321	Rock Wall Draw	1,160	0	0	246	297	617
6322	Skull Creek	8,724	318	0	1,195	1,003	6,208
6323	Wolf Creek	53,155	12,452	0	11,038	14,725	14,940
6324	Massadona	8,478	315	136	1,527	2,388	4,112
6325	Bear Valley	1,019	964	0	55	0	0
6326	Elk Springs	19,673	0	0	1,448	15,236	2,989
6329	Winter Valley Gulch	1,630	0	0	21	1,567	42
6330	Upper Coal Creek	5,355	0	163	1,127	1,599	2,466
6331	Baking Powder	3,640	0	0	852	1,030	1,758
6332	Horse Draw	11,690	292	0	2,564	3,521	5,313
6615	Strawberry Peak	900	69	420	29	100	282
6616	Goff Camp Gulch	2,074	453	1,358	21	0	242
6617	Cave Gulch	1,675	477	1,049	39	17	93
6618	Cabin Gulch	905	174	586	0	30	115
6619	Villa Individual	620	55	405	0	0	160
6620	Jordan Gulch	6,350	918	3,946	10	288	1,188
6621	Lower Smith Gulch	8,570	757	3,098	313	1,899	2,503
6622	Windy Gulch	2,367	46	992	20	528	781
6623	Anderson Individual	877	209	323	0	26	319
6624	Willow Springs	750	43	444	0	46	217
6625	Smith-Crawford	12,114	1,593	7,002	24	1,080	2,415
6626	Isolated Tract	450	83	303	0	0	64
6627	Ryan Draw	1,229	138	801	0	9	281
6800	Kourlis H.	574	72	370	0	11	121
6801	Jensen H.	369	72	250	0	0	47
6802	Livingston L.	497	72	331	0	0	94
6803	Zingheim & Jones	790	48	511	0	0	231
6804	Cook F.	450	135	315	0	0	0
6805	Theos M.	95	66	0	29	0	0
6806	Rosenlund B.	872	217	593	0	8	54
6807	Sheridan F. & I.	993	108	653	0	0	232
6808	Russell J.	1,360	21	593	0	310	436
6809	Rienau B.	240	0	152	0	0	88
6810	Kritsas	614	0	295	0	106	213
6811	Moore W. C.	40	0	16	0	11	13
6812	Theos T.	566	41	335	12	0	178
6813	Theos N.	1,543	535	195	360	0	453
6814	Smith C.	341	143	0	98	0	100
6815	Lennon D.	149	90	0	44	0	15
6816	Bar Bell Ranch	1,266	427	196	281	0	362
6817	Wheeler & Phillips	919	305	28	249	0	337
6818	Dodo J.	120	57	27	36	0	0
6821	Wilber G.	760	378	112	270	0	0
6823	Raley R.	120	84	0	36	0	0
6824	Amick	758	22	275	18	204	239
6825	LaGrange R.	680	188	443	0	23	26
6826	Barney	40	0	16	0	11	13
6827	Dorrell C.	197	0	76	0	56	65
6828	Sprod R.	320	40	120	12	68	80
6829	Seeley D. & J.	3,310	1,029	2,086	72	57	66
6830	Jensen W.	929	72	432	0	196	229
6831	Jolley H.	2,240	1,408	280	552	0	0
6832	Mace Cox et al	520	156	364	0	0	0
6833	Jewell et al	280	104	161	15	0	0
6834	Robinson J.	640	180	445	0	0	15
6835	Woodward T.	1,080	288	748	0	0	44
6836	Wilcoxson F.	200	60	140	0	0	0
6837	Halandras	347	104	243	0	0	0
	Total	1,508,966	257,150	536,320	197,279	186,189	332,028
	Percent	100	17	36	13	12	22

1/ Soil Erosion Susceptibility is a rating based on expected losses of surface soil when all vegetation cover, including litter is removed. The rating criteria are those used by the Soil Conservation Service, based upon soil, slope, and climate. (SL) "slight" means that little loss of soil material is expected; minor sheet or rill erosion may occur. (M) "moderate" means that some loss of surface soil material can be expected; rills, small gullies, and sheet erosion may occur. (S) "severe" means that considerable loss of surface soil material can be expected; rills, numerous small gullies, and sheet erosion can occur.

TABLE D-4
SEDIMENT YIELD BY REPRESENTATIVE ALLOTMENTS 1/

Allotment No. Name	Present 2/	Alternative A Action Proposal	% Change	Alternative B No Action	% Change	Alternative C Elimination of Livestock	% Change	Alternative D Minimum Constraints on Livestock	% Change	Alternative E Enhancement of Other Resources	% Change	Alternative F Minimum Constraints on Wild Horses	% Change
6003 Wood Road Gulch	2.82	2.60	-8	2.82	0	2.35	-17	2.60	-8	2.47	-12	2.60	-8
6005 North Dry Fork	3.00	2.87	-4	3.00	0	2.68	-11	2.87	-4	2.77	-8	2.87	-4
6006 Little Hills	2.30	2.23	-3	2.38	+4	2.08	-10	2.23	-3	2.12	-8	2.23	-3
6007 Main Dry Fork	2.11	2.03	-4	2.80	+33	1.92	-9	2.03	-4	1.98	-6	2.03	-4
6008 Segar Gulch	2.74	2.63	-4	2.88	+5	2.47	-10	2.63	-4	2.54	-7	2.63	-4
6023 Piceance Mountain	1.07	0.99	-7	1.08	+1	0.91	-14	0.99	-7	0.95	-11	0.99	-7
6024 Fawn Creek	1.21	1.16	-4	1.25	+3	1.09	-10	1.16	-4	1.12	-7	1.16	-4
6030 Yellow Creek	2.38	2.23	-6	2.40	+1	2.06	-13	2.23	-6	2.14	-10	2.23	-6
6032 Spring Creek	2.07	2.00	-3	2.13	+3	1.88	-9	2.00	-3	1.94	-6	2.00	-3
6036 Greasewood	2.38	2.30	-3	2.45	+3	2.17	-9	2.30	-3	2.24	-6	2.30	-3
6302 Roundtop	1.41	1.33	-6	1.50	+6	1.25	-11	1.33	-6	1.30	-8	1.33	-6
6307 K Ranch	1.07	0.90	-16	0.97	-10	0.84	-21	0.90	-16	0.87	-19	0.90	-16
6308 Artesia	4.23	4.03	-5	4.37	+3	3.68	-13	3.98	-6	4.67	-10	3.98	-6
6312 Raven Ridge	7.68	7.39	-4	7.68	0	7.00	-9	7.39	-4	7.18	-7	7.39	-4
6323 Wolf Creek	1.94	1.84	-5	1.94	-2	1.75	-10	1.84	-5	1.79	-8	1.84	-5
6330 Upper Coal Creek	6.60	6.45	-2	6.60	0	6.01	-9	6.45	-2	6.20	-6	6.45	-2
6316 Spooky Mountain	5.52	5.21	-6	5.64	+2	4.90	-11	5.21	-6	5.04	-9	5.21	-6
6337 Cathedral Bluffs	2.24	2.14	-4	2.33	+4	2.00	-11	2.14	-4	2.07	-8	2.14	-4
6346 Twin Buttes	2.02	1.93	-5	2.09	+3	1.80	-11	2.00	-1	1.86	-8	2.00	-1
6354 E. Douglas Creek	1.87	1.84	-1	1.88	0	1.74	-7	1.84	-1	1.75	-6	1.84	-1
6357 Evacuation Creek	2.38	2.32	-3	2.60	+9	2.17	-9	2.32	-3	2.24	-6	2.32	-3
6605 Keystone	3.75	3.59	-4	3.95	+5	4.16	-11	3.59	-4	3.47	-7	3.59	-4
6612 Black's Gulch	5.62	5.41	-4	5.62	0	5.10	-9	5.41	-4	5.24	-7	5.41	-4
6621 Lower Smith Gulch	4.05	3.99	-1	4.30	+6	3.74	-8	3.99	-1	3.86	-5	3.99	-1
6625 Smith-Crawford	1.90	1.83	-4	2.04	+7	1.69	-11	1.83	-4	1.76	-7	1.83	-4
Weighted Averages	2.39	2.28	-5	2.46	+3	2.12	-11	2.30	-4	2.19	-8	2.30	-4

1/ Sediment yield in tons/acre/year
2/ Present sediment yields are based on data developed by the Colorado Land Use Commission (1974).

APPENDIX D

SOIL AND WATER RESOURCES

METHODOLOGY FOR DETERMINING SHEET EROSION

Sheet erosion by water was estimated by using an equation developed by G. W. Musgrave. The equation was developed from measured erosion rates on plots with 10 percent slope, 72.6 foot length, and a rainfall of 1.375 inches. The equation is as follows:

$$E=FR(S/10)^{1.35}(L/72.6)^{0.35}(P/1.375)^{1.75}$$

where:

E = sheet erosion in tons/acre/year;

F = basic erosion rate of bare soil in tons/year;

R = cover factor;

S = average slope of contribution area in percent;

L = length of largest contributing meander waterway in feet;

P = maximum two-year frequency, 30-minute rainfall in inches.

The source of data: for P was from the Rainfall Frequency Atlas of the U.S.; for L was from map measurements for half the distance between major waterways by topographic regions; for S was the mean value of slopes presented in the Soil Conservation Service Range Site descriptions; for R was from an illustration in the BLM Manual Section 7317.22A converting ground cover percentage (1976-1978 vegetation inventories) to Musgrave cover factor; and for F was from another illustration from the same manual section giving the basic erosion rate from the description of the soil unit which was extracted from the White River Unit Resource Analysis (URA).

METHODOLOGY FOR HYDROLOGIC PREDICTIONS

Twenty-five allotments, representing a cross section of geographic locations, vegetative hydrologic soil, and climatic characteristics were chosen for use in predicting hydrologic impacts.

Vegetative, hydrologic soil group, and range site condition and trend information in the White River Unit Resource Analysis (URA) were used in the methodology. Acreage of each hydrologic unit was determined for each range site within a given allotment.

Each hydrologic unit was assigned a cover density using data collected during vegetation inventories for developing the URAs. Percent vegetation cover was added to percent litter cover plus half of the cover of large rock plus small rock to get the cover densities used in the Soil Conservation Service (SCS) model for predicting runoff.

Gifford and Hawkins (1976) found through literature review that there is an influence of grazing on infiltration. Ungrazed infiltration rates were statistically higher than grazed. The soil survey of Rio Blanco County listed infiltration rates by soil subgroups within mapping units. Infiltration rates for SCS range sites were calculated by the percent of each soil series within a mapping unit. Range sites were also divided by major vegetation types in each allotment. A weighted infiltration rate was calculated by allotment acres within a mapping unit. Infiltration under existing conditions, the action proposal and alternatives were based on range condition and trend data.

Gifford et al. (1975) developed linear regression equations to predict infiltration rates under light to moderate and heavy grazing.

Equation 1: $F_e 0.950+0.398F_o$

Equation 2: $F_h=0.674+0.234F_o$

Where: $F_e=$ Infiltration rate in light to moderate grazed areas; $F_h=$ Infiltration rate in heavily grazed areas; $F_o=$ Infiltration rate in lightly grazed areas or in excellent condition (assumed to be the infiltration rates taken from the soil survey for the White River area).

A curve number was derived for each unit using the equations in Table 1 where possible and Table 2 when the soil type within the unit did not coincide with the equations in Table 1. A weighted curve number was calculated for each allotment.

The Weather Bureau's Technical Paper 40, Rainfall Frequency Atlas of the United States was used to determine design storm sizes. For each representative allotment, a design storm of a 50 year, 24 hour return frequency was used.

The SCS Curve Number method (1972) was then used to determine runoff for purposes of predicting relative changes in flow (Antecedent Moisture Condition II was assumed, i.e., 0.5 to 1.5 inches of rain in the previous 5 days).

TABLE 1
CURVE NUMBERS (CN) AS A FUNCTION OF COVER DENSITY (CD)
AND INFILTRATION RATE, f (inches per hour)

Vegetative Cover	Limites of application CD (%) a/	f (in/hr) b/	Equation CN =
Juniper-Grass	none		92.4-4.8f-(0.25+0.08f)CD
Sage-Grass	none		96.0-10.5f-(0.49-0.035f)CD
Herbaceous	none		92.5-5.0f-(0.12-0.072f)CD
Oak-Aspen	none		83.4-4.25f-(0.39+0.055f)CD
Ponderosa Pine	>10%, <80%		90.0-8.0f-(0.02+0.13f)CD
Pasture or Rangeland	none	<2.13	92.06-4.26f-(0.11-0.08f)CD
	<50	>2.13	92.06-4.26f+(0.154-0.204f)CD
	>50	>2.13	113.91-14.55f-0.28CD
Annual Grass	none	<2.13	92.5-4.47f-(0.12+0.065f)CD
	<50	>2.13	95.37-5.82f+(0.019-131f)CD
	>50	>2.13	118.53-16.72f-(0.461-0.095f)CD
Forests	none	<1.13	89.0-8.24f-(0.20+0.02f)CD
	none	>1.13	102.41-14.55f-(0.20+0.02f)CD
Roads	CD=0	<2.13	92.0-4.24f
	CD=0	>2.13	98.45-7.27f

Source: Gifford, Hawkins and Williams (1975).

a/ CD = cover density in percent.
b/ f = infiltration rate in inches per hour.

TABLE 2
COEFFICIENTS FOR RUNOFF CURVE NUMBER (Y) AS A FUNCTION OF PERCENT COVER (X), AND Y = a - bX FOR VARIOUS VEGETATION TYPES AND SOIL GROUPS

Vegetation Type	Soil Group	a	b	Notes
Juniper-Grass	C	88	0.32	1/
	B	82	0.42	1/
Sage-Grass	C	86.5	0.46	1/
	B	73.5	0.415	1/
Herbaceous	D	95	0.115	1/
	C	90	0.19	1/
	B	84	0.25	1/
Oak-Aspen	C	79	0.44	1/
	B	74	0.51	1/
Desert Brush	D	93	0.06	2/ 3/
	C	80	0.06	2/ 3/
	B	84	0.06	2/ 3/
Ponderosa Pine	C	83	0.14	2/ 4/
	B	73	0.31	2/ 4/
Pasture or Rangeland	A	77	0.56	3/
	A	63	0.28	6/
	B	83	0.28	
	C	89	0.18	
	D	91	0.13	5/
Annual Grass	A	75	0.44	3/
	A	60	0.13	6/
	B	83	0.26	
	C	89	0.08	
	D	91	0.13	7/
Forests (precipitation = 25 inches)	A	50.5	0.286	
	B	71.5	0.229	
	C	81.5	0.229	
	D	87	0.21	7/
Roads	A	73	0.00	
	B	83	0.00	
	C	88.5	0.00	
	D	90.5	0.00	
Bare Rock	(N.A.)	96	0.00	7/
Water Surfaces	(N.A.)	100	0.00	8/

Note: All above curve numbers for AMC II and Io = 0.2S, cover without rocks. 1/ From Enderlin and Markowitz (1962). 2/ From Simanton, Renard and Sutter (1973). 3/ For X<50 percent. 4/ For 10 percent X<80 percent. Nonlinear relationship to Y = 92 and Y = 83, respectively at X = 0. 5/ From NEH-4 (in table form); reduced and converted to above coefficients. 6/ For X>50 percent. Note similarity between annual grass and rangeland coefficients except for Soil Group "A". 7/ From unpublished tables from USFS personnel (personal communication). 8/ Assumes (Initial Abstraction) = 0.08 inch.

The sediment yield rates for the EIS area were taken from the Sediment Yield Map for Colorado published by the Colorado Land Use Commission (1974). Most of the quantitative data used to determine these yields were compiled by the Colorado Land Use Commission from dry reservoirs or small watersheds and were considered to represent the average weight of volume sediment deposited in the reservoirs. Data for determining the sediment yields were obtained from a variety of sources:

(1) A reservoir survey made by the SCS, USGS, and the Corps of Engineers;

(2) Suspended sediment load measurements made by the USGS, USBR, and Corps of Engineers;

(3) Estimates of sediment yields taken from the Pacific Southwest Inter-Agency Committee Procedures;

(4) Geological maps; and

(5) Soils, vegetation, and land use maps prepared by SCS.

In the analysis, a worst case situation was assumed and the high end of the ranges provided by the map was used. For the different alternatives, changes in vegetation cover (broken down by range sites in each allotment) were weight averaged to derive a percent change for predicting sediment yield.

APPENDIX E

VEGETATION

Vegetation

Methodology for Determining Range Condition and Trend.

Table E-1 Present and Future Condition and Trend on Public Lands Alternative A - Action Proposal.

Table E-2 Description of Existing Riparian Vegetation within the White River Resource Area.

Table E-3 Summary of Impacts on Riparian Vegetation Resulting from Alternative A (Action Proposal) and Alternative F (Optimize Wild Horses).

Table E-4 Summary of Impacts on Riparian Vegetation Resulting from Alternative B (No Action).

Table E-5 Summary of Impacts on Riparian Vegetation Resulting from Alternative C (Elimination of Livestock Grazing).

Table E-6 Summary of Impacts on Riparian Vegetation Resulting from Alternative D (Optimize Livestock Grazing).

Table E-7 Summary of Impacts on Riparian Vegetation Resulting from Alternative E (Emphasis on Other Resource Uses).

Table E-8 Threatened and Endangered Plant Species.

APPENDIX E

VEGETATION

METHODOLOGY FOR DETERMINING PRESENT RANGE CONDITION AND TREND

Range condition is the apparent health of rangeland and trend is the direction of change in range condition. Livestock forage condition was used as the basis for determining range condition. Range condition and trend were determined from transect data taken during the inventory phases of the White River Unit Resource Analysis in 1977. Drought conditions during 1976 and 1977 were believed to have had a negative effect on basic vegetation characteristics used in determining condition and trend with trend being the most affected. These effects were considered during evaluations to eliminate potential drought-related bias.

