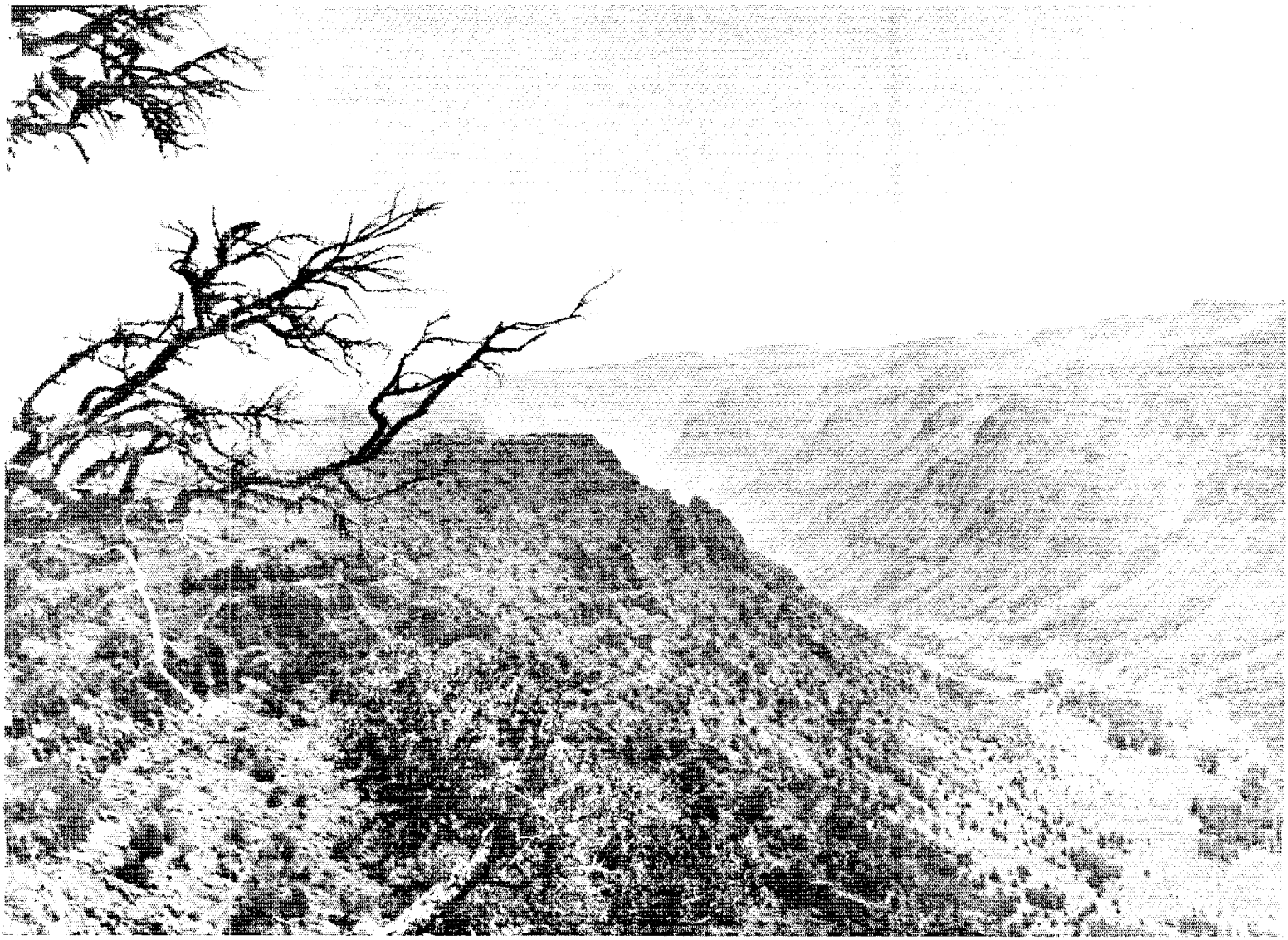
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