Range Condition

Erosion condition classes and livestock forage species, classified as desirable, intermediately desirable, and undesirable, were used to determine forage condition. Many forage species evaluated in the various desirability categories are also valuable wildlife forage species. The following criteria were used in the forage classification process.

1) *Desirable plants* are those which are palatable, productive, and nutritious forage species, are 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.

2) *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. They may be less palatable to grazing animals or more resistant to grazing use.

3) *Least desirable plants* include those that are definitely the poorer species in an ecosystem and consist principally of annuals, invaders, and noxious and low-value forage plants.

Erosion condition classes were determined by computing the soil surface factor (SSF), an expression of current erosion activity rated on a numeric scale from 0-100. Seven categories of surface features are considered in the examination of an area. These features are soil movement, surface litter, surface rock, pedestals, rills, flow patterns, and gullies, and are considered and evaluated numerically (BLM Form 7310-12, "Determination of Erosion Condition Class"). The five erosion condition classes used to depict current erosion activity through numerical values assigned are: stable 0-20; slight 21-40; moderate 41-60; critical 61-80; severe 81-100.

The erosion condition classes and the above plant classifications result in the following forage condition criteria:

1.) *Good Condition*: Composition is 40 percent or more of both desirable and intermediate species with at least 20 percent made up of desirable species. Erosion condition class is slight to stable.

2.) *Fair Condition*: Composition is 15 to 39 percent of desirable and intermediate species with 5 or more percent made up of desirable species. Erosion condition class is less than critical. Also, those rangelands where the composition comprises 60 percent or more of intermediate species and less than 5 percent of desirable species, were rated fair condition when the erosion condition class is moderate to stable.

3.) *Poor Condition*: Composition is less than 15 percent desirable and intermediate species. Erosion condition class is critical to severe. (It should be noted that if the erosion condition class is critical to severe, the site is rated in poor condition regardless of the plant composition).

These criteria and professional judgement were used in classifying range condition from inventory data taken in the White River Resource Area.

Range Trend

Key plant species are the major range plants used as indicators in determining range trend. Key species are forage species which serve as indicators to the degree of use and the resultant direction of range condition. Because of their importance, key species are a prime consideration in a management program.

The vigor and reproduction of key species are the major characteristics evaluated in determination of range trend. The evaluation involves determining different levels of vigor and reproduction with a numerical value assigned to each level. Vigor of key species is assigned a value on a scale of 0 to 50 with 0 being the highest state of vigor and is characterized by robust plants of maximum height, producing an abundance of leafage, seed stalks, and shoots. Browse plants are sturdy with good leader growth. A vigor rating of 50, however, indicates that key species are rare or have recently died in substantial numbers with dead grass plants a common occurance. Browse plants in this category are decadent, with little or no leader growth and have many dead branches. Undesirable plants are prevalent.

Reproduction is rated on a 0 to 50 scale similar to that of vigor. Reproduction of key species in the 0 to 10 category is abundant with full seed heads and many key species present in the younger age classes. The 41-50 category, however, denotes reproduction of only undesirable species with no key species reproduction.

After determining the level of vigor and reproduction of the key species and assigning a numerical value to each, the values are added and the resulting number is an indication of range trend based on a predetermined scale where a rating of 0-33 is improving, 34-66 static, and 67-100 is declining.

METHODOLOGY FOR DETERMINING FUTURE RANGE CONDITION AND TREND

Future changes in range condition and trend were determined by BLM range conservationists based upon expected changes that would occur under management prescribed by each alternative. Expected changes were based on changes that have occurred on allotments in the EIS area that were under improved management, on range trend studies, inventory data gathered during 1976-1977, and professional judgement.

Comparisons were made between ranges in poor, fair, and good condition within the same vegetation type, soil type, and range site. Range trend, as influenced by species composition, plant vigor and reproduction, and soil erosion condition (SSF), together with the expected influences of the proposed grazing management (rest periods and change in grazing capacities) were used as a directional indicator of whether range condition would be expected to improve or decline over the long term.

An example of this method would be an area in poor range condition which would improve to fair condition in the long term. This change would be attributed to an existing improving trend with plant composition very near that which would characterize low fair condition range with soil erosion at less than critical levels. By meeting critical growth requirements of desirable plants and adjusting grazing capacities to meet forage production, vegetation in the area would be expected to improve enough for the area to be rated as fair condition in the long term. This is expected to occur even if the area has low site potential. If this particular area was in low poor condition with low site potential, fair condition probably would not be achieved.

Generally, areas with range condition at the lower ends of each condition class would not improve to a higher condition class except in cases under intensive management with high site potential.

Estimations of future changes in range condition as influenced by each alternative were based on the same criteria. Management under all alternatives was assumed to result in cessation of declining trends with the exception of Alternative B. Assessment under Alternative B involved predicting changes in condition class based on the direction of change (declining, static, or improving trend) occurring in the present, with the assumption that this trend would continue to occur over the long term. A change of only one condition class was expected to occur over the long term under this alternative.

TABLE E-1
PRESENT AND FUTURE CONDITION AND TREND ON PUBLIC LANDS
ALTERNATIVE A - ACTION PROPOSAL

Allotment No. Name	Condition Present Poor	Condition Present Fair	Condition Present Good	Condition Future Poor	Condition Future Fair	Condition Future Good	Trend Present Improving	Trend Present Static	Trend Present Declining	Trend Future Improving	Trend Future Static	Trend Future Declining
EXISTING INTENSIVE MANAGEMENT												
Cattle Spring/Summer/Fall												
6008 Segar Gulch	8,652	11,730	0	8,427	10,523	1,432	0	5,369	15,013	7,734	12,648	0
6300 Cricket	0	2,977	0	0	2,977	0	0	2,977	0	0	2,977	0
Total	8,652	14,707	0	8,427	13,500	1,432	0	8,346	15,013	7,734	15,625	0
Cattle Spring/Summer/Fall/Winter												
6026 Reagles	6,622	16,276	0	6,622	16,007	269	0	22,898	0	12,613	10,285	0
6027 Square S	32,062	37,939	0	32,062	37,939	0	0	70,001	0	37,099	32,902	0
6612 Black's Gulch	802	23,968	0	802	23,968	0	0	24,770	0	8,063	16,707	0
6353 Park Canyon/ Bitter Creek	5,179	10,264	0	5,179	10,264	0	0	15,443	0	0	15,443	0
Total	44,665	88,447	0	44,665	88,178	269	0	133,112	0	57,775	75,337	0
PROPOSED INTENSIVE MANAGEMENT												
Cattle Spring												
6038 Little Spring Crk.	8,264	6,613	0	8,264	6,613	0	0	9,821	5,056	479	14,398	0
6039 Hammond Draw	1,100	5,997	0	1,100	5,997	0	0	5,202	1,895	378	6,719	0
6333 Pinyon Ridge	12,344	3,167	0	12,204	3,307	0	0	15,511	0	6,380	9,131	0
6613 Upper Smith Gulch	862	7,795	0	862	7,675	120	0	8,657	0	2,891	5,766	0
Total	22,570	23,572	0	22,430	23,592	120	0	39,191	6,951	10,128	36,014	0
Cattle Spring/Summer												
6003 Wood Road Gulch	0	0	1,669	0	851	818	0	1,669	0	1,179	490	0
6011 Thirteen Mile	1,601	5,766	0	751	3,252	3,364	0	5,362	2,005	2,235	5,132	0
Total	1,601	5,766	1,669	751	4,103	4,182	0	7,031	2,005	3,414	5,622	0
Cattle Spring/Summer/Fall												
6012 Fourteen Mile	210	2,456	400	210	1,360	1,496	369	2,697	0	1,742	1,324	0
6022 Davis Canyon	45	499	362	45	46	815	0	906	0	0	906	0
6024 Fawn Creek	2,551	18,427	0	2,551	18,427	0	0	17,775	3,203	5,381	15,597	0
6030 Yellow Creek	5,003	57,177	10,305	5,003	49,083	18,399	10,305	59,215	2,965	39,426	33,059	0
6031 Duck Creek	7,081	13,888	890	3,739	16,402	1,718	0	16,994	4,865	7,043	14,816	0
6032 Spring Creek	7,751	27,363	3,770	7,751	26,089	5,044	0	28,447	10,437	21,155	17,729	0
6033 E. Fork Spring Crk.	360	2,567	0	360	2,567	0	0	2,927	0	2,120	807	0
6040 Upper Fletcher	2,416	3,834	0	2,416	3,834	0	0	4,736	1,514	0	6,250	0
6302 Roundtop	912	6,250	0	6,125	1,037	0	0	1,949	5,213	0	7,162	0
6304 Basin Springs	95	5,130	1,000	95	5,130	1,000	0	6,225	0	2,748	3,477	0
6306 Turner Creek	0	3,479	0	0	3,749	0	0	3,749	0	161	3,588	0
6361 Foundation Creek	3,896	4,511	1,296	3,573	4,834	1,296	323	7,335	2,045	949	8,754	0
6608 S. Fork Price Crk.	0	2,266	0	0	2,266	0	0	2,266	0	2,266	0	0
6620 Jordan Gulch	0	6,350	0	0	6,350	0	0	6,350	0	1,545	4,805	0
Total	30,320	154,467	18,023	31,868	141,174	29,768	10,997	161,571	30,242	84,536	118,274	0
Cattle Spring/Summer/Fall/Winter												
6006 Little Hills	5,856	47,199	0	5,856	45,846	1,353	0	42,321	10,734	14,606	38,449	0
6023 Piceance Mountain	2,735	95,098	6,752	2,735	38,874	62,976	0	103,729	856	70,479	34,106	0
6029 Black Sulphur	6,123	12,627	0	5,885	11,604	1,261	0	12,416	6,334	6,061	12,689	0
6036 Greasewood	6,972	14,838	6,000	6,365	14,336	7,109	0	24,619	3,191	13,127	14,683	0
6307 K Ranch	9,688	21,057	6,294	9,698	21,047	6,294	3,190	27,364	6,485	18,215	18,824	0
6323 Wolf Creek	21,490	22,209	9,456	20,869	20,670	11,616	4,683	44,728	3,744	9,621	43,534	0
6337 Cathedral Bluffs	39,376	34,647	2,920	38,488	22,223	16,232	0	69,175	7,768	6,248	70,695	0
6346 Twin Buttes	35,449	97,569	1,584	31,662	81,692	21,248	1,513	114,043	19,046	9,638	124,964	0
6354 E. Douglas Creek	21,500	23,905	443	21,500	17,852	6,496	0	40,928	4,920	15,408	30,440	0
6357 Evacuation Creek	15,493	36,175	3,000	13,216	27,846	13,606	2,277	47,797	4,594	6,189	48,479	0
6367 Cathedral Creek	2,855	7,055	0	2,855	7,055	0	0	3,558	6,352	2,073	7,837	0
6605 Keystone	1,878	25,993	0	1,878	22,921	3,072	0	26,233	1,638	8,745	19,126	0
6625 Smith-Crawford	4,185	7,929	0	4,110	6,231	1,773	0	10,039	2,075	1,766	10,348	0
Total	173,600	446,301	36,449	165,117	338,197	153,036	11,663	566,950	77,737	182,176	474,174	0

TABLE E- 1
PRESENT AND FUTURE CONDITION AND TREND ON PUBLIC LANDS
ALTERNATIVE A - ACTION PROPOSAL

Allotment		Condition						Trend					
		Present			Future			Present			Future		
No.	Name	Poor	Fair	Good	Poor	Fair	Good	Improving	Static	Declining	Improving	Static	Declining
Cattle Spring/Fall/Winter													
6005	North Dry Fork	7,338	4,765	0	5,936	5,013	1,154	0	12,103	0	4,518	7,585	0
6041	Lower Fletcher	3,898	5,789	0	3,878	5,309	500	0	6,529	3,158	1,812	7,875	0
6322	Skull Creek	5,845	2,529	350	5,845	2,529	350	0	8,287	437	2,442	6,282	0
6329	Winter Valley Gulch	883	747	0	826	804	0	309	1,321	0	895	735	0
6600	McAndrews Gulch	480	12,122	183	480	12,122	183	0	8,656	4,129	3,378	9,407	0
6621	Lower Smith Gulch	5,729	2,841	0	5,729	2,841	0	0	0	8,570	1,238	7,332	0
6622	Windy Gulch	1,967	400	0	1,967	400	0	0	0	2,367	0	2,367	0
	Total	26,140	29,193	533	24,661	29,018	2,187	309	36,896	18,661	14,283	41,583	0
Cattle Summer/Fall													
6007	Main Dry Fork	709	8,996	0	709	8,292	704	0	4,358	5,347	3,764	5,941	0
6009	Hyberger	301	1,572	0	301	520	1,052	0	1,127	746	414	1,459	0
6010	Little Rancho	0	1,330	0	533	247	550	0	1,330	0	247	1,083	0
6305	Martha's Hole	587	2,382	902	902	587	2,382	0	1,312	2,559	99	3,772	0
6325	Bear Valley	275	744	0	275	629	115	0	1,019	0	287	732	0
6615	Strawberry Peak	0	820	80	0	584	316	0	900	0	331	569	0
6617	Cave Gulch	200	1,277	198	200	1,277	198	0	1,675	0	330	1,345	0
6626	Isolated Tract	75	375	0	75	375	0	0	375	75	0	450	0
	Total	2,147	17,496	1,180	2,995	12,511	5,317	0	12,096	8,727	5,472	15,351	0
Cattle Fall/Winter													
6028	Hatch Gulch	2,160	6,423	0	1,970	4,837	1,776	0	8,583	0	521	8,062	0
6334	Coal Reef	3,506	331	0	2,559	1,278	0	0	3,759	78	1,085	2,752	0
	Total	5,666	6,754	0	4,529	6,115	1,776	0	12,342	78	1,606	10,814	0
Sheep Spring													
6335	Hall Draw	9,070	0	0	7,832	1,238	0	0	3,034	6,036	0	9,070	0
	Total	9,070	0	0	7,832	1,238	0	0	3,034	6,036	0	9,070	0
Sheep Spring/Fall/Winter													
6015	Gordon Gulch	250	1,074	1,336	168	506	1,986	0	2,660	0	555	2,105	0
6016	Davis Creek	600	3,563	420	600	2,332	1,651	0	4,483	100	2,993	1,590	0
6017	Coyote-Schutte	904	3,385	2,262	904	2,974	2,673	0	6,551	0	1,860	4,691	0
6021	Naval Oil Shale	0	2,786	0	0	2,786	0	0	2,786	0	0	2,786	0
6042	Boise Draw	2,412	4,666	1,168	2,413	3,585	2,248	2,193	5,541	512	2,041	6,205	0
6326	Elk Springs	10,186	9,487	0	10,163	5,513	3,997	3,737	15,936	0	8,272	11,401	0
6604	West Shutta	0	755	1,564	0	755	1,564	1,564	755	0	0	2,319	0
	Total	14,352	25,716	6,750	14,248	18,451	14,119	7,494	38,712	612	15,721	31,097	0
Sheep Spring/Winter													
6308	Artesia	17,951	22,473	940	17,951	22,473	940	0	32,278	9,086	15,638	25,726	0
6312	Raven Ridge	4,760	3,706	0	4,760	3,706	0	0	8,466	0	1,678	6,788	0
6314	Raven Park	14,074	2,448	0	12,796	3,726	0	458	16,064	0	4,172	12,350	0
6316	Spooky Mountain	20,236	10,596	250	16,186	14,646	250	0	21,738	9,344	4,706	26,376	0
6324	Massadona	1,908	6,570	0	1,908	6,570	0	0	7,251	1,227	3,799	4,679	0
6330	Upper Coal Creek	327	214	4,814	327	214	4,814	0	5,355	0	159	5,196	0
6332	Horse Draw	3,202	8,488	0	3,202	8,488	0	0	11,690	0	8,488	3,202	0
6338	Johnson-Trujillo	10,419	11,379	0	7,802	11,390	2,606	0	16,936	4,862	1,898	19,900	0
6340	Shavetail	1,856	5,533	0	1,856	5,533	0	0	7,389	0	993	6,396	0
6342	Douglas Creek	1,458	4,060	0	1,458	4,060	0	0	5,518	0	158	5,360	0
	Total	76,191	75,467	6,004	68,246	80,806	8,610	458	132,685	24,519	41,689	115,973	0
Sheep Winter													
6014	Lower Fourteen Mile	118	1,300	1,492	190	572	2,148	0	2,910	0	625	2,285	0
6320	Red Wash	8,724	0	0	4,156	4,568	0	0	8,724	0	0	8,724	0
6331	Baking Powder	0	3,531	109	0	3,531	109	0	109	3,531	109	3,531	0
6343	Gilsonite	2,657	21,523	0	2,657	11,383	10,140	0	24,180	0	2,920	21,260	0
6371	Miller Creek	796	2,063	0	796	1,629	434	0	2,386	473	1,629	1,230	0
	Total	12,295	28,417	1,601	7,799	21,683	12,831	0	38,309	4,004	5,283	37,030	0
Cattle & Sheep Spring/Summer/Fall													
6019	Cow Creek	719	12,024	4,401	719	11,744	4,681	0	17,144	0	10,229	6,915	0
	Total	719	12,024	4,401	719	11,744	4,681	0	17,144	0	10,229	6,915	0