Draft

Oregon State Office | September 1982

Andrews Grazing Management Program

Environmental Impact Statement



IN REPLY REFER TO

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

OREGON STATE OFFICE
P.O. Box 2965 (825 NE Multnomah Street)
Portland, Oregon 97208

Enclosed for your review and comment is the Andrews Grazing Management Draft Environmental Impact Statement (EIS). The statement analyzes the impacts which would result from the proposed livestock management program and three alternatives. The purpose of the statement is to disclose the probable environmental impacts for consideration along with economic and technical information in the decisionmaking process.

Some of the proposed range improvements arrayed in this EIS may be dropped from consideration after completion of benefit cost analysis. After completion of the decision process the actual level of range improvements will also be limited by availability of funds.

One EIS, the Harney EIS, was originally scheduled to analyze the grazing management on the Riley Planning Unit and the Andrews Resource Area. Under a revised schedule, a separate EIS is being prepared for each area. The Andrews EIS covers the Andrews Resource Area. The Riley EIS, the draft of which was distributed in June 1982, covers the Riley Planning Unit.

Comments concerning the adequacy of this statement will be considered in the preparation of the final environmental impact statement. The comment period will end December 1, 1982. Informal meetings to answer questions on the draft EIS will be held at 7:30 p.m., November 16, 1982, in Denio, Nevada at the Community Hall and 7:30 p.m., November 17, 1982, in Burns, Oregon, in the Club Room of the Harney County Museum. Bureau of Land Management personnel will be available to answer questions regarding the draft EIS analysis.

The draft EIS may be incorporated into the final EIS by reference only. The final EIS then would consist of public comments and responses and any needed changes of the draft. Therefore, please retain this draft EIS for use with the final.

Comments received after the close of the comment period will be considered in the decision process, even though they may be too late to be specifically addressed in the final environmental impact statement. Your comments on the draft EIS should be sent to:

District Manager
74 S. Alvord Street
Burns, Oregon 97720

Sincerely yours,

State Director

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

Draft **Environmental Impact Statement**

Andrews Grazing Management Program

Prepared by
Bureau of Land Management
U.S. Department of the Interior
1982

e & d -
State Director, Oregon State Office

ANDREWS PROPOSED GRAZING MANAGEMENT

Draft (x) Final ( ) Environmental Impact Statement
Department of the Interior, Bureau of Land Management

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

2. **Abstract:** The Bureau of Land Management proposes to implement livestock grazing management on 1.6 million acres (24 allotments) of public land in eastern Oregon. Unallotted status would continue on 509 acres. Implementation of the proposed action includes allocation of forage to livestock, wild horses, wildlife and nonconsumptive uses: establishment of grazing systems; and construction of range improvements. Forage condition would improve and forage production would increase.

Initially, there would be a 10 percent decrease in allocation to livestock from the 1980 actual use of 101,769 AUMs. No change in the amount of water runoff would occur; however, sediment yield would decrease. Wig game populations and fish production are expected to increase. Six permittees would lose forage exceeding 10 percent of their annual requirements under the proposed action and Alternative 2, and 14 would be so affected under Alternative 3. Under Alternative 3, losses exceeding 50 percent of current requirements would be experienced by six permittees for a period of 1 or more months of the year.