TABLE E-1
PRESENT AND FUTURE CONDITION AND TREND ON PUBLIC LANDS
ALTERNATIVE A - ACTION PROPOSAL

Allotment	Condition						Trend					
	Present			Future			Present			Future		
No. Name	Poor	Fair	Good	Poor	Fair	Good	Improving	Static	Declining	Improving	Static	Declining
Cattle & Sheep Spring/Summer/Fall/Winter												
6603 Little Tom's Draw	5,882	7,918	300	5,662	8,138	300	0	13,600	500	300	13,800	0
Total	5,882	7,918	300	5,662	8,138	300	0	13,600	500	300	13,800	0
PROPOSED LESS INTENSIVE MANAGEMENT AREAS												
Cattle Spring												
6627 Ryan Draw	0	1,229	0	0	1,229	0	0	1,229	0	0	1,229	0
Total	0	1,229	0	0	1,229	0	0	1,229	0	0	1,229	0
Cattle Summer												
6001 Puckett Gulch	605	247	188	605	134	301	0	1,040	0	239	801	0
Total	605	247	188	605	134	301	0	1,040	0	239	801	0
Cattle Spring/Summer												
6618 Cabin Gulch	271	634	0	271	634	0	0	905	0	0	905	0
6619 Villa Individual	0	620	0	0	182	438	0	620	0	0	620	0
6811 Moore, W. C.	0	40	0	0	40	0	0	40	0	0	40	0
6816 Bar Bell Ranch	0	1,266	0	0	1,266	0	0	1,266	0	0	1,266	0
Total	271	2,560	0	271	2,122	438	0	2,831	0	0	2,831	0
Cattle Spring/Summer/Fall												
6025 Skinner Ridge	0	1,539	0	0	461	1,078	0	1,539	0	0	1,539	0
6301 Cottonwood Draw	0	2,518	0	0	2,518	0	0	2,518	0	755	1,763	0
6303 Mud Springs Draw	0	549	0	0	549	0	0	549	0	0	549	0
6607 N. Fork Price Crk.	0	750	0	0	750	0	0	0	750	0	750	0
6610 Gower Gulch	1,000	903	0	1,000	903	0	0	1,080	823	1,080	823	0
6623 Anderson Individual	0	877	0	0	787	90	0	877	0	196	681	0
6624 Willow Springs	0	750	0	0	696	54	0	750	0	0	750	0
6807 Sheridan, F. & I.	0	993	0	0	993	0	0	993	0	0	993	0
6809 Rineau, B.	0	240	0	0	240	0	0	240	0	0	240	0
6810 Kritsas	0	614	0	0	614	0	0	614	0	0	614	0
6814 Smith, C.	0	341	0	0	341	0	0	341	0	0	341	0
6817 Wheeler & Phillips	0	919	0	0	919	0	0	919	0	0	919	0
6818 Dodo, J.	0	120	0	0	120	0	0	120	0	0	120	0
6821 Wilber, G.	0	760	0	0	760	0	0	760	0	0	760	0
6823 Raley, R.	0	120	0	0	120	0	0	120	0	0	120	0
6824 Amick	0	758	0	0	758	0	0	758	0	0	758	0
6826 Barney	0	40	0	0	40	0	0	40	0	0	40	0
6827 Dorrell, C.	0	197	0	0	197	0	0	197	0	0	197	0
6828 Sprod, R.	0	320	0	0	320	0	0	320	0	0	320	0
Total	1,000	13,308	0	1,000	12,086	1,222	0	12,735	1,573	2,031	12,277	0
Cattle Spring/Summer/Fall/Winter												
6825 LaGrange, R.	0	680	0	0	680	0	0	680	0	0	680	0
Total	0	680	0	0	680	0	0	680	0	0	680	0
Cattle Summer/Fall												
6002 Pine Knot Gulch	196	839	0	196	234	605	777	258	0	839	196	0
6359 E. Evacuation Crk.	3,150	3,100	0	3,150	3,100	0	0	6,250	0	500	5,750	0
6614 West Strawberry	39	351	0	39	0	351	0	351	39	0	390	0
6616 Goff Camp Gulch	1,414	660	0	1,364	710	0	0	2,074	0	50	2,024	0
Total	4,799	4,950	0	4,749	4,044	956	777	8,933	39	1,389	8,360	0
Cattle Fall/Winter												
6602 River	503	357	0	503	357	0	0	689	171	0	860	0
Total	503	357	0	503	357	0	0	689	171	0	860	0

TABLE E-1
PRESENT AND FUTURE CONDITION AND TREND ON PUBLIC LANDS
ALTERNATIVE A - ACTION PROPOSAL

Allotment	Condition						Trend					
	Present			Future			Present			Future		
No. Name	Poor	Fair	Good	Poor	Fair	Good	Improving	Static	Declining	Improving	Static	Declining
Sheep Spring/Summer												
6806 Rosenlund, B.	0	872	0	0	872	0	0	872	0	0	872	0
6833 Jewell et al	0	280	0	0	280	0	0	280	0	0	280	0
Total	0	1,152	0	0	1,152	0	0	1,152	0	0	1,152	0
Sheep Spring/Summer/Fall												
6609 Chokecherry	0	359	1,064	0	359	1,064	0	1,423	0	359	1,064	0
6800 Kourlis, H.	0	574	0	0	574	0	0	574	0	0	574	0
6802 Livingston, L.	0	497	0	0	497	0	0	497	0	0	497	0
6803 Zingheim & Jones	0	790	0	0	790	0	0	790	0	0	790	0
6805 Theos, M.	0	95	0	0	95	0	0	95	0	0	95	0
6812 Theos, T.	0	566	0	0	566	0	0	566	0	0	566	0
6830 Jensen, W.	0	929	0	0	929	0	0	929	0	0	929	0
6831 Jolley, H.	0	2,240	0	0	2,240	0	0	2,240	0	0	2,240	0
6834 Robinson, J.	0	640	0	0	640	0	0	640	0	0	640	0
6836 Wilcoxson, F.	0	200	0	0	200	0	0	200	0	0	200	0
6837 Halandras	0	347	0	0	347	0	0	347	0	0	347	0
Total	0	7,237	1,064	0	7,237	1,064	0	8,301	0	359	7,942	0
Sheep Spring/Summer/Fall/Winter												
6801 Jensen, H.	0	369	0	0	369	0	0	369	0	0	369	0
6813 Theos, N.	0	1,543	0	0	1,543	0	0	1,543	0	0	1,543	0
6829 Seeley, D. & J.	0	3,310	0	0	3,310	0	0	3,310	0	0	3,310	0
6832 Mace Cox et al	0	520	0	0	520	0	0	520	0	0	520	0
Total	0	5,742	0	0	5,742	0	0	5,742	0	0	5,742	0
Sheep Summer/Fall												
6804 Cook, F.	0	450	0	0	450	0	0	450	0	0	450	0
Total	0	450	0	0	450	0	0	450	0	0	450	0
Sheep Spring/Winter												
6310 Bonanza	0	1,549	0	0	1,549	0	0	1,549	0	0	1,549	0
6311 Stateline	595	2,715	0	1,092	2,218	0	0	3,310	0	2,715	595	0
6313 Coal Oil	1,872	1,737	847	1,872	1,737	847	0	3,361	1,095	828	3,628	0
6341 Banta	548	82	0	367	181	82	0	339	291	0	630	0
Total	3,015	6,083	847	3,331	5,685	929	0	8,559	1,386	3,543	6,402	0
Sheep Winter												
6321 Rock Wall Draw	1,160	0	0	1,083	77	0	0	1,160	0	525	635	0
6344 Weaver Draw	832	1,073	0	832	1,073	0	0	1,905	0	53	1,852	0
Total	1,992	1,073	0	1,915	1,150	0	0	3,065	0	578	2,487	0
Cattle & Sheep Spring/Summer/Fall												
6808 Russell, J.	0	1,360	0	0	1,360	0	0	1,360	0	0	1,360	0
6835 Woodward, T.	0	1,080	0	0	1,080	0	0	1,080	0	0	1,080	0
Total	0	2,440	0	0	2,440	0	0	2,440	0	0	2,440	0
Horses Spring/Summer/Fall												
6815 Lennon, D.	0	149	0	0	149	0	0	149	0	0	149	0
Total	0	149	0	0	149	0	0	149	0	0	149	0
Unallotted	0	3,240	0	0	3,240	0	0	3,240	0	0	3,240	0
Stock Driveways	0	9,600	0	0	9,600	0	0	9,600	0	0	9,600	0
Grand Total	446,055	996,742	79,009	422,323	855,945	243,538	31,698	1,291,854	198,254	448,485	1,073,321	0

TABLE E-2
DESCRIPTION OF EXISTING RIPARIAN VEGETATION WITHIN
THE WHITE RIVER RESOURCE AREA

Allotment No.	Stream	Public Acres Riparian	Dominant Riparian Vegetation 1/	Condition/Trend 2/	Percent Ground Cover
6005/6019	Piceance Creek	5.5	TAMAR2, POA++	Fair/stable	* *
6017	Schutte Gulch	2.0	POA++, CIRSI	Poor/stable	10
6019	McCarthy Gulch	1.5	POTR5, SYMPH, POA++, SCIRP	Poor/stable	5-15
6019	Cow Creek	3.2	RIBES, POA++	Fair-Poor/declining	5-45
6019	West Branch Cow Creek	1.2	POTR5, POA++	Fair/declining	20-50
6019	Bear Creek	2.2	POTR5, PICEA, SALIX, POA++	Poor/stable	1-15
6019/6021	Trappers Creek	5.0	POTR5, PSME, SALIX, RIBES, SYMPH, POA++	Poor/declining	5-15
6023	Willow Creek	.7	TYPHA, POA++	Fair/stable	60
6023	East Willow Creek	8.4	ROSA+, POA++	Fair/stable	60-70
6023	West Willow Creek	9.6	POA++, CAREX	Fair/stable	80
6023	East Hunter Creek	3.2	POTR5, POA++	Poor/stable	5-30
6023	West Hunter Creek	5.6	ROSA+, POA++, CIRSI	Poor/stable	25-30
6023	Middle Fork Stewart Creek	2.5	POSA+, POA++	Poor/stable	5-25
6024	Fawn Creek	7.6	POA++, CAREX	Fair/stable	10-70
6024	West Fawn Creek	4.2	POTR5, SALIX, POA++	Fair/stable	10-70
6026/6027	Ryan Gulch	12.3	POTR5, POA++, GERAN	Fair/declining	5-50
6029	Black Sulfur Creek	8.5	ACNE2, SALIX, POA++	Fair/stable	10-40
6029	Yankee Culch	3.5	SALIX, POA++, CIRSI	Poor/stable	5-30
6029	Eureka Creek	6.2	SALIX, POA++	Fair/stable	5-25
6030/6036	Yellow Creek	11.9	SALIX, SCIRP, POA++, RANUN	Fair/stable	30
6030	Big Duck Creek	2.3	ROSA+, POA++, CAREX	Poor/stable	5-20
6030	K U Gulch	.9	POTR5, ROSA+, POA++	Fair/declining	10-15
6032	Spring Creek	.3	TAMAR2, JUNCU, SCRIP, XANTH2	Poor/stable	* *
6031/6033	Indian Springs Draw	* *	* *	* *	* *
6033	East Fork Spring Creek	* *	* *	* *	* *
6304	Trail Creek	* *	* *	* *	* *
6304/6307	K Creek	27.9	SALIX, SCIRP, TYPHA, MEOF	Fair/stable	20
6307	Buckwater Creek	14.9	SALIX, SCIRP, MEOF, ASCLE	Fair/stable	15-20
6307	Bull Canyon	1.6	SALIX, SCIRP	Poor/stable	* *
6307	Bull Draw	.5	ACNEN, SALIX, JUNCU, CAREX, ASCLE	Good/stable	30
6307	Willow Creek	7.0	SALIX, EQUIS, ASCLE	Fair/stable	20
6307	Middle Creek	1.8	SALIX, SCIRP, MEOF	Fair/stable	15-20
6308/6316	Stinking Water Creek	8.9	TAMAR2, SCIRP, ASCLE	Fair/stable	25
6323	Peterson Draw	1.5	SALIX, JUNCU, TYPHA, ASCLE	Good/stable	30
6323	Three Spring/Yellow Cat Draws	6.4	SALIX, JUNCU, TYPHA, ASCLE	Fair/stable	20
6324	Horse Draw	4.0	SALIX, JUNCU, TYPHA, MEOF	Good/stable	25
6324	Divide Creek Reservoir	4.0	SALIX, ELAN, SCIRP	Good/stable	50-60
6337	Windy Canyon	* *	* *	* *	* *
6337	Bear Park Creek	2.4	ROSA+, POA++, CAREX, MEAR4	Fair/declining	20
6337	East Douglas Creek	11.2	SALIX, SCIRP, TRIFO, POA++	Fair/declining	15-30
6337	Douglas Creek	* *	* *	* *	* *
6337	Sucker/Willow Creeks	8.5	ROSA+, POA++, CIRSI	Fair/declining	15
6337/6367	Cathedral Creek	7.6	ACNE2, POAN3, SALIX, POA++	Poor/declining	1-3
6346	West Creek	2.3	SALIX, SCIRP, JUNCU, XANTH2	Poor/stable	10
6346	Missouri Creek	2.0	POA++, ROSA+, GERAN	Fair/stable	* *
6346	Red Cedar Spring	* *	* *	* *	* *
6354	Brush Creek	7.3	* *	Fair/declining	25
6357	West Evacuation Creek	* *	* *	* *	* *
6357/6359	East Evacuation Creek	* *	* *	* *	* *
6358	Bitter Creek	* *	* *	* *	* *
6358	Rathole Canyon	* *	* *	* *	* *
6368	Brewster Canyon	* *	* *	* *	* *

TABLE E-2
DESCRIPTION OF EXISTING RIPARIAN VEGETATION WITHIN
THE WHITE RIVER RESOURCE AREA

Allotment No.	Stream	Public Acres Riparian	Dominant Riparian Vegetation 1/	Condition/Trend 2/	Percent Ground Cover
6367	Lake Creek	22.7	POAN3, SALIX, POA++, JUNCU	Fair/declining	15
6367	Soldier Creek	5.8	POAN3, SALIX, POA++	Fair/declining	15
6600/6333	Crooked Wash	9.3	SALIX, SCIRP, XANTH2, TAMAR2	Poor/stable	15
6605	Deep Channel Creek	1.6	JUNCU, TRIFO, RANUN, TAMAR2	Poor/declining	5
6608	Price Creek	* *	* *	* *	* *
6625	East Fork Wilson Creek	1.0	* *	Poor/stable	* *
6625	West Fork Good Spring Creek	1.0	* *	Poor/stable	* *
6807	Ninemile Draw	* *	* *	* *	* *
6813	Cow Creek	4.0	SALIX	Good/stable	* *
6813	Big Beaver Creek	2.0	SALIX	Good/stable	* *
6829	East Fork Flag Creek	2.0	SALIX, CAREX	Good/stable	80
	White River	20.0	SALIX, POAN3, TAMAR2	Good/stable	* *

1/ Abbreviation codes for plant species were taken from the National List of Scientific Plant Names. USDA, Soil Conservation Service. The following codes were used:

SALIX	Willow (Salix spp.)	POTR5	Aspen (Populus tremuloides)
POAN3	Narrowleaf Cottonwood (Populus augustifolia)	ACNE2	Boxelder (Acer negundo)
ELAN	Russian olive (Elaeagnus augustifolia)	RIBES	Currant (Ribes spp.)
ROSA+	Rose (Rosa spp.)	TAMAR2	Tamerisk (Tamarix spp.)
PSME	Douglas fir (Pseutasuga menziesii)	SYMPH	Snowberry (Symphocarpos spp.)
PICEA	Spruce (Picea spp)	CAREX	Sedge (Carex spp.)
JUNCU	Rush (Juncus spp.)	POA++	Bluegrass (Poa spp.)
EQUIS	Horsetail (Equisetum spp.)	SCIRP	Bulrush (Scirpus spp.)
TYPHA	Cattail (Typha spp.)	ASCLE	Milkweed (Asclepias spp.)
CIRSI	Thistle (Cirsium spp.)	GERAN	Geranium (Geranium spp.)
MEOF	Yellow sweetclover (Melilotus officinalis)	TRIFO	Clover (Trifolium spp.)
XANTH2	Cockleburr (Xanthium spp.)		

2/ Condition ratings are defined as follows:

Excellent - Diversity and abundance of typical riparian plants (trees, shrubs, forbs, grasses, 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.

Good - Most groups of typically riparian plants (trees, shrubs, forbs, grasses, 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. Vegetation shades water at least part of the day.

Fair - Many of the typically riparian plants (trees, shrubs, forbs, grasses, etc.) rare or missing from stream border. Age diversity lacking, little sign of reproduction. Bare soil may be common. Vegetative shade on stream lacking or only during morning and evening hours.

Poor - Typically riparian plants 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.

* * No data available.