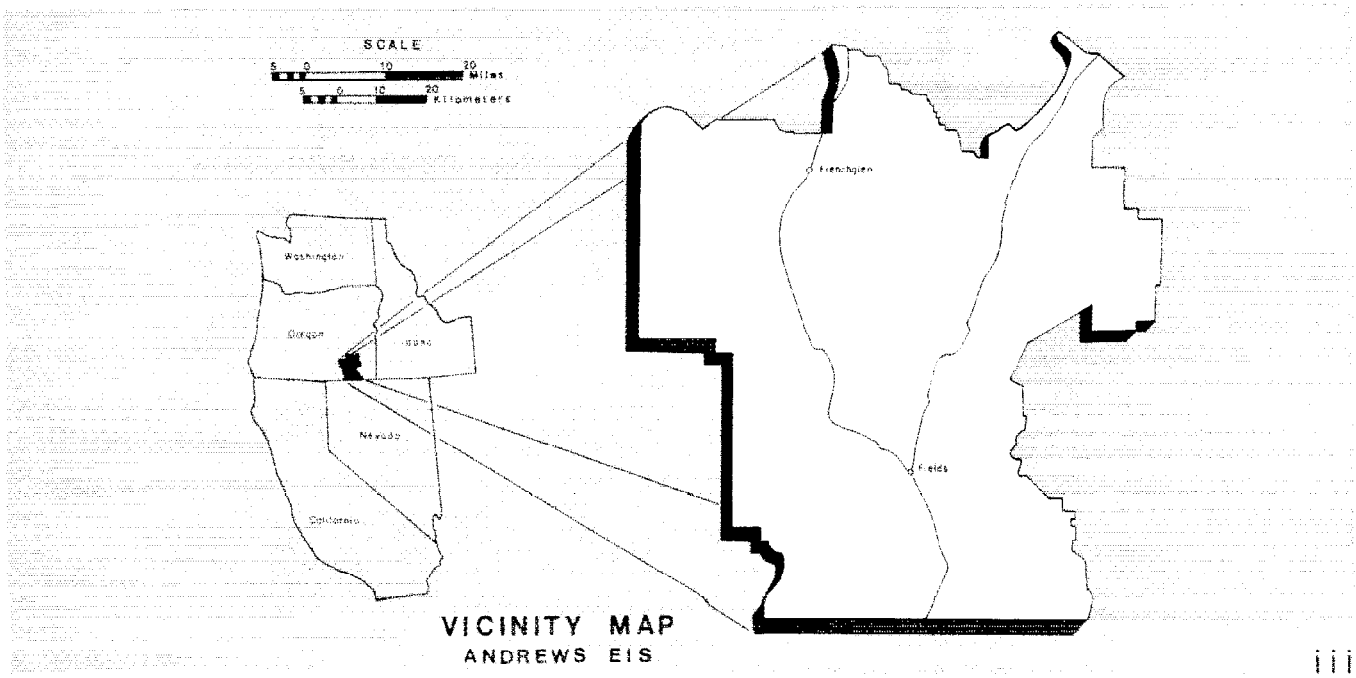
3. Alternatives analyzed:

a. No Action
b. Emphasize Livestock Grazing
c. Emphasize Non-Livestock Values.

4 Draft statement made available to EPA and the public late September 1982. The comment period will be 60 d&s, ending December 1, 1982.

5. For further information contact:

Gerry Fullerton, EIS Team Leader
Bureau of Land Management
Oregon State Office
P.O. Box 2965 (825 N.E. Multnomah St.)
Portland, Oregon 97208
Telephone: (503) 231-6951



VICINITY MAP
ANDREWS EIS

Table of Contents

Chapter 3 Environmental Consequences

Tables

Figures

SUMMARY

This environmental impact statement (EIS) describes and analyzes the environmental impacts of implementing a livestock grazing management program in the Andrews EIS area of the Burns District in eastern Oregon. The proposed action. developed through the Bureau planning system using public input, is the preferred alternative. Three other alternatives are also described and analyzed.

The proposed action consists of range improvements, livestock forage allocation and implementation of grazing management of 24 allotments covering 1573,481 acres of public land and continued unallotted status (no authorized livesrock grazing) on 509 acres.

The purpose of the proposed action is to implement planning decisions needed for management, protection and enhancement of the rangeland resources. The proposal would cover a 25-year period: 10 years for implementation and 15 additional years to achieve objectives.