Table E-3
Summary of the Impacts on Riparian Vegetation
Resulting from Alternative A (Action Proposal)
and Alternative F (Optimize Wild Horses)

Allot. No.	Stream	BLM Acres	Vegetative Composition 1/ Herbaceous	Woody	Condition and Trend 2/ Present	Future	Vegetative Ground Cover 3/
6005/6019	Piceance Creek	5.5	+	- *	Fair/Stable	Fair/Stable	+
6017	Shutte Gulch	2.0	0	0	Poor/Stable	Poor/Stable	0
6019	McCarthy Gulch	1.5	+	0	Poor/Stable	Fair/Stable	+
6019	Cow Creek	3.2	+	0	Fair-Poor/Declining	Fair/Stable	+
6019	West Branch Cow Creek	1.2	+	+	Fair/Declining	Fair Stable	+
6019	Bear Creek	2.2	+	0	Poor/Stable	Fair/Stable	+
6019/6021	Trappers Creek	5.0	+	+	Poor/Declining	Good/Stable	+
6023	Willow Creek	.7	+	0	Fair/Stable	Fair/Stable	+
6023	East Willow Creek	8.4	0	-	Fair/Stable	Fair/Declining	0
6023	West Willow Creek	9.6	0	-	Fair/Stable	Fair/Declining	0
6023	East Hunter Creek	3.2	+	0	Poor/Stable	Poor/Improving	+
6023	West Hunter Creek	5.6	0	0	Poor/Stable	Poor/Stable	0
6023	Middle Fork Stewart Creek	2.5	+	0	Poor/Stable	Poor/Stable	+
6024	Fawn Creek	7.6	+	+	Fair/Stable	Fair/Stable	+
6024	West Fawn Creek	4.2	+	+	Fair/Declining	Fair/Stable	+
6026/6027	Ryan Gulch	12.3	+	0	Fair/Declining	Fair/Stable	+
6029	Black Sulfur Creek	8.5	+	0	Fair/Stable	Fair/Stable	+
6029	Yankee Gulch	3.5	+	0	Poor/Stable	Fair/Stable	+
6029	Eureka Creek	6.2	+	0	Fair/Stable	Fair/Stable	+
6030/6036	Yellow Creek	11.9	+	0	Fair/Stable	Fair/Stable	+
6030	Big Duck Creek	2.3	+	0	Poor/Stable	Fair/Stable	+
6030	K U Gulch	.9	+	0	Fair/Declining	Fair/Stable	+
6032	Spring Creek	.3	+	0	Poor/Stable	Fair/Stable	+
6031/6033	Indian Springs Draw	* *	* *	* *	* *	* *	* *
6033	East Fork Spring Creek	* *	* *	* *	* *	* *	* *
6304	Trail Creek	* *	* *	* *	* *	* *	* *
6304/6307	K Creek	27.9	+	+	Fair/Stable	Good/Stable	+
6307	Buckwater Creek	14.9	0	0	Fair/Stable	Fair/Stable	0
6307	Bull Canyon	1.6	0	0	Poor/Stable	Poor/Stable	0
6307	Bull Draw	.5	0	0	Good/Stable	Good/Stable	0
6307	Willow Creek	7.0	0	0	Fair/Stable	Fair/Stable	0
6307	Middle Creek	1.8	0	0	Fair/Stable	Fair/Stable	0
6308/6316	Stinking Water Creek	8.9	0	- *	Fair/Stable	Fair/Stable	+
6323	Peterson Draw	1.5	+	+	Good/Stable	Good/Stable	+
6323	Three Springs/Yellow Cat Draw	6.4	+	+	Fair/Stable	Good/Stable	+
6324	Horse Draw	4.0	+	0	Good/Stable	Good/Stable	+
6324	Divide Creek Reservoir	4.0	0	0	Good/Stable	Good/Stable	0
6337	Windy Canyon	* *	* *	* *	* *	* *	* *
6337	Bear Park Creek	2.4	+	0	Fair/Declining	Fair/Stable	+
6337	East Douglas Creek	11.2	+	+	Fair/Declining	Fair/Stable	+
6337	Douglas Creek	* *	* *	* *	* *	* *	* *
6337	Sucker/Willow Creeks	8.5	+	0	Fair/Declining	Fair/Stable	+
6337/6367	Cathedral Creek	7.6	+	0	Poor/Declining	Poor/Stable	+
6346	West Creek	2.3	+	- *	Poor/Stable	Poor/Stable	+
6346	Missouri Creek	2.0	+	0	Fair/Stable	Fair/Stable	+
6346	Red Cedar Spring	* *	* *	* *	* *	* *	* *
6354	Brush Creek	7.3	- *	-	Fair/Declining	Poor/Stable	-
6357	West Evacuation Creek	* *	* *	* *	* *	* *	* *
6357/6359	East Evacuation Creek	* *	* *	* *	* *	* *	* *
6358	Bitter Creek	* *	* *	* *	* *	* *	* *
6358	Rathole Canyon	* *	* *	* *	* *	* *	* *
6358	Brewster Canyon	* *	* *	* *	* *	* *	* *
6367	Lake Creek	22.7	+	+	Fair/Declining	Good/Stable	+
6367	Soldier Creek	5.8	+	+	Fair/Declining	Good/Stable	+
6600/6333	Crooked Wash	9.3	+	+	Poor/Stable	Fair/Stable	+
6605	Deep Channel Creek	1.6	0	0	Poor/Declining	Poor/Stable	0
6608	Price Creek	* *	* *	* *	* *	* *	* *
6625	East Fork Wilson Creek	1.0	+	+	Poor/Stable	Fair/Stable	+
6625	West Fork Good Spring Creek	1.0	+	+	Poor/Stable	Fair/Stable	+
6807	Ninemile Draw	* *	* *	* *	* *	* *	* *
6813	Cow Creek	4.0	0	0	Good/stable	Good/stable	0
6813	Big Beaver Creek	2.0	0	0	Good/stable	Good/stable	0
6829	East Fork Flag Creek	2.0	0	0	Good/Stable	Good/Stable	0
	White River	20.0	0	0	Good/Stable	Good/Stable	0

1/ Vegetative composition rating signs are defined as follows:

+ increase in vegetation composition of desirable riparian species
0 no change in vegetative composition of desirable species
- decrease in vegetative composition of desirable species

2/ Condition ratings are defined in Table E-2

3/ Vegetative ground cover ratings are defined as follows:

+ increase in ground cover
0 no change in ground cover
- decrease in ground cover

* Vegetation conversion to undesirable species is expected over the longterm. In the case of woody vegetation, saltcedar is expected to assert dominance. In the case of herbaceous vegetation a shift from desirable perennial grasses to undesirable forbs is expected. Along some lower reaches sagebrush would invade where evidence of such a conversion is already in progress.

* * No data available

Table E-4
Summary of the Impacts on Riparian Vegetation
Resulting from Alternative B (No Action)

Allot. No.	Stream	BLM Acres	Vegetative Composition 1/ Herbaceous	Woody	Condition and Trend 2/ Present	Future	Vegetative Ground Cover 3/
6005/6019	Piceance Creek	5.5	0	- *	Fair/Stable	Fair/Stable	+
6017	Shutte Gulch	2.0	0	0	Poor/Stable	Poor/Stable	0
6019	McCarthy Gulch	1.5	-	0	Poor/Stable	Nonexistent	-
6019	Cow Creek	3.2	-	-	Fair-Poor/Declining	Poor/Stable	-
6019	West Branch Cow Creek	1.2	-	-	Fair/Declining	Poor/Stable	-
6019	Bear Creek	2.2	-	-	Poor/Stable	Poor/Stable	-
6019/6021	Trappers Creek	5.0	-	-	Poor/Declining	Nonexistent	-
6023	Willow Creek	.7	0	0	Fair/Stable	Fair/Stable	0
6023	East Willow Creek	8.4	0	0	Fair/Stable	Fair/Stable	0
6023	West Willow Creek	9.6	0	0	Fair/Stable	Fair/Stable	0
6023	East Hunter Creek	3.2	0	- *	Poor/Stable	Poor/Stable	0
6023	West Hunter Creek	5.6	-	- *	Poor/Stable	Poor/Stable	-
6023	Middle Fork Stewart Creek	2.5	0	0	Poor/Stable	Poor/Stable	0
6024	Fawn Creek	7.6	0	0	Fair/Stable	Fair/Stable	0
6024	West Fawn Creek	4.2	0	0	Fair/Declining	Fair/Stable	0
6026/6027	Ryan Gulch	12.3	-	- *	Fair/Declining	Poor/Stable	-
6029	Black Sulfur Creek	8.5	0	0	Fair/Stable	Fair/Stable	0
6029	Yankee Gulch	3.5	-	- *	Poor/Stable	Poot/Stable	-
6029	Eureka Creek	6.2	0	-	Fair/Stable	Fair/Stable	-
6030/6036	Yellow Creek	11.9	-	0	Fair-Good/Stable	Fair/Stable	0
6030	Big Duck Creek	2.3	0	0	Poor/Stable	Poor/Stable	0
6030	K U Gulch	.9	-	-	Fair/Declining	Poor/Stable	-
6032	Spring Creek	.3	0	- *	Poor/Stable	Poor/Stable	0
6031/6033	Indian Springs Draw	* *	* *	* *	* *	* *	* *
6033	East Fork Spring Creek	* *	* *	* *	* *	* *	* *
6304	Trail Creek	* *	* *	* *	* *	* *	* *
6304/6307	K Creek	27.9	0	+	Fair/Stable	Fair/Stable	+
6307	Buckwater Creek	14.9	0	+	Fair/Stable	Fair/Stable	+
6307	Bull Canyon	1.6	0	0	Poor/Stable	Poor/Stable	0
6307	Bull Draw	.5	0	0	Good/Stable	Good/Stable	0
6307	Willow Creek	7.0	0	+	Fair/Stable	Fair/Stable	+
6307	Middle Creek	1.8	0	+	Fair/Stable	Fair/Stable	+
6308/6316	Stinking Water Creek	8.9	0	- *	Fair/Stable	Fair/Stable	+
6323	Peterson Draw	1.5	0	+	Good/Stable	Good/Stable	+
6323	Three Springs/Yellow Cat Draw	6.4	0	+	Fair/Stable	Fair/Stable	+
6324	Horse Draw	4.0	0	0	Good/Stable	Good/Stable	0
6324	Divide Creek Reservoir	4.0	0	0	Good/Stable	Good/Stable	0
6337	Windy Canyon	* *	* *	* *	* *	* *	* *
6337	Bear Park Creek	2.4	-	-	Fair/Declining	Poor/Stable	-
6337	East Douglas Creek	11.2	-	-	Fair/Declining	Poor/Stable	-
6337	Douglas Creek	* *	* *	* *	* *	* *	* *
6337	Sucker/Willow Creeks	8.5	-	-	Fair/Declining	Poor/Stable	-
6337/6367	Cathedral Creek	7.6	0	0	Poor/Declining	Poor/Stable	0
6346	West Creek	2.3	0	- *	Poor/Stable	Poor/Stable	+
6346	Missouri Creek	2.0	0	0	Fair/Stable	Fair/Stable	0
6346	Red Cedar Spring	* *	* *	* *	* *	* *	* *
6354	Brush Creek	7.3	-	0	Fair/Declining	Poor/Stable	-
6357	West Evacuation Creek	* *	* *	* *	* *	* *	* *
6357/6359	East Evacuation Creek	* *	* *	* *	* *	* *	* *
6358	Bitter Creek	* *	* *	* *	* *	* *	* *
6358	Rathole Canyon	* *	* *	* *	* *	* *	* *
6358	Brewster Canyon	* *	* *	* *	* *	* *	* *
6367	Lake Creek	22.7	-	- *	Fair/Declining	Poor/Stable	-
6367	Soldier Creek	5.8	-	- *	Fair/Declining	Poor/Stable	-
6600/6333	Crooked Wash	9.3	0	0	Poor/Stable	Poor/Stable	0
6605	Deep Channel Creek	1.6	0	0	Poor/Declining	Poor/Stable	0
6608	Price Creek	* *	* *	* *	* *	* *	* *
6625	East Fork Wilson Creek	1.0	0	0	Poor/Stable	Poor/Stable	0
6625	West Fork Good Spring Creek	1.0	0	0	Poor/Stable	Poor/Stable	0
6807	Ninemile Draw	* *	* *	* *	* *	* *	* *
6813	Cow Creek	4.0	0	0	Good/Stable	Good/Stable	0
6813	Big Beaver Creek	2.0	0	0	Good/Stable	Good/Stable	0
6829	East Fork Flag Creek	2.0	0	0	Good/Stable	Good/Stable	0
	White River	20.0	0	0	Good/Stable	Good/Stable	0

Note: Footnotes are explained in Table E-3

Table E-5
Summary of the Impacts on Riparian Vegetation
Resulting from Alternative C (Elimination of Livestock Grazing)

Allot. No.	Stream	BLM Acres	Vegetative Composition 1/ Herbaceous	Woody	Condition and Trend 2/ Present	Future	Vegetative Ground Cover 3/
6005/6019	Piceance Creek	5.5	+	- *	Fair/Stable	Fair/Stable	+
6017	Shutte Gulch	2.0	+	0	Poor/Stable	Fair/Stable	+
6019	McCarthy Gulch	1.5	+	+	Poor/Stable	Good/Stable	+
6019	Cow Creek	3.2	+	+	Fair-Poor/Declining	Good/Stable	+
6019	West Branch Cow Creek	1.2	+	+	Fair/Declining	Excellent/Stable	+
6019	Bear Creek	2.2	+	+	Poor/Stable	Good/Stable	+
6019/6021	Trappers Creek	5.0	+	+	Poor/Declining	Good/Stable	+
6023	Willow Creek	.7	+	0	Fair/Stable	Fair/Stable	+
6023	East Willow Creek	8.4	+	+	Fair/Stable	Excellent/Stable	+
6023	West Willow Creek	9.6	+	+	Fair/Stable	Good/Stable	+
6023	East Hunter Creek	3.2	+	+	Poor/Stable	Good/Stable	+
6023	West Hunter Creek	5.6	+	0	Poor/Stable	Fair/Stable	+
6023	Middle Fork Stewart Creek	2.5	+	+	Poor/Stable	Excellent/Stable	+
6024	Fawn Creek	7.6	+	+	Fair/Declining	Good/Stable	+
6024	West Fawn Creek	4.2	+	+	Fair/Declining	Fair/Stable	+
6026/6027	Ryan Gulch	12.3	+	0	Fair/Declining	Fair/Stable	+
6029	Black Sulfur Creek	8.5	+	+	Fair/Stable	Excellent/Stable	+
6029	Yankee Gulch	3.5	+	+	Poor/Stable	Good/Stable	+
6029	Eureka Creek	6.2	+	+	Fair/Stable	Good/Stable	+
6030/6036	Yellow Creek	11.9	+	0	Fair-Good/Stable	Good/Stable	+
6030	Big Duck Creek	2.3	+	+	Poor/Stable	Good/Stable	+
6030	K U Gulch	.9	+	+	Fair/Declining	Good/Stable	+
6032	Spring Creek	.3	+	- *	Poor/Stable	Good/Stable	+
6031/6033	Indian Springs Draw	* *	* *	* *	* *	* *	* *
6033	East Fork Spring Creek	* *	* *	* *	* *	* *	* *
6304	Trail Creek	* *	* *	* *	* *	* *	* *
6304/6307	K Creek	27.9	+	+	Fair/Stable	Excellent/Stable	+
6307	Buckwater Creek	14.9	+	+	Fair/Stable	Excellent/Stable	+
6307	Bull Canyon	1.6	+	+	Poor/Stable	Fair/Stable	+
6307	Bull Draw	.5	+	+	Good/Stable	Excellent/Stable	+
6307	Willow Creek	7.0	+	+	Fair/Stable	Excellent/Stable	+
6307	Middle Creek	1.8	+	+	Fair/Stable	Excellent/Stable	+
6308/6316	Stinking Water Creek	8.9	+	+	Fair/Stable	Excellent/Stable	+
6323	Peterson Draw	1.5	+	+	Good/Stable	Excellent/Stable	+
6323	Three Springs/Yellow Cat Draw	6.4	+	+	Fair/Stable	Excellent/Stable	+
6324	Horse Draw	4.0	+	+	Good/Stable	Excellent/Stable	+
6324	Divide Creek Reservoir	4.0	0	0	Good/Stable	Good/Stable	0
6337	Windy Canyon	* *	* *	* *	* *	* *	* *
6337	Bear Park Creek	2.4	+	+	Fair/Declining	Good/Stable	+
6337	East Douglas Creek	11.2	+	+	Fair/Declining	Good/Stable	+
6337	Douglas Creek	* *	* *	* *	* *	* *	* *
6337	Sucker/Willow Creeks	8.5	+	+	Fair/Declining	Excellent/Stable	+
6337/6367	Cathedral Creek	7.6	+	+	Poor/Declining	Good/Stable	+
6346	West Creek	2.3	+	+	Poor/Stable	Good/Stable	+
6346	Missouri Creek	2.0	+	0	Fair/Stable	Good/Stable	+
6346	Red Cedar Spring	* *	* *	* *	* *	* *	* *
6354	Brush Creek	7.3	+	+	Fair/Declining	Good/Stable	+
6357	West Evacuation Creek	* *	* *	* *	* *	* *	* *
6357/6359	East Evacuation Creek	* *	* *	* *	* *	* *	* *
6358	Bitter Creek	* *	* *	* *	* *	* *	* *
6358	Rathole Canyon	* *	* *	* *	* *	* *	* *
6358	Brewster Canyon	* *	* *	* *	* *	* *	* *
6367	Lake Creek	22.7	+	+	Fair/Declining	Good/Stable	+
6367	Soldier Creek	5.8	+	+	Fair/Declining	Good/Stable	+
6600/6333	Crooked Wash	9.3	+	+	Poor/Stable	Good/Stable	+
6605	Deep Channel Creek	1.6	+	0	Poor/Declining	Fair/Stable	+
6608	Price Creek	* *	* *	* *	* *	* *	* *
6625	East Fork Wilson Creek	1.0	+	+	Poor/Stable	Good/Stable	+
6625	West Fork Good Spring Creek	1.0	+	+	Poor/Stable	Good/Stable	+
6807	Ninemile Draw	* *	* *	* *	* *	* *	* *
6813	Cow Creek	4.0	0	0	Good/Stable	Good/Stable	0
6813	Big Beaver Creek	2.0	0	0	Good/Stable	Good/Stable	0
6829	East Fork Flag Creek	2.0	+	+	Good/Stable	Excellent/Stable	+
	White River	20.0	0	0	Good/Stable	Good/Stable	0

Note: Footnotes are explained in Table E-3

Table E-6
Summary of the Impacts on Riparian Vegetation
Resulting from Alternative D (Optimize Livestock Grazing)

Allot. No.	Stream	BLM Acres	Vegetative Composition 1/ Herbaceous	Woody	Condition and Trend 2/ Present	Future	Vegetative Ground Cover 3/
6005/6019	Piceance Creek	5.5	+	- *	Fair/Stable	Fair/Stable	+
6017	Shutte Gulch	2.0	0	0	Poor/Stable	Poor/Stable	0
6019	McCarthy Gulch	1.5	+	0	Poor/Stable	Fair/Stable	+
6019	Cow Creek	3.2	+	0	Fair-Poor/Declining	Fair/Stable	+
6019	West Branch Cow Creek	1.2	+	+	Fair/Declining	Fair/Stable	+
6019	Bear Creek	2.2	+	0	Poor/Stable	Fair/Stable	+
6019/6021	Trappers Creek	5.0	+	+	Poor/Declining	Good/Stable	+
6023	Willow Creek	.7	+	0	Fair/Stable	Fair/Stable	+
6023	East Willow Creek	8.4	0	-	Fair/Stable	Fair/Declining	0
6023	West Willow Creek	9.6	0	-	Fair/Stable	Fair/Declining	0
6023	East Hunter Creek	3.2	+	0	Poor/Stable	Poor/Improving	+
6023	West Hunter Creek	5.6	0	0	Poor/Stable	Poor/Stable	0
6023	Middle Fork Stewart Creek	2.5	+	0	Poor/Stable	Poor/Stable	+
6024	Fawn Creek	7.6	+	+	Fair/Stable	Fair/Stable	+
6024	West Fawn Creek	4.2	+	+	Fair/Declining	Fair/Stable	+
6026/6027	Ryan Gulch	12.3	-	0	Fair/Declining	Poor/Stable	-
6029	Black Sulfur Creek	8.5	+	0	Fair/Stable	Fair/Stable	+
6029	Yankee Gulch	3.5	+	0	Poor/Stable	Fair/Stable	+
6029	Eureka Creek	6.2	+	0	Fair/Stable	Fair/Stable	+
6030/6036	Yellow Creek	11.9	+	0	Fair/Stable	Fair/Stable	+
6030	Big Duck Creek	2.3	+	0	Poor/Stable	Fair/Stable	+
6030	K U Gulch	.9	+	0	Fair/Declining	Fair/Stable	+
6032	Spring Creek	.3	+	0	Poor/Stable	Fair/Stable	+
6031/6033	Indian Springs Draw	* *	* *	* *	* *	* *	* *
6033	East Fork Spring Creek	* *	* *	* *	* *	* *	* *
6304	Trail Creek	* *	* *	* *	* *	* *	* *
6304/6307	K Creek	27.9	+	+	Fair/Stable	Good/Stable	+
6307	Buckwater Creek	14.9	0	0	Fair/Stable	Fair/Stable	0
6307	Bull Canyon	1.6	0	0	Poor/Stable	Poor/Stable	0
6307	Bull Draw	.5	0	0	Good/Stable	Good/Stable	0
6307	Willow Creek	7.0	0	0	Fair/Stable	Fair/Stable	0
6307	Middle Creek	1.8	0	0	Fair/Stable	Fair/Stable	0
6308/6316	Stinking Water Creek	8.9	0	- *	Fair/Stable	Fair/Stable	+
6323	Peterson Draw	1.5	+	+	Good/Stable	Good/Stable	+
6323	Three Springs/Yellow Cat Draw	6.4	+	+	Fair/Stable	Good/Stable	+
6324	Horse Draw	4.0	+	0	Good/Stable	Good/Stable	+
6324	Divide Creek Reservoir	4.0	0	0	Good/Stable	Good/Stable	0
6337	Windy Canyon	* *	* *	* *	* *	* *	* *
6337	Bear Park Creek	2.4	+	0	Fair/Declining	Fair/Stable	+
6337	East Douglas Creek	11.2	+	+	Fair/Declining	Fair/Stable	+
6337	Douglas Creek	* *	* *	* *	* *	* *	* *
6337	Sucker/Willow Creeks	8.5	+	0	Fair/Declining	Fair/Stable	+
6337/6367	Cathedral Creek	7.6	+	0	Poor/Declining	Poor/Stable	+
6346	West Creek	2.3	-	- *	Poor/Stable	Poor/Stable	+
6346	Missouri Creek	2.0	+	0	Fair/Stable	Fair/Stable	+
6346	Red Cedar Spring	* *	* *	* *	* *	* *	* *
6354	Brush Creek	7.3	- *	-	Fair/Declining	Poor/Stable	-
6357	West Evacuation Creek	* *	* *	* *	* *	* *	* *
6357/6359	East Evacuation Creek	* *	* *	* *	* *	* *	* *
6358	Bitter Creek	* *	* *	* *	* *	* *	* *
6358	Rathole Canyon	* *	* *	* *	* *	* *	* *
6358	Brewster Canyon	* *	* *	* *	* *	* *	* *
6367	Lake Creek	22.7	+	+	Fair/Declining	Good/Stable	+
6367	Soldier Creek	5.8	+	+	Fair/Declining	Good/Stable	+
6600/6333	Crooked Wash	9.3	+	+	Poor/Stable	Fair/Stable	+
6605	Deep Channel Creek	1.6	0	0	Poor/Declining	Poor/Stable	0
6608	Price Creek	* *	* *	* *	* *	* *	* *
6625	East Fork Wilson Creek	1.0	+	+	Poor/Stable	Fair/Stable	+
6625	West Fork Good Spring Creek	1.0	+	+	Poor/Stable	Fair/Stable	+
6807	Ninemile Draw	* *	* *	* *	* *	* *	* *
6813	Cow Creek	4.0	0	0	Good/Stable	Good/Stable	0
6813	Big Beaver Creek	2.0	0	0	Good/Stable	Good/Stable	0
6829	East Fork Flag Creek	2.0	0	0	Good/Stable	Good/Stable	0
	White River	20.0	0	0	Good/Stable	Good/Stable	0

Note: Footnotes are explained in Table E-3

Table E-7
Summary of the Impacts on Riparian Vegetation
Resulting from Alternative E (Emphasis on Other Resource Uses)

Allot. No.	Stream	BLM Acres	Vegetative Composition 1/ Herbaceous	Woody	Condition and Trend 2/ Present	Future	Vegetative Ground Cover 3/
6005/6019	Piceance Creek	5.5	0	- *	Fair/Stable	Fair/Stable	+
6017	Shutte Gulch	2.0	+	0	Poor/Stable	Fair/Stable	+
6019	McCarthy Gulch	1.5	+	0	Poor/Stable	Fair/Stable	+
6019	Cow Creek	3.2	+	0	Fair-Poor/Declining	Fair/Stable	+
6019	West Branch Cow Creek	1.2	+	+	Fair/Declining	Fair/Stable	+
6019	Bear Creek	2.2	+	+	Poor/Stable	Fair/Stable	+
6019/6021	Trappers Creek	5.0	+	+	Poor/Declining	Good/Stable	+
6023	Willow Creek	.7	+	0	Fair/Stable	Fair/Stable	+
6023	East Willow Creek	8.4	+	+	Fair/Stable	Good/Stable	+
6023	West Willow Creek	9.6	+	0	Fair/Stable	Fair/Stable	+
6023	East Hunter Creek	3.2	+	+	Poor/Stable	Fair/Stable	+
6023	West Hunter Creek	5.6	+	0	Poor/Stable	Fair/Stable	+
6023	Middle Fork Stewart Creek	2.5	+	+	Poor/Stable	Fair/Stable	+
6024	Fawn Creek	7.6	+	+	Fair/Stable	Good/Stable	+
6024	West Fawn Creek	4.2	+	+	Fair/Declining	Fair/Stable	+
6026/6027	Ryan Gulch	12.3	+	0	Fair/Declining	Fair/Stable	+
6029	Black Sulfur Creek	8.5	+	+	Fair/Stable	Good/Stable	+
6029	Yankee Gulch	3.5	+	+	Poor/Stable	Good/Stable	+
6029	Eureka Creek	6.2	+	+	Fair/Stable	Good/Stable	+
6030/6036	Yellow Creek	11.9	+	0	Fair-Good/Stable	Fair-Good/Stable	+
6030	Big Duck Creek	2.3	+	+	Poor/Stable	Fair/Stable	+
6030	K U Gulch	.9	+	+	Fair/Declining	Good/Stable	+
6032	Spring Creek	.3	+	0	Poor/Stable	Fair/Stable	+
6031/6033	Indian Springs Draw	* *	* *	* *	* *	* *	* *
6033	East Fork Spring Creek	* *	* *	* *	* *	* *	* *
6304	Trail Creek	* *	* *	* *	* *	* *	* *
6304/6307	K Creek	27.9	+	+	Fair/Stable	Excellent/Stable	+
6307	Buckwater Creek	14.9	+	+	Fair/Stable	Excellent/Stable	+
6307	Bull Canyon	1.6	+	+	Poor/Stable	Fair/Stable	+
6307	Bull Draw	.5	+	+	Good/Stable	Excellent/Stable	+
6307	Willow Creek	7.0	+	+	Fair/Stable	Excellent/Stable	+
6307	Middle Creek	1.8	+	+	Fair/Stable	Excellent/Stable	+
6308/6316	Stinking Water Creek	8.9	+	+	Fair/Stable	Good/Stable	+
6323	Peterson Draw	1.5	+	+	Good/Stable	Good/Stable	+
6323	Three Springs/Yellow Cat Draw	6.4	+	+	Fair/Stable	Good/Stable	+
6324	Horse Draw	4.0	+	+	Good/Stable	Good/Stable	+
6324	Divide Creek Reservoir	4.0	0	0	Good/Stable	Good/Stable	0
6337	Windy Canyon	* *	* *	* *	* *	* *	* *
6337	Bear Park Creek	2.4	+	+	Fair/Declining	Good/Stable	+
6337	East Douglas Creek	11.2	+	+	Fair/Declining	Good/Stable	+
6337	Douglas Creek	* *	* *	* *	* *	* *	* *
6337	Sucker/Willow Creeks	8.5	+	+	Fair/Declining	Excellent/Stable	+
6337/6367	Cathedral Creek	7.6	+	+	Poor/Stable	Fair/Stable	+
6346	West Creek	2.3	+	+	Poor/Stable	Good/Stable	+
6346	Missouri Creek	2.0	+	+	Fair/Stable	Good/Stable	+
6346	Red Cedar Spring	* *	* *	* *	* *	* *	* *
6354	Brush Creek	7.3	+	+	Fair/Stable	Good/Stable	+
6357	West Evacuation Creek	* *	* *	* *	* *	* *	* *
6357/6359	East Evacuation Creek	* *	* *	* *	* *	* *	* *
6358	Bitter Creek	* *	* *	* *	* *	* *	* *
6358	Rathole Canyon	* *	* *	* *	* *	* *	* *
6358	Brewster Canyon	* *	* *	* *	* *	* *	* *
6367	Lake Creek	22.7	+	+	Fair/Declining	Good/Stable	+
6367	Soldier Creek	5.8	+	+	Fair/Declining	Good/Stable	+
6600/6333	Crooked Wash	9.3	+	+	Poor/Stable	Good/Stable	+
6605	Deep Channel Creek	1.6	+	0	Poor/Stable	Fair/Stable	+
6608	Price Creek	* *	* *	* *	* *	* *	* *
6625	East Fork Wilson Creek	1.0	+	+	Poor/Stable	Fair/Stable	+
6625	West Fork Good Spring Creek	1.0	+	+	Poor/Stable	Fair/Stable	+
6807	Ninemile Draw	* *	* *	* *	* *	* *	* *
6813	Cow Creek	4.0	0	0	Good/Stable	Good/Stable	0
6813	Big Beaver Creek	2.0	0	0	Good/Stable	Good/Stable	0
6829	East Fork Flag Creek	2.0	0	0	Good/Stable	Good/Stable	0
	White River	20.0	0	0	Good/Stable	Good/Stable	0

Note: Footnotes are explained in Table E-3

TABLE E-8
THREATENED AND ENDANGERED PLANT SPECIES

Plant Name	Status	Locotion	Habitat	Elevation	Associated Plants	Taxonomic Difficulties	No. of Populations	Individuals/ Population
Aquilegia barnebyi Munz	Recommended for Federal Register Suggested as "Vulnerable" CONPS T/E list	Rio Blanco Co. 1. Near Rio Blanco 2. Cathedral Bluffs 3. 15 mi SE of Rangely 4. near White River City	Aquifer systems of Green River Shale Seeps & water-falls calcareous soils, high pH	6,000 - 9,000'	Cystopteris	A. micrantha A. triternata	21	Ranges from 2-200
Arabis demissa Greene var. russeola Rollins	THREATENED July 1, 1975 Federal Register	Moffat Co. 1. Wolf Creek Canyon & drainage 2. SE Tanks Peak 3. Blue Mtn. 4. Douglas Mtn. 5. Roundtop Mtn.	Uinta Formation Lodoic Sandstone Red Creek Quartzite	7,500'	Happlopappus Amelanchier Juniperus Artemisia Draba Mimulus	A. demissa var. languida A. oxylobula A. gunnisoniana	Undetermined	Undetermined
Astragalus detritalis Jones	ENDANGERED June 16, 1976 Federal Register ENDANGERED Smithsonian Inst. 1975 CONPS T/E list	Rio Blanco Co. 1. Strawberry Creek 2. White River valley 3. 14 mi E Rangely 4. Raven Ridge	Ohio Creek Formation clay bluffs cobbly knolls sandy clay soils exposed shale	5,400 - 6,200'	Lesquerella Artemisia Phlox Gymnocarpon Cryptantha Erigeron	none	5	Not determined
Astragalus lutosus M.E. Jones	ENDANGERED July 1, 1975 Federal Register ENDANGERED Smithsonian Inst. 1975 CONPS T/E list	Rio Blanco Co.; Piceance Basin 1. Rough Gulch 2. Open Gulch 3. Summer Camp 4. Duck Creek 5. Piceance Creek 6. Dry Fork Piceance 7. Black Sulphur 8. Thirteen Mile 9. Dry Ryan Gulch 10. Yellow Creek 11. Cottonwood Spring 12. Logan Wash 13. Cathedral Bluffa 14. near White River City	loose shale scree Green River Formation Uinta Formation bare alkaline hilla	6,900 - 7,000'	Galium Oryzopsis Penstemon Crypantha Eriogonum Happlopappus Senecio Chrysothamnus	none	26 (23 w/in Piceance Basin) locally common to Piceance Basin	250 (Range from 35-500)
Bolophyta ligulata M.E. Jones W.A. Weber (Parthenium ligulatum)	THREATENED July 1, 1975 Federal Register ENDANGERED June 16, 1976 Federal Register CONPS T/E list	Rio Blanco Co. 1. Raven Ridge Moffat Co. 1. Cold Springs 2. Little Joe Basin	Gypaum hills alkaline flats gypaeous shale bluffs selenium rich soils	5,400 - 5,750'	Astragalus Oxytropis Cryptantha Stanleya Juniperus Cercocarpus Forsellesia Pinus Eriogonum Hilaria Artemisia	none	3	Not determined
Cryptantha rollinsii Johnst.	No legal status recommended as "THREATENED"	Rio Blanco Co. 1. Raven Ridge 2. Raven Ridge Gap Moffat Co. 1. S. Bear Valley	loose clay & sandstone scree		Eriogonum ehpedroides (T/E) Forsellesia Agropyron	none	One known location in Rio Blanco Co., Colo., also reported from Uintah & Emery Co., Utah *endemic species w/ very limited range	Not determined

TABLE E-8
THREATENED AND ENDANGERED PLANT SPECIES

Plant Name	Status	Locotion	Habitat	Elevation	Associated Plants	Taxonomic Difficulties	No. of Populations	Individuals/ Population
Cryptantha stricta (Osterh.) Payson	THREATENED July 1, 1975 Federal Register THREATENED Smithsonian Inst. 1975 CONPS T/E list	Moffat Co. 1. Blue Mtn. 2. W. of Roundtop Mtn. 3. Douglas Mtn. 4. S. Yampa River 5. Dinosaur 6. S. Bear River 7. Cross Mtn. Canyon	Madison Limestone Morgan Formation Lodore Formation loose limestone & talus slopes heavy clay soils	6,500 - 9,000'		yes	*narrowly endemic species	Ranges from 5-50
Eriogonum ephedroides Reveal	ENDANGERED June 16, 1976 Federal Register 1979 proposed as "THREATENED" to office of Endangered Species CONPS T/E list ENDANGERED Smithsonian Inst. 1975	Rio Blanco Co. 1. Raven Ridge 2. Raven Ridge Gap	loose clay & sandstone shale scree SSW slopes	5,600'	Forsellesia Cryptantha rollinsii (T/E) Agropyron Tetradymia Artemisia Ephedra Atriplex	Ephedra torreyana (occularly from distance	One discontinuous population along ridge *endemic species w/ very limited range	250-300
Eriogonum saurinum Reveal	THREATENED July 1, 1975 Federal Register THREATENED Smithsonian Inst. 1975 CONPS T/E list	Moffat Co. 1. Dinosaur Natl. Mon. vicinity	Mowry Shale outcrops clay & sandstone ridges	5,200'	Juniperus Chrysothamnus	none	*endemic to narrow band of Mowry Shale locally common in Utah in the Vernal vicinity	Not determined
Festuca dasyclada Hackel	ENDANGERED June 16, 1976 Federal Register CONPS T/E list	Rio Blanco Co. 1. SW Rio Blanco Garfield Co. 1. Roan Cliffs	Green River Formation loose shale scree & rock talus slopes	varies	Artemisia Oryzopsis Cryptantha Astragalus Agropyron Galium Quercus Ribes Pseuclotsuga Acer Astragalus lutosus (T/E) Eriogonum	yes	9 *narrow endemic species	150
Oxytropis obnapiformis C.L. Porter	ENDANGERED Smithsonian Inst. 1975 CONPS T/E list	Rio Blanco Co. 1. Dry Ryan Gulch 2. W Stake Springs 3. W Black Sulphur Crk. 4. Cathedral Bluffs	Green River Formation Evacuation Creek member sandy soils clay bluffs	low to med.	Artemisia Penstemon Lupinus Eriogonum Lappula	none	Not determined	Not determined
Penstemon grahamii Keck	ENDANGERED July 1, 1975 Federal Register June 16, 1976 Federal Register	Rio Blanco Co. 1. Raven Ridge	Green River Formation loose talus slopes	6,400'	Pinyon-Juniper	P. miser	1	Not determined
Sullivantia purpusii (Brand) Rosendahl	THREATENED July 1, 1975 Federal Register THREATENED Smithsonian Inst. 1975 CONPS T/E list	Rio Blanco Co. 1. Parachute Creek 2. N Piceance Basin	seeps & waterfalls contact of mahogany ledge of Green River Formation		Aquilegia barnebyi (T/E) Calamagiostis	none	Not determined	Not determined

APPENDIX F

RANCH ECONOMICS

APPENDIX F

RANCH ECONOMICS

The ranch economic analysis in this appendix is based on a study conducted by the Range Science Department at Colorado State University. The study, entitled "Impacts of Federal Grazing on the Economy of Colorado", was published in 1979. It was funded by the State of Colorado, U.S. Forest Service, and the Bureau of Land Management.