Under the proposed action. the existing forage production of 102.536 AUMs would be allocated to livestock (94,687 AUMs). wildlife (3,399). wild horses (5,680) and nonconsumptive uses (1,770 AUMs). The allocation to livestock constitutes a 10 percent decrease from the 1980 actual use of 101.769 AUMs.

In the long term. implementation of grazing systems and range improvements would result in future forage production that could be as much as 158.224 AUMs. It is anticipated that this would be allocated to livestock (147,375 AUMs), wildlife (3,399 AUMs). wild horses (5.680 AUMs) and nonconsumptive uses (1.770 AUMs). Rest rotation grazing system would be implemented on 55 percent of the area. winter grazing on 13 percent, spring grazing on 12 percent. spring, summer grazing on 9 percent, and other systems on 1 1 percent.

Proposed range improvements include 262 miles of fence, 37 springs, 103 miles of pipeline, 18 wells, 55 reservoirs and 26 waterholes. Vegetation manipulation is proposed for 153,751 acres and would consist of 78,520 acres of brush control and seeding, 72,731 acres brush control only and 2,500 acres of irrigated pasture. Brush control would consist of spraying with 2,4-D herbicide or burning.

Three alternatives to the proposed action were analyzed:

1. No **action** - Under this alternative, there would be no change from present management conditions. Livestock use would be allowed to continue at the 1980 active preference level of 102.988 AUMs. In addition, use by wildlife (3,399 AUMs), wild horses (5.680 AUMs) and nonconsumptive use (1.522 AUMs) would occur. The total use of vegetation under this alternative would be about 11.053 AUMs higher than the existing livestock forage production (which is based on proper use levels) Spring/summer grazing would continue on 56 percent of the area, winter on 15 percent, spring on 12 percent. rest rotation on 10 percent and others on 7 percent. No additional range improvement projects or grazing systems would be undertaken.

2 Emphasize Livestock Grazing - In the long term, this alternative would provide 32.205 AUMs more than the proposed action from implementation of the following additional improvements: 69.280 acres brush control and seed. 72.880 acres brush control, 3,900 acres irrigated pasture, 5 wells, 46 miles of pipeline and 86 miles of fence. Rest rotation grazing would be implemented on 54 percent of the area, winter an 13 percent. spring on 12 percent, deferred rotation on 7 percent. spring/summer on 9 percent and others on 5 percent. The wild horse numbers would be 30 in the South Steens herd management area and 60 in the Alvord/Sheepshead herd management area, All riparian areas would be grazed by livestock except in existing exclosures. The initial allocation of forage production would be the same as for the proposed action for wildlife. 218 AUMs less for nonconsumptive uses, 4.840 AUMs less for wild horses and 5.088 AUMs more for livestock,

3 **Emphasize Non-livestock Grazing Values** - In the long term, this alternative would provide 23.843 AUMs less than the proposed action. There would be an additional 61 miles of fence constructed. Other range improvements would be less than the proposed action level as follows: 33 miles of pipeline, 6 springs, 1 well, 2 reservoirs, 73.583 acres brush control and seed and 66.28: acres brush control only. Livestock grazing would be excluded from 263,282 acres with special values (17 percent of the area). Rest rotation grazing would be implemented on 38 percent of the area. deferred rotation on 5 percent, winter on 11 percent, spring on 11 percent, spring 'summer on 16 percent and others on 2 percent,

ENVIRONMENTAL CONSEQUENCES

Vegetation

Under the proposed action and Alternatives 2 and 3, forage conditions would improve and livestock forage production would increase. Total residual ground cover would decrease significantly under the proposed action and Alternative 2. Alternative 1 would result in a decline in *forage condition, an*

unquantified decrease in livestock forage production and a decrease in total residual ground cover. The proportion of residual ground cover composed of perennial vegetation would increase under all alternatives except Alternative 1. The proposed action and Alternative 3 would result in significant increases in woody key species on poor and fair condition riparian areas. Alternatives 1 and 2 would result in decreases in woody species in these areas. The standard procedures and design elements would prevent impacts to proposed threatened, endangered and sensitive plants from construction of range improvements. The impacts from other aspects of the grazing management program on these plant species are unknown.