The study involved extensive survey work on 134 ranching operations in Colorado that graze livestock in federally owned lands. The survey methods were personal interviews, and the ranching operations were randomly selected from all ranches in Colorado that graze livestock on federally owned lands.

The study divided Colorado into five regions, each of which exhibited certain ranchiny characteristics. A variety of ranch models were developed for each region, depending upon size and livestock class groupings evident from the survey work. The White River Resource Area is in the northwest study region. Eight ranch models were developed for this region from the survey results obtained from 51 ranching operations. These ranch models are thought to accurately represent the EIS area ranches, with the survey sample even containing some of the 100 area ranches grazing livestock on public lands (BLM).

Linear programming techniques were applied to the eight models in order to make estimates of gross revenue, net revenue, property tax, and hired ranch employment changes for use in the text of this document.

Ranch budgets were developed for each of the eight ranch models (Example F-1). The ranch budgets were constructed from the study survey data and from computer runs of the eight models. The budgets contain six sections: operating expences, livestock inventory, gross revenue, buildings-improvements-lands machinery and equipment inventory, and forage balance. Gross revenue results from sales to final demand by these ranches, and net revenue is derived by subtracting operating expenses and livestock inventory carrying and depreciation costs from gross revenue. Net revenue is considered to be personal income to ranch families.

Ranch family and operator labor is included in the operating expense portion of the ranch budgets. In order to exclude family and operator labor costs from the net revenue calculations, the models calculated were termed"2nd Net Revenue", which represents both investment return and estimated value of operator and family labor. To the extent that these net revenues are not adequate compensation to ranch families and operators for labor imputs, they would be subsidizing ranching operations with their labor.

The 100 EIS area ranching operations which graze livestock on BLM lands were grouped by size and livestock class into the eight ranch models. Present BLM forage use and forage use reductions resulting from the various alternatives were tracked from each allotment to the individual ranching operations. When these forage use considerations involved common use allotments, a proration of use among operators was made based on authorized use each operator has for the allotment. Private grazing lands within the allotments were also considered in tracking forage use changes to the ranching operations since their use could be affected by changes in BLM forage use. Thus, any combination of BLM forage use, whether it is on one or several allotments or is of single or combined use or is in combination with private land use, has been associated with the respective ranching operations. The BLM forage use, and associated private forage use where appropriate, were used to identify the average forage use and forage use changes indicated in the tables in the text of this document. There average forage use AUM numbers were applied to the eight ranch models to derive the estimated ranch economic effects from BLM forage use.

BLM forage use was spread proportionally in the models based on the period of use information obtained from the study survey work. The forage balance sections of the ranch budgets indicate these use patterns by season. The four seasons are indicated at the top of each forage balance table in terms of calendar days numbered consecutively through the year. As BLM forage use was altered, the models adjusted, supplying forage available on the ranches during the four seasons to the extent that private forage was available. When private forage was lacking to adjust to the changes, livestock herd size was adjusted to compensate for the net forage use changes. The herd size adjustments become the source of grass and net revenue changes associated with the BLM forage use changes.

In the ranch budgets for the eight models (Example F-1), certain operating expense items such as ranch business, utilities, and water assessment were judged to be relatively fixed, and thus were not varied by the model for changes in BLM forage use. Other expense items such as marketing, vet-

TABLE F-1
CHANGES IN GROSS REVENUE, 2nd NET REVENUE, AND
LABOR REQUIREMENTS PER ONE AUM CHANGE BY MODEL

Model	Cattle	Sheep	Change in Gross Revenue (dollars)	Change in 2nd Net Revenue 1/ (dollars)	Change in Hired Labor (man-years)
1	1-149		29.24	-10.077	.00046216
2	150-449		29.24	- 1.187	.00070448
3	450-749		32.70	3.609	.00024898
4	750-1999		30.84	1.207	.00020583
5	2000 or more		60.81	10.377	.00055738
6		1-6000	37.76	9.556	.00075054
7	1-1399	1-1749		4.363	
	Cattle		28.35		.00030157
	Sheep		28.21		.00072902
8	1400 or more	1750 or more		9.977	
	Cattle		45.64		.00029450
	Sheep		29.08		.00075757

1/ Negative values indicate that this type of ranch was earning a negative net income. Therefore, a decrease in AUMs would result in reduced losses.

SOURCE: Bartlett, E.T., R.G. Taylor, and J.R. McKean. 1979. Impacts of Federal Grazing on the Economy of Colorado. Fort Collins: Colorado State University.

erinary, and shearing were varied to compensate for the various herd sizes.

All of these revenue and expense changes were computed by the models into terms of changes per AUM of available forage. The gross and net revenue variations associated with a change of one AUM for each of the eight ranch models are shown in Table F-1. These variations per AUM use change were the applied to the average AUM increase or reduction per ranch for the action proposal and alternatives to make revenue estimates.

Changes in requirements for hired labor per AUM change were also calculated by the models. These changes are included in Table F-1 in terms of the decimal portion of a man-year of hired labor associated with a one AUM change for each of the eight ranch models. Those factors were applied to the total AUM increase or decrease for each model to make man year employment change estimates.

Individual EIS area ranches may not exactly match the budget displays for the ranch models. However, since the models are averages for the survey ranches falling into the respective categories, the models should on the average, accurately estimate economic impacts on EIS area ranching operations.

EXAMPLE F-1
RANCH BUDGET MODEL 1
1 to 149 Cattle

REGION: NORTHWEST
MODEL: CATTLE #1

Operating Expenses	Unit	Rate $/Unit	Number of Units	Total Expense
Taxes	$			1,600
Marketing Expenses	$			620
Ranch Business	$			620
Interest on Production	$			1,213
General Supplies	$			4,140
Utilities	$			1,567
Veterinary	$			433
Insurance	$			1,167
Equipment Rental	$			33
Fuel-Lube	$			3,533
Shearing	$			0
Water Assessment	$			67
Fence-Building Repair	$			500
Machine-Equip. Repair	$			2,473
Custom Hire	$			400
Fertilizer-Chemical	$			4,167
Seed	$			50
Feed Purchases:				
1. Alfalfa	ton	58	0	0
2. Hay	ton	58	3	174
3. Grain	bus	1.90	150	285
4. Supplement	ton	154	1.2	185
5. Salt	ton	73	2.5	183
Trucking:				
1. Cattle	$			350
2. Sheep	$			0
Labor:				
1. Manager	man-yrs.	8,952	.167	1,495
2. Seasonal	man-yrs.	5,916	.083	493
3. Temporary	man-yrs.		.051	400
4. Annual			0	0
5. Operator	man-yrs.	10,464	.833	8,716
6. Family	man-yrs.	5,664	2.167	12,274
Land Leases:				
1. Range	AUM	6.38	39.45	252
2. Irr. Pasture	AUM	6.63	17.70	117
3. Hay	acre	37	25	925
4. Alfalfa			0	0
5. Row Crop			0	0
6. Aftermath	AUM	4.93	31.8	157
Grazing Fees:				
1. Forest Service	AUM	1.60	305.1	988
2. BLM	AUM	1.51	121.05	183
3. State	AUM	3.11	48.45	151
Federal Land Expenses:				
1. Grazing Assoc. Fees	$			167
2. Maintenance Cost	$			400
Yearling Calf Purchases			0	0
Ram Lease			0	0

EXAMPLE F-1 (continued)

REGION: NORTHWEST
MODEL: CATTLE #1

Livestock Inventory	Value/Head	Number	Total Value	Annual Cost depr. + opp.	
COWS	285.80	100	28,580		2,572
BULLS	603	5	3,015	410	270
1st REPLACEMENT HEIFERS	250	16	4,000		360
2nd REPLACEMENT HEIFERS	285.80	15	4,287		386
YEARLINGS	250	9	2,250		203
EWES		0	0		0
BUCK		0	0		0
REPLACEMENT EWES		0	0		0
HORSES					
1. Ranch Use	477	6	2,862	234	256
2. Total Horses	477	9	4,293		
Total Annual opp. and depr. cost				644	4,047

Gross Revenue	Units	Rate $/Unit	Number of Units	Total Revenue
CATTLE				
Calt Sales:	head	178	64	11,392
Yearling Sales:	head	355	9	3,195
Cull Cows	head	286	13	3,718
Cull Bulls	head	420	1	420
SHEEP				
Lambs	head			0
1. fats	head			0
2. feeders	head			0
Cull Ewes	head			0
Cull Bucks	head			0
WOOL SALES	lbs			0
HORSE SALES	head	322	1	322
CROP SALES				
1. Alfalfa	ton			
2. Hay	ton	61	30	1,830
3. Grain	bus	3.71	677	2,512
LIVESTOCK	dol			19,047
CROP	dol			4,342
TOTAL	dol			23,389

EXAMPLE F-1 (continued)

REGION: NORTHWEST
MODEL: CATTLE #1

Buildings, Improvements and Land	Units	Number	Value/Unit (dollars)	Total Value (dollars)
HOUSING:				
1. Owner/Manager	sq. ft.	1,545.33	30	463.59
2. Labor I	sq. ft.	856.8	25	21,420
3. Labor II	sq. ft.	2,104	25	52,600
4. Bunkhouse	sq. ft.	882	20	17,640
BARNS	sq. ft.	3,974.75	9.5	37,760
SHEDS	sq. ft.	570.75	2.9	1,655
CORRALS	No.	1.5	2,000	3,000
GRAINARIES	sq. ft.	1,166.67	6	7,000
HAY STORAGE	sq. ft.	0	3	0
OTHER BUILDINGS	sq. ft.	1,456	2.8	4,076
FENCING:				
1. Barb	mi.	31.2	1,200	37,440
2. Woven	mi.	.3	1,300	390
DITCH	mi.	3.5	950	3,325
RANGE IMPROVEMENTS	acre	108.3	22	2,382
WELLS	No.	0	1,750	0
WINDMILLS	No.	0	1,300	0
PUMPS	No.	.3	4,833	1,449
STOCK PONDS	No.	3	3,223	9,669
SPRING DEVELOPMENT	No.	1.2	1,750	2,100
TROUGHS	No.	1	500	500
LAND:				
1. Range	acre	636.7		
2. Irr. Pasture	acre	225		
3. Alfalfa	acre	20		
4. Hay	acre	313		
5. Row Crop	acre	0		
6. Grain	acre	29.35		
TOTAL ACRES:	acre	1,224.03		
BUILDINGS VALUE				191,510
LAND IMPROVEMENTS VALUE				57,255
TOTAL VALUE				248,765

EXAMPLE F-1 (continued)

REGION: NORTHWEST
MODEL: CATTLE #1

Machinery and Equipment Inventory	Number of Units	Average Total Value	Total Annual Depreciation
TRACTORS:			
40 hp	2	4,600	614
41-74 hp	0	0	0
74 hp	0	0	0
PICKUPS	1	2,650	883
1-TON TRUCKS	1	3,350	670
AUTOS	1	1,890	756
PLOWS:			
(2 Bot.)	1	318	64
(3 Bot.)	0	0	0
(4 Bot.)	0	0	0
DRILLS	1	378	50
DISCS	1	648	130
SIDE RAKES	2	1,134	260
WINDROWERS (self prop)	1	4,050	1,157
BALERS:			
(PTO)	1	2,106	602
(self prop)	0	0	0
HARROWS	1	135	18
WAGONS (General)	2	3,834	512
MANURE SPREADERS	1	950	190
TRAILERS (Stock)	1	918	122
BALE LOADERS	0	0	0
TOOL VALUE (dollars)	-	200	13
MOWERS	1	594	170
FRONT LOADERS	0	0	0
BLADES	0	0	0
LEVELERS	0	0	0
DITCHERS	0	0	0
CRAWLER TRACTORS:			
40 hp	0	0	0
41-75 hp	0	0	0
STACKHANDS	0	0	0
SHEEPCAMPS	0	0	0
CULTIVATOR	0	0	0
SILAGE-CHOPPER/LOADER	0	0	0
SEMI-TRACTOR	0	0	0
MISCELLANEOUS	0	0	0
TOTAL	-	27,755	6,211

EXAMPLE F-1 (continued)

FORAGE BALANCE, AUM'S BY FORAGE TYPE

REGION: NORTHWEST
MODEL: CATTLE #1

FORAGE TYPE	Season 1 ON: 121 OFF: 181	Season 2 ON: 181 OFF: 270	Season 3 ON: 271 OFF: 330	Season 4 ON: 331 OFF: 120	TOTAL
Forest Service	27.00	257.40	20.70	0	305.10
BLM	67.35	30.30	21.30	2.10	121.05
State	38.10	4.50	5.85	0	48.45
Deeded Forage:					
Range	153.00	98.10	108.30	277.95	637.35
Irr. Pasture	38.40	53.55	45.45	270.85	408.25
Aftermath	0.60	0	59.25	141.10	200.95
Total Deeded Forage:	192.00	151.65	213.00	689.90	1,246.55
Leased Forage:					
Range	2.85	26.70	7.20	2.70	39.45
Irr. Pasture	2.25	13.50	1.95	0	17.70
Aftermath	0	0	28.65	3.15	31.80
Total Leased Forage:	5.10	40.20	37.80	5.85	88.95
Seasonal Totals:	329.55	484.05	298.65	697.85	1,810.10

GLOSSARY

GLOSSARY

ACTIVE LICENSED USE. The amount of authorized livestock use licensed each year.

ACTUAL USE. Five year average of active licensed use.

ALLOTMENT. An area of land where one or more operators graze their livestock. It generally consists of public lands but may include parcels of private or state owned lands. The number of livestock and period of use are stipulated for each allotment. An allotment may consist of several pastures or be only one pasture.

ALLOTMENT MANAGEMENT PLAN (AMP). A concisely written program of livestock grazing management, including supportive measures, if required, designed to attain specific multiple use management goals in a grazing allotment.

ALLOWABLE USE. The maximum livestock grazing use that would be allowed each allotment each year under the various alternatives.

ALLUVIAL SOIL. A soil developing from recently deposited alluvium and exhibiting essentially no horizon development or modification of the recently deposited materials.

ALLUVIUM. Unconsolidated rock or soil material deposited by running water, including gravel, sand, silt, clay, and various mixtures of these.

ANIMAL UNIT MONTH (AUM). The amount of forage necessary for the subsistence of one cow or its equivalent for a period of one month.

ANNUALS. Plants produced from seed which complete their life cycle in one growing season.

AQUIFER. A water-bearing bed or stratum of permeable rock, sand, or gravel capable of yielding considerable quantities of water.

ARCHEOLOGICAL RESOURCES. Sites, areas, structures, objects, or other evidence of prehistoric or historic human activities.

ASPECT. The orientation of a slope in respect to the compass; a position facing or fronting a particular direction.

ASPECT (VEGETATION). The appearance that a dominant or most common species of vegetation gives to the viewer, i.e., short grass, pinyon-juniper, big sagebrush. (See vegetation type).

AUTHORIZED USE. Synonymous with grazing preference; maximum amount of livestock use permitted on an allotment per year.

BASAL AREA. That area of ground covered by the primary stem of a plant or tree, usually expressed in square feet.

BASIN AND RANGE PHYSIOGRAPHIC PROVINCE. A region of similar geologic structures that has mountains formed by faulted and tilted blocks of strata.

BED AND BANK EROSION. Refers to channel cutting by fast moving water. Bed erosion is the depth of the eroded area; bank erosion is the width of the eroded area.

BIOMASS. The weight of all (or the specified) living organisms over a unit of area.

BROWSE. The part of leaf and twig growth of shrubs, woody vines, and trees available for animal consumption.

CATCHMENT. A structure built to collect and retain water.

CALCAREOUS. Composed of, containing, or characteristic of calcium carbonate, calcium, or limestone.

CARRYING CAPACITY. The maximum stocking rate possible without inducing damage to vegetation or related resources. Carrying capacity may vary from year to year on the same area due to fluctuating forage production.

CFR. Code of Federal Regulations.

CHECK DAM. Man-made structure which will slow down or temporarily stop runoff. Check dams reduce water velocity and channel erosion and cause sediment deposition in the channels above the structures.

COMPETITION. Two or more organisms or species sustaining damage due to a limited resource mutually required.

COMPETIIVE FORAGE. Forage which is being utilized by more than one grazing animal at the same period of time or in the same areas.

COMPOSITION. The proportions of various plant species in relation to the total in a given area.

CONTRAST. The effect of a striking difference in the form, line, color, or texture of the landscape features within the area being viewed.

CONTRAST RATING. A method of determining the extent of visual impact for an existing or proposed activity that will modify any landscape feature (land and water form, vegetation and structures).

CRITICAL WINTER RANGE. An area essential to the winter maintenance of a given population, which, if modified, could result in the loss of a significant portion of that particular population.

CULTURAL RESOURCES. Those fragile and nonrenewable remains of human activity, occupation, or endeavor, which are reflected in districts sites, structures, buildings, objects, artifacts, ruins, works of art, architecture or natural features.

DEFERRED GRAZING. Withholding of livestock grazing until a certain stage of plant growth is reached, usually maturity of seed.

DETRITUS. Disintegrated inorganic and organic matter.

DIRECT INCOME. Synonomous with net revenues to ranching operations.

DISCORDANT VISUAL IMPACT. An adverse impact to a VRM management class.

DISSOLVED SOLIDS. The total amount of dissolved material, organic and inorganic, contained in water or wastes.

ECOSYSTEM. A complex self-sustaining natural system, which includes living and nonliving components of the environment, and the interactions that bind them together. Its functioning involves the circulation of matter and energy between organisms and the environment.

EDAPHIC. Related to soils.

EDGE EFFECT. An area where the types of food and cover are more diverse sometimes creating a more favorable wildlife habitat, i.e., meadow abutting forest or logged area adjacent to or surrounded by "natural" vegetation.

ENDANGERED SPECIES. Any species which is in danger of extinction throughout all or a significant portion of its range.

ENVIRONMENTAL ASSESSMENT (EA). A report analyzing the impacts of some proposed action on a given environment. It is similar to an environmental statement except that it is generally smaller in scope and makes recommendations for action. EAs are sometimes preliminary to environmental statements.

EROSION. The process by which soil particles are detached and moved.

EROSION CONDITION CLASS. A classification system for soil erosion which allows a site to be ranked on a scale of 0-100, in increments of 20 points. Value classes are: 1-20 = stable; 21-40 = slight; 41-60 = moderate; 61-80 = critical; 81-100 = severe. The terms used for value classes are largely self-explanatory.

FACULTATIVE. Capable of adaptive response to variable environmental conditions.

FECAL COLIFORM. Nonspore-forming, rod-shaped bacteria (i.e., *Escherichia coli*); indicator of water quality.

FIRE BREAKS. A barrier of cleared or plowed land intended to check a fire.

FLOODPLAIN. The nearly level alluvial plain that borders a stream and is subject to inundation during high water.

FLOW PATTERN. Microchannel(s) collecting and/or redistributing water resulting from precipitation events; a flow pattern is smaller than a rill.

FUGITIVE DUST. Dust particles suspended in the atmosphere, usually created by winds and traffic.

GRAZEABLE. Referring to an area or areas suitable for grazing based upon the presence of forage and its accessibility to the kinds of animals under consideration.

GRAZING PERMIT. A document authorizing use of the public lands within grazing districts for the purpose of grazing livestock.

GRAZING PREFERENCE. Preference denotes the number of active Animal Unit Months (AUMs) of livestock grazing on public lands available to be authorized by permit. Does not include suspended AUMs.

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 vegetation.

GRAZING TREATMENT. Periods of livestock grazing use and rest from use.

GROUND COVER (SOIL). The material covering the soil and providing protection from, or resistance to, the impact of raindrops, and expressed in percent of the area covered. Composed of vegetation, litter, erosion pavement, and rock.

GROUND COVER (VEGETATION). Vegetation ground cover is living vegetation which covers a point on the ground surface, when viewed from directly overhead, including canopies of trees and shrubs within 20 feet or less of the ground surface and lichens and mosses 1/16 inch or more in thickness.

GROUND WATER. That part of subsurface water that completely saturates the rocks and is under hydrostatic pressure.

GULLY. A channel cut by concentrated runoff through which water commonly flows during or immediately after heavy rains or during the melting of snow. A gully must have a depth in excess of 6 inches.

HABITAT. A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

HERBACEOUS. Green plants with leaflike appearance or texture, not including shrubs, trees, mosses, or lichens.

HERBICIDE. A chemical substance used to kill or inhibit growth of plants.

HISTORICAL RESOURCES. All evidences of human activity that date from historic (i.e., recorded history) periods.

HMP. Habitat Management Plan.

HUNTER DAY. Participation of one person in hunting for all or part of one day.

HYBRIDIZATION. The act of producing offspring to two animals or plants of different species.

HYDROCARBON. Any of numerous organic compounds, such as benzene and methane, that contain only carbon and hydrogen.

HYDROGRAPHIC AREA. A region wholly or partially surrounded by topographic barriers and comprised of watersheds which drain to a common point, either to an interior basin or to an adjoining hydrographic area.

HYDROLOGIC SOIL GROUP. A class of soils which have similar general infiltration and water movement ability through the soil profile and bedrock.

IMPACT. The final or ultimate change in an environmental element. This is determined by tracing all cause-effect paths generated by an action.

INCREASERS. Plants which increase as the vegetational composition deteriorates.

INDIRECT INCOME. Net revenue to other sectors of the economy resulting from sales to ranching operations.

INFILTRATION. The downward entry of water into the soil.

INTENSIVE MANAGEMENT. Management using range improvements and scientific techniques to maximize sustained yields of animal and forage production.

INTRUSION. A feature (land and water form, vegetation, or structure) which is generally considered out of context with the characteristic landscape.

INVADERS. Plants which invade or occupy open space resulting from the loss of other plants.

INVERSION. A state in which the air temperature increases with increasing altitude, holding surface air down along with its pollutants.

INVERTEBRATE. An animal without a backbone. This group includes such animals as insects, clams, snails, and worms.

KEY FORAGE SPECIES. Relatively or potentially abundant, endures moderately close grazing, and serves as an indicator of changes occurring in the vegetational complex. This species is an important vegetative component which, if overused, will have significant effect on watershed condition, grazing capacity or other resource values.

KIND OF LIVESTOCK. Species of domestic livestock grazing on a range (cattle, horses, sheep, or a combination of these). May be broken down to greater detail (cow with calves, yearlings, steers, ewes, ewes with lambs, etc.).

LANDSCAPE FEATURES. The land and water form; vegetation and structures which compose the characteristic landscape.

LEACHING. The removal of materials in solution from the soil.

LESS INTENSIVE MANAGEMENT. Management using scientific techniques with a minimum of range improvements to achieve management goals.

LICENSED ACTIVE USE (LICENSED USE). Synonomous with Grazing Permit.

LITHIC SCATTER. Stone debris left as the result of tool manufacture or reshaping.

LITTER. The uppermost layer of undecomposed, organic debris on or near the soil surface.

MANAGEMENT FRAMEWORK PLAN (MFP). Land use plan for public lands which provides a set of goals, objectives, and constraints for a specific planning area to guide the development of detailed plans for the management of each resource.

MESA. A broad, nearly flat-topped and usually isolated upland mass.

MESIC. Characterized by, relating to, or requiring a moderate amount of moisture.

MORPHOLOGY. Pertaining to the shape, form, or structure of a thing.

MULTIPLIERS. Amount of additional income expected to be generated in all sectors of a regional economy as a result of an increase or decrease in income of the livestock sector.

NAAQS. National Ambient Air Quality Standards.

NATIONAL REGISTER OF HISTORIC PLACES. The official list, established by the Historic Preservation Act of 1966, of the nation's cultural resources worthy of preservation.

NATIONAL REGISTER PROPERTY. A district, site, building, structure, or object included in the National Register.

NET REVENUE TO RANCHING OPERATIONS. Gross revenue minus all operating expenses including operator and family labor costs. Net revenue is direct income to the ranch operator and family.

NONCOMMERCIAL FORESTS. Forests that are not capable of producing at least 20 cubic feet per acre per year of timber-producing tree species.

NONCOMPETITIVE FORAGE. Forage utilized by only one type of grazing animal.

NONUSE (REGULAR). The authorization by permit to not place livestock on the range without loss of preference for future consideration in livestock use of public lands. Expressed in Animal Unit Months.

OUTDOOR RECREATION OPPORTUNITIES (ACTIVITIES). A general categorization of leisure pursuits which occur in the outdoors.

OVERSTORY. That portion of a plant community that is dominant as to height, the tallest plants on a given site.

PAA. Planning Area Analysis.

PALEOINDIAN. Cultural remains of human groups which coexisted with Pleistocene megafauna in North America.

PALEONTOLOGY. A science dealing with the life of past geological periods as known from fossil remains.
PARENT MATERIAL. The unconsolodated and more-or-less chemically weathered mineral or organic matter from which soil develops.
PASTURE. As used in this document, a pasture is a subdivision of a grazing allotment on public lands. For example, the allotment is divided into 3 pastures.
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.
PERCOLATION. Downward movement of water through soils.
PERENNIAL. A plant having a life cycle of 3 or more years.
PERENNIAL WATER. Bodies of water or streams which contain water yearlong.
PERIOD OF USE. A specified number of days in which livestock are permitted to graze on public land. Period is specified on the grazing permit.
PERMEABILITY. The ease with which gasses, liquids, or plant roots penetrate or pass through a bulk mass of soil or a layer of soil.
PERMITTEE. Holder of a license or permit for grazing on an allotment.
PETROGLYPH. A figure, design, or indentation carved, abraded, or pecked on a rock.
PHENOLOGY. A term used to describe the sequence of events and time of occurrence of the life processes of a plant, i.e., start of growth, bloom stage, seed ripe, dormant stage.
PHENOTYPIC. The visible properties or appearance of an organism that are produced by the genetic constitution and the environment.
PHYSIOGRAPHIC REGION. An extensive portion of the landscape normally encompassing many hundreds of square miles which portrays similar qualities of soil, rock, slope, and vegetation of the same geomorphic origin.
PICTOGRAPH. A figure or design painted on a rock.
PLANT COVER. The percent of an area covered by any part of living plant material (aerial plant cover), or that percent area occupied by the portion of living plants at the point of emergence from the ground (basal plant cover).
PLANT DENSITY. The number of vegetation individuals per unit of area. Refers to the relative closeness of individual vegetation to one another.
POPULATION. A group of organisms of the same species living in a particular space.
POROSITY. The volume percentage of the total bulk not occupied by solid particles.
PRECIPITATION. The discharge of water, in liquid or solid state, out of the atmosphere, generally upon land or water surface. The term is also used to designate the quantity of water that is precipitated.
PREFERENCE. See grazing preference.
PRESCRIBED BURN. A controlled fire used to meet management goals, i.e., reduce shrub and tree invasion or change species composition towards a more desirable forage.
PRIVILEGE. Synonomous with grazing preference.
PUBLIC LAND. Land administered by the Bureau of Land Management.
RANCH BUDGET. An itemized summary of the expenditures and receipts of a ranch operation.
RANCH OPERATOR. See permittee.
RANGE CONDITION. The apparent health of rangeland vegetation and soils as measured by the composition of plant species desirable to livestock with ratings of good, fair, and poor (Appendix E). Stability of the soil is also used to judge range condition.
RANGE TREND. The direction of change in range condition.
RAPTOR. Birds of prey with sharp talons and strongly curved beaks; e.g., hawks, owls, eagles, falcons.
RECREATION RESOURCES. Any resource or feature that contributes to outdoor leisure pursuits or experiences.
RESERVOIR. A livestock watering pond less than 2 acre/feet capacity.
REST. Deferment of grazing on a range area to allow plants to replenish their food reserves. Used here to refer to year long relief from livestock grazing.
RHIZOMATOUS GRASS. Grasses with a rootlike, usually horizontal, stem growing under or along the ground and sending out roots from its lower surface and leaves or shoots from its upper surface.
RILL. A small intermittent water course with steep sides, less than 6 inches deep.
RIPARIAN. Situated on or pertaining to the bank of a river, stream, or other body of water. Normally used to refer to the plants of all types that grow rooted in the watertable of streams, ponds, and springs.
ROADLESS AREA. That area bounded by a road using the edge of the physical change that creates the road or the inside edge of the right-of-way as a boundary.
ROCKSHELTER. Any natural shelter between or under standing rocks in which the debris and remains of campfires of prehistoric people are found.
SCENIC QUALITY. The degree of harmony, contrast, and variety within a landscape.
SEASON OF USE. Synonomous with period of use.
SEDIMENTARY. Rocks that are formed from fragments of other rocks and deposited in water (sandstone, shale, conglomerate), by precipitation from solution (gypsum) or from secretions or organisms (mostly limestone).
SEDIMENTATION. The act or process of depositing a material, such as water depositing suspended soil particles in an area, such as a stream bottom.
SEDIMENT YIELD. The amount of sediment given up by a watershed over a specific time period, usually a year. Ordinarily, it is expressed as tons, acre feet, or cubic yards of sediment per unit of drainage area per year.
SENSITIVITY. As applied to visual resource management, that degree of concern expressed by the user toward scenic quality and existing or proposed visual change in a particular characteristic landscape.
SEP. Social-Economic Profile of the tri-county area of northwest Colorado.
SERAL. Pertaining to the successional stages of biotic communities.
SHEET EROSION. The removal of a fairly uniform layer of soil from the land surface by runoff water.
SILT. Sedimentary material consisting primarily of mineral particles intermediate in size between sand and clay.
SOIL ASSOCIATION. A mapping unit used on general soil maps, in which two or more defined taxonomic units occurring together in a characteristic pattern are combined because the scale of the map due to the purpose for which it is being made does not require delineation of the individual soils.
SOIL PRODUCTIVITY. The capability of a soil to produce a specified plant or sequence of plants under a specified system of management.
SOIL SERIES. The basic unit of soil classification being a subdivision of a family and consisting of soils which are essentially alike in all major profile characteristics except the texture of the surface horizon.
SOIL STRUCTURE. The combination or arrangement of primary soil particles into secondary particles, units, or peds. These secondary units may be, but usually are not, arranged in the profile in such a manner to give a distinctive characteristic pattern.
SOIL SURFACE FACTOR (SSF). A factor reflecting the present erosion activity on the ground surface. It is used to reflect the general condition of the area represented by an associated transect used in the determination of hydrologic condition for watershed cover. Synonomous with Erosion Condition Class.
SPECIES DIVERSITY. A general relationship between the number of individuals in a given area. This relationship is

expressed as ratios between the number of species and number of individuals and are called species diversity indices.

STAND. An aggregation of trees or other growth occupying a specific area and sufficiently uniform in composition, species, age, arrangement, and condition, to be distinguishable from the forest or other growth on adjoining areas.

SUBSTRATE. A surface on which a plant or animal grows or is attached.

SURFACE SOIL. The uppermost part of the soil, ordinarily moved in tillage, or its equivalent in uncultivated soils, and ranging in depth from 3 or 4 inches to 8 or 10 inches.

TAXONOMIC. Process of classifying organisms in established categories.

THREATENED SPECIES. Any species which is likely to become an endangered species within the forseeable future throughout all or a significant portion of its range.

TOPSOIL. Presumed fertile soil or soil material, usually rich in organic matter, used to top-dress road banks, parks, and other similar areas.

TOTAL SUSPENDED PARTICULATES. All solid or semi-solid material found in the atmosphere.

UNDERSTORY. That portion of a plant community that grows underneath taller plants growing on the same site.

UNGULATE. A hoofed mammal belonging to one of two taxonomic categories called orders and including horses, cattle, and deer.

UNIT RESOURCE ANALYSIS (URA). The system of data gathering and analysis that precedes land use planning for public lands. See also Management Framework Plan.

VEGETATION TYPE. A plant community with immediately distinguishable characteristics, based upon and named after the apparent dominant plant species.

VERTEBRATE. An animal having a backbone or spinal column.

VIGOR (PLANTS). 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.

VISUAL RESOURCE. Land, water, vegetation, animals or any other features that are visible.

VISUAL RESOURCE MANAGEMENT (VRM). The planning, design, and implementation of management objectives to provide acceptable levels of visual impacts for all BLM resource management activities.

VISUAL RESOURCE MANAGEMENT CLASSES. The degree of visual change that is acceptable within the characteristic landscape. It is based upon the physical and sociological characteristics of any given homogeneous area and serves as a management objective.

WATER GAPS. A space or break left in a fence to allow access to water.

WICKIUP. A frame hut covered with matting, bark, or brush.

WILDERNESS AREA. An area formally designated by Congress as a part of the National Wilderness Preservation System.

WILDERNESS CHARACTERISTICS. The definition contained in section 2(c) of the Wilderness Act (78 Stat. 891).

WILDERNESS STUDY AREAT1. A roadless area which has been found to have wilderness characteristics (thus having the potential of being included in the National Wilderness System), and which will be subjected to intensive analysis in BLM's planning system, and public review to determine wilderness suitability, and is not yet the subject of a congressional decision regarding its designation as wilderness.