Soils

Erosion would be slightly decreased under the proposed action and Alternatives 2 and 3 due to the increase in the proportion of residual ground cover composed of perennial vegetation. Erosion would increase on allotments presently overstocked under Alternative 1. Streambank stability would significantly increase under Alternative 3 and slightly increase under the proposed action. Decreases in streambank stability would occur under Alternative 1.

Water

No change in the amount of runoff would occur under any of the alternatives. Sediment yield would decrease under the proposed action and Alternative 3 and remain the same under Alternative 2. Under Alternative 1, sediment yield would increase over present levels.

Wildlife

Small mammals, birds and fish which are dependent on riparian areas would increase under the proposed action and Alternative 3. Most increases would occur during the first 6 years under Alternative 3. The proposed action may take 10-20 years for significant increases to occur. Alternatives 1 and 2 would decrease wildlife dependent on riparian areas.

Vegetation manipulation would greatly decrease small mammals and birds which are dependent on sagebrush. Decreases would occur on 150,000 acres in the proposed action, 293,000 acres in Alternative 2 and 11,000 acres in Alternative 3. Sage grouse populations associated with 5 strutting grounds would be decreased in Alternative 2.

The proposed action would support a slight increase in deer numbers. Alternatives 1 and 3 would maintain existing numbers. Decreased cover from sagebrush control in Alternative 2 would slightly decrease deer.

The proposed action and Alternative 2 would support increased antelope numbers. Alternative 1 and 3 would maintain existing populations.

Wild Horses

Temporary disturbances to wild horses would occur during the period of construction of range improvements under the proposed action and Alternatives 2 and 3. Wild horses would be allocated sufficient forage to provide for a maximum total population of 540 head under the proposed action and Alternatives 1 and 3; and 90 head under Alternative 2.

Recreation

Projected visitor use to 1990 would not be significantly impacted under any alternative. As a result of impacts to recreational experiences and recreation-related wildlife populations, visitor use reductions would tend to balance increases in visitor use in activities beneficially impacted. Under all alternatives, area-wide 1990 projected visitor use for public lands in the EIS area would show an estimated 26 percent increase over existing levels for a total of about 155,710 visitor days.

Cultural Resources

Appropriate measures would be taken to identify and protect cultural sites prior to ground-disturbing activities. No impacts would occur to known cultural sites of significance.

Visual Resources

Certain portions of the EIS area may experience slight degradation of visual quality due to contrast created by range improvements. Project design features, as well as VRM program procedures and constraints, would minimize land form and vegetative contrast. In the long term, visual quality would improve as range condition improves.

Special Areas

No adverse impacts would occur to potential ACECs or proposed RNAs under the proposed action or any alternative. Livestock exclusion from special areas currently being grazed would have the potential to create beneficial impacts.

Socioeconomics

Six permittees would lose public forage exceeding 10 percent of their total annual forage requirements in the short term under the proposed action and Alternative 2. None would lose as much as 10 percent under Alternative 1. Under Alternative 3, 14 permittees would lose more than 10 percent of their annual requirements. in terms of their month-to-month requirements, under the proposed action and under Alternative 2 one permittee would lose 50 percent or more of herd requirements for 1 or more months during the year, Under Alternative 3. six permittees would be so affected,

Local personal income and employment in the short tern; would be increased under ail alternatives. however. increases under Alternative 3 would be negligible. In the long term under the proposed action, income would be increased by $805,000 annually and employment by 78 jobs. Increases would also occur under the other alternatives.

PURPOSE AND NEED

This environmental impact statement (EIS) analyzes the impacts of implementing a livestock grazing management program on public lands administered by the Bureau of Land Management (BLM) in the Burns District in eastern Oregon. This area is referred to as the Andrews EIS area.