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(LIVESTOCK/WILD HORSE/WILDLIFE DIETARY PREFERENCE)

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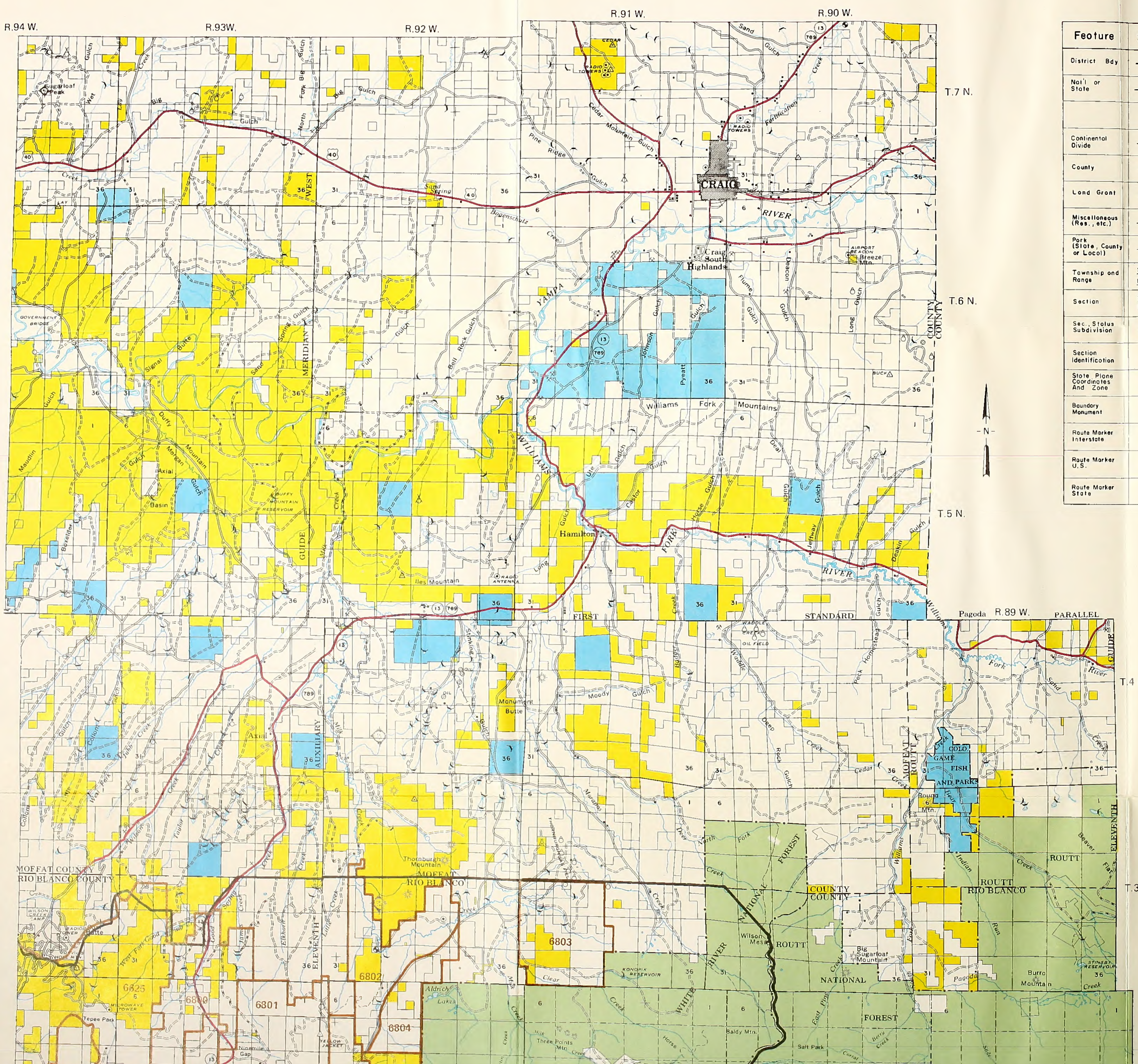
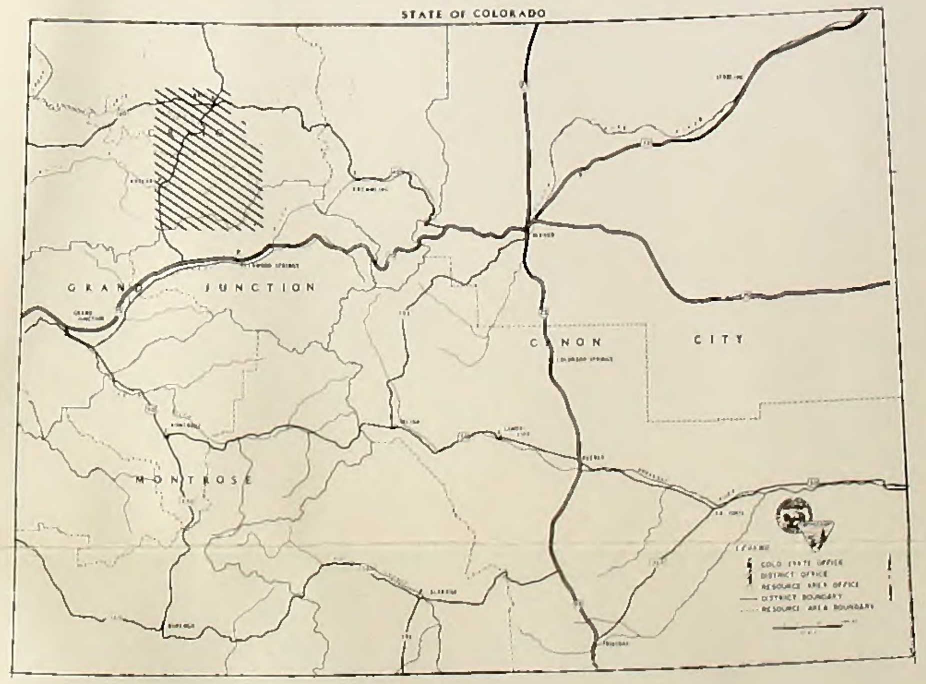


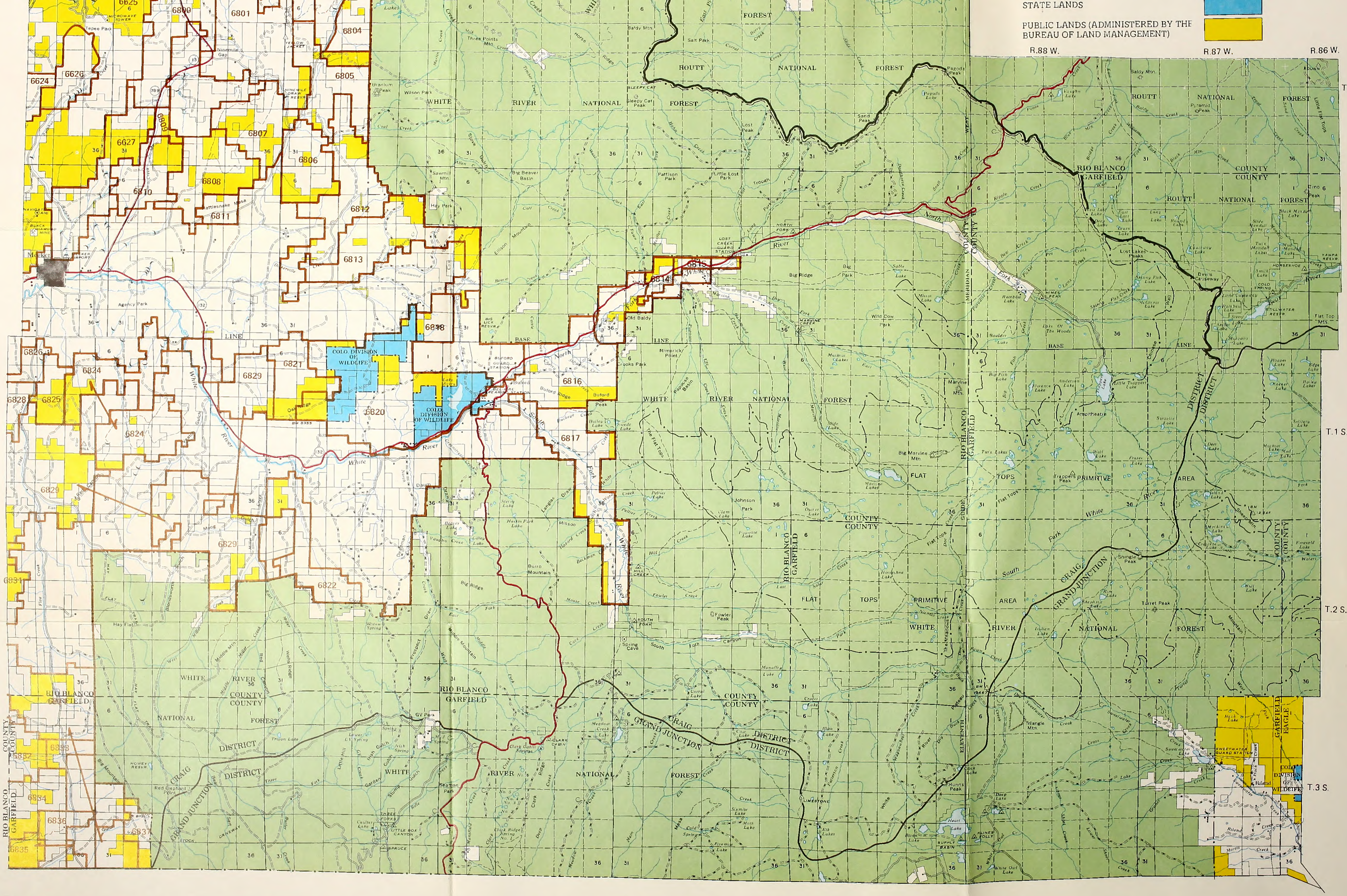


MAP SYMBOLS

Feature	Symbol	Feature	Symbol	Feature	Symbol	Feature	Symbol	Feature	Symbol
District Bdy		Road All Weather	Divided	Principal Access	Divided	Buildings		Towns and Cities	
Nat'l or State		Road Seasonal Use				Buildings (Abandoned)		River or Large Stream	
		Road "Jeep" Type "Primitive"		Road Interchange		BLM Office		Stream	
Continental Divide		Trail		Rest Area		School		Large Dam	
County		Railroad Double Track				Church		Reservoir or Retention Dam	
Land Grant		Railroad Single Track				Radio Installation		Lake or Pond	
Miscellaneous (Res., etc.)		Glacier		Levee or Dike		Fire Lookout (Primary)		Intermittent Lake or Pond	
Park (State, County or Local)		Road Bridge		Corral		Fire Lookout (Secondary)		Dry Lake or Pond	
Township and Range	Surveyed Protracted	Railroad Bridge		Recreation Site		Fire Tool Cache		Marsh	
Section	Surveyed Protracted	Foot Bridge		Tanks-(label as to type)		Shelter		Spring	
Sec., Status Subdivision		Ferry		Oil or Gas Wells		Cliff Dwelling		Improved Spring	
Section Identification	6	Road Ford		Mine or Quarry		Ruins Small Large	Ruins Ruins	Well	
State Plane Coordinates And Zone	1,500,000E	Trail Ford		US Mineral or Location Monument		Cemetery	CEM	Artesian Well	
Boundary Monument		Road Tunnel		Located Object (Labeled)		Sawmill		Windmill	
Route Marker Interstate		Railroad Tunnel		Triangulation Station	Dag	Airfield		Aqueduct Tunnel	
Route Marker U.S.				Bluffs or Cliffs				Ditch or Canal	
Route Marker State		Prominent Peak		Prominent Ridge		Gaging Station		Aqueduct	

0 5 10 15 20 miles

RANGE ALLOTMENTS	6831
FOREST LANDS	
STATE LANDS	
PUBLIC LANDS (ADMINISTERED BY THE BUREAU OF LAND MANAGEMENT)	



WHITE RIVER RESOURCE AREA – EAST 1/3

SOURCE OF INFORMATION: OFFICE OF SPECIAL MAPPING, DENVER SERVICE CENTER, AND OTHER BLM RECORDS

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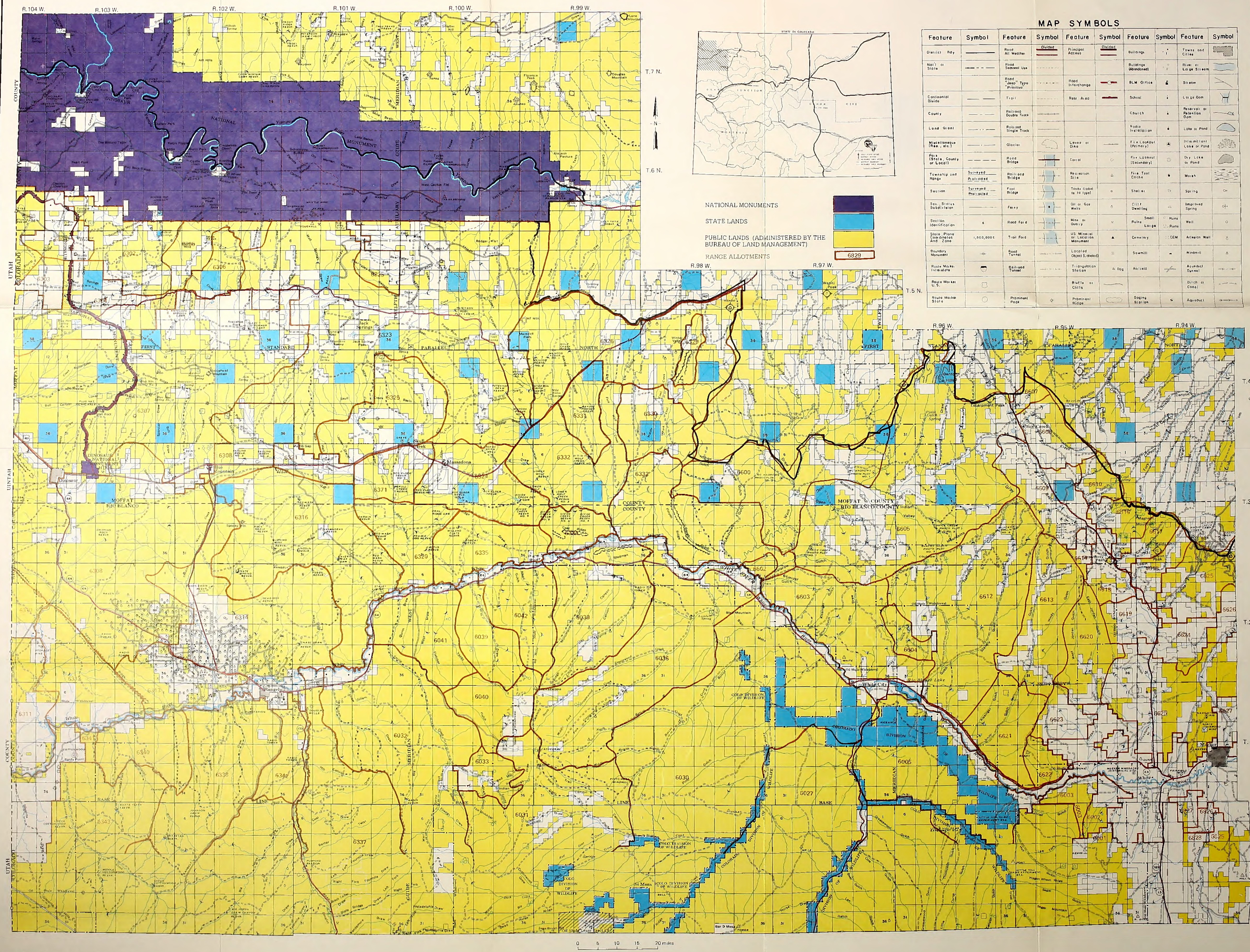

SOURCE OF INFORMATION: OFFICE OF SPECIAL MAPPING
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WHITE RIVER RESOURCE AREA – NORTH 1/3

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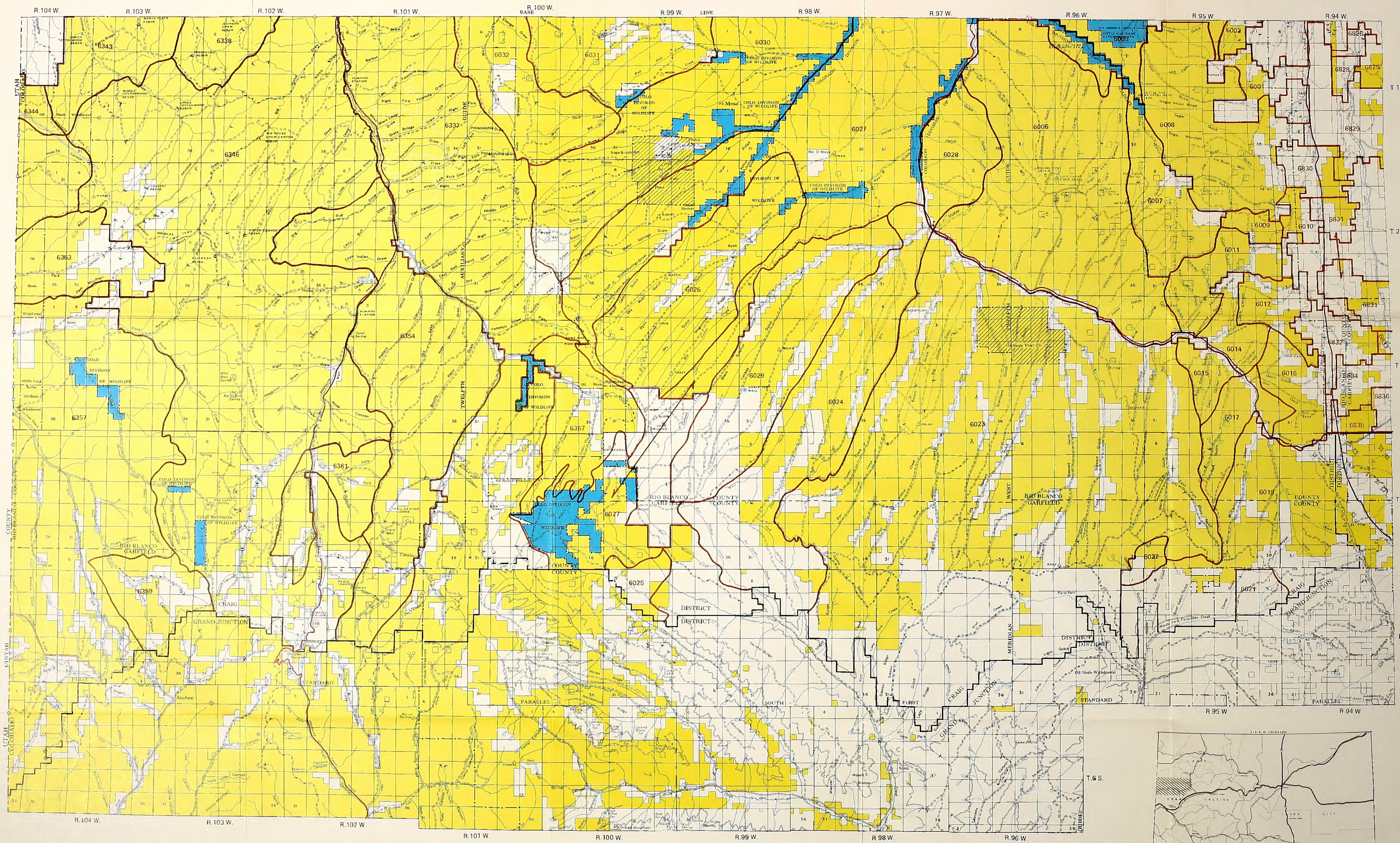

0 5 10 15 20 miles

STATE LANDS

PUBLIC LANDS (ADMINISTERED BY THE BUREAU OF LAND MANAGEMENT)

RANGE ALLOTMENTS

SOURCE OF INFORMATION: OFFICE OF SPECIAL MAPPING, DENVER SERVICE CENTER, AND OTHER BLM RECORDS

WHITE RIVER RESOURCE AREA — SOUTH 1/3

U.S. GOVERNMENT PRINTING OFFICE