The BLM is responsible for management of livestock grazing use on public lands in a manner that would maintain or improve the public land resources including soil, water, vegetation and wildlife habitat. The Bureau's principal authority and direction to manage lands are found in the Taylor Grazing Act of 1934, Federal Land Policy and Management Act of 1976 (FLPMA) and Public Rangelands Improvement Act of 1978.

The purpose of the proposed action is to implement planning decisions needed for management, protection and enhancement of the rangeland resources. The proposed action is a livestock grazing program consisting of forage allocation and implementation of grazing systems and range improvement projects. This action is needed to maintain or improve conditions. Three alternatives to the proposed action will be analyzed: No Action, Emphasize Livestock Grazing, and Emphasize Non-Livestock Values.

The proposed action is the preferred alternative that was developed through the Bureau Planning System using public input. Significant land and resource use alternatives considered during the planning process which would affect the rangeland resources are addressed in the alternatives analyzed in this EIS.

The significant issues and alternatives were defined after and as a result of public scoping meetings in Denio, Nevada, and Burns and Portland, Oregon, See Appendix A for summary and results of EIS scoping.

The EIS, along with additional data, will provide the decisionmaker with information to select a management program considering resource conditions as well as social and economic impacts,

Chapter 1
Description of the Proposed Action and Alternatives

CHAPTER 1 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The proposed action and alternatives would directly involve grazing management for 24 allotments on 1.6 million acres of public land in the Andrews EIS area. There are an additional 83,392 acres of State land and 431,160 acres of private land within the allotments (as shown in Figure 1-1).

Most allotment-specific proposals are displayed in Appendix B. In the proposed action and all alternatives, unallotted status (no authorized grazing) would be continued on 509 acres of public lands. No range improvements, allocations or grazing systems are planned on these unallotted lands.

In addition to the proposed action, the following alternatives are analyzed in this document:

Alternative 1 No Action
Alternative 2 Emphasize Livestock Grazing
Alternative 3 Emphasize Non-Livestock Values

The alternatives differ from the proposed action in three ways: (1) the allocation of livestock forage (2) the types of grazing systems to be applied and (3) the kind and amount of range improvements to be constructed. The Components of the Proposed Action and Alternatives section in this chapter describes these three elements, Table 1-1 summarizes the components of the proposed action and alternatives, See Appendix B, Tables B-t and B-2 for livestock forage allocations and grazing systems by allotment.

PROPOSED ACTION

The following description of the Proposed Action is based on the grazing management proposed in Andrews Resource Area planning documents

The general objective of the proposed action is to implement intensive grazing management (grazing systems and range improvements) to improve and/or maintain forage condition to benefit wildlife, wild horses and livestock.

The major features of the proposed action are:

- An initial reduction of 9,902 AUMs in livestock grazing use from the 1980 actual use level of 101,769 AUMs. Initially the proposal would allocate the present livestock forage production (see Glossary) of 102,536 AUMs to: livestock (91,687), wild horses (5,680), wildlife (3,399) and nonconsumptive uses (1,770). The initial allocations would provide sufficient forage to meet Oregon Department of Fish and Wildlife big game objectives for muie deer and antelope and would allow a maximum wild horse population of approximately 540 horses.

- Over the long term, an increase in the livestock forage production of 55,688 AUMs resulting from the development of 2,500 acres of irrigated pasture, 151,251 acres ofvegetation manipulation (brush control and seeding), the construction of water developments in areas presently unuseable because of lack of water, and the implementation of grazing systems. For the purpose of analysis it is assumed that the entire long term increase in forage production would be allocated to livestock while the long term allocation of forage to wildlife, wild horses, and nonconsumptive use would remain the same as the initial allocation since this would satisfy the long term objectives for these uses.

- Continuation of livestock exclusion from 7,730 acres.

- Exclude livestock from an additional 6,640 acres in areas with special values (riparian areas wetlands and four proposed Research Natural Areas), See Table 1-2, Figure 1-2 and Appendix 5, Table B-4.

- Temporarily exclude livestock for a period of 2 years from 13,695 acres in areas with streamside riparian values on portions of McCoy Creek and Kiger Creek.

- Allow brush control on a maximum of 10 percent of the area within 2 miles of any known sage grouse strutting grounds unless the brush control would be beneficial to sage grouse,

- Manage major wetlands and streamside riparian areas to improve or maintain stream channel stability, water quality and wildlife and fish habitat. (See Appendix G, Table G-i .)

Additional range improvements may be needed to implement intensive grazing management. Exact numbers and economic feasibility of improvements have not been determined. However, Appendix B, Table B-3, presents an approximate number and type of water development! miles of fence and acres of vegetation manipulation needed to implement the proposed grazing systems. Only those improvements which are cost beneficial would be implemented under the proposed action See Figure 1-3 for proposed vegetation manipulation by alternative.

ALTERNATIVE 1 - NO ACTION

This alternative constitutes a continuation of the present situation. There would be no change from present management conditions. Existing exclusions would be maintained (see Table I-2). Appendix B, Table B-2, lists acres under each grazing system. Grazing permits would continue to be issued at present levels of use which is in excess of grazing

Table 1-1 Summary of Components

	1980 Level	Proposed Action	ALT. 1 No Action	ALT. 2 Emphasize Livestock	ALT. 3 Emphasize Non-Livestock
Existing Forage Production (AUMs)	102,536	102,536	102,536	102,536	102,536
Initial Allocation (AUMs)					
Wildlife	2,991	3,399	3,399	3,399	3,399
Wild Horses	6,384	5,680	5,680	840	5,680
Nonconsumptive	1,522	1,770	1,522	1,522	20,738
Livestock	101,769	91,687	102,988	96,775	72,719
Long Term Forage Production (AUMs)		158,224	[1]	190,429	134,381
Long Term Allocation (AUMs)					
Wildlife		3,399	3,399	3,399	3,399
Wild Horses		5,680	5,680	840	5,680
Nonconsumptive		1,770	1,522	1,522	20,738
Livestock		147,375	102,988	184,668	104,564
Grazing Systems (acres)[2]					
Winter		202,305	230,127	201,605	178,280
Spring		186,980	187,030	187,030	167,780
Spring/Summer		148,255	883,364	149,221	259,008
Spring/Fall		8,565	8,565	7,665	8,565
Deferred		8,781	35,903	35,903	3,021
Deferred Rotation		93,393	11,688	102,493	82,593
Rest Rotation		872,550	163,530	852,550	595,060
Irrigated Pasture		2,500	0	6,400	2,500
Nonuse		210	22,870	210	210
Exclusion		14,370	7,730	7,730	256,307
Temporary Exclusion		13,698	0	0	0
Fenced Federal Range		20,574	21,374	21,374	20,074
Unallotted		509	509	509	509
Trailing Use		1,300	1,300	1,300	83
Range Improvements					
Fences (miles)	515	262	0	348	323
Springs (each)	88	47	0	48	41
Pipelines (miles)	82	103	0	149	60
Wells (each)	46	18	0	23	17
Reservoirs (each)	283	55	0	55	53
Waterholes (each)	58	26	0	26	26
Brush control/seed (acres)	55,998[3]	78,520	0	147,800	4,957
Brush control only (acres)	14,616	72,731	0	145,611	6,450
Irrigation (acres)	0	2,500	0	6,400	2,500

[1] Livestock allocations for the No Action Alternative represent the 1980 active preference (102,988 AUMs). For the purpose of analysis, the long term allocation shown is the same as the initial allocation. Long term production of livestock forage, however, is expected to decline by an unquantifiable amount under the No Action alternative.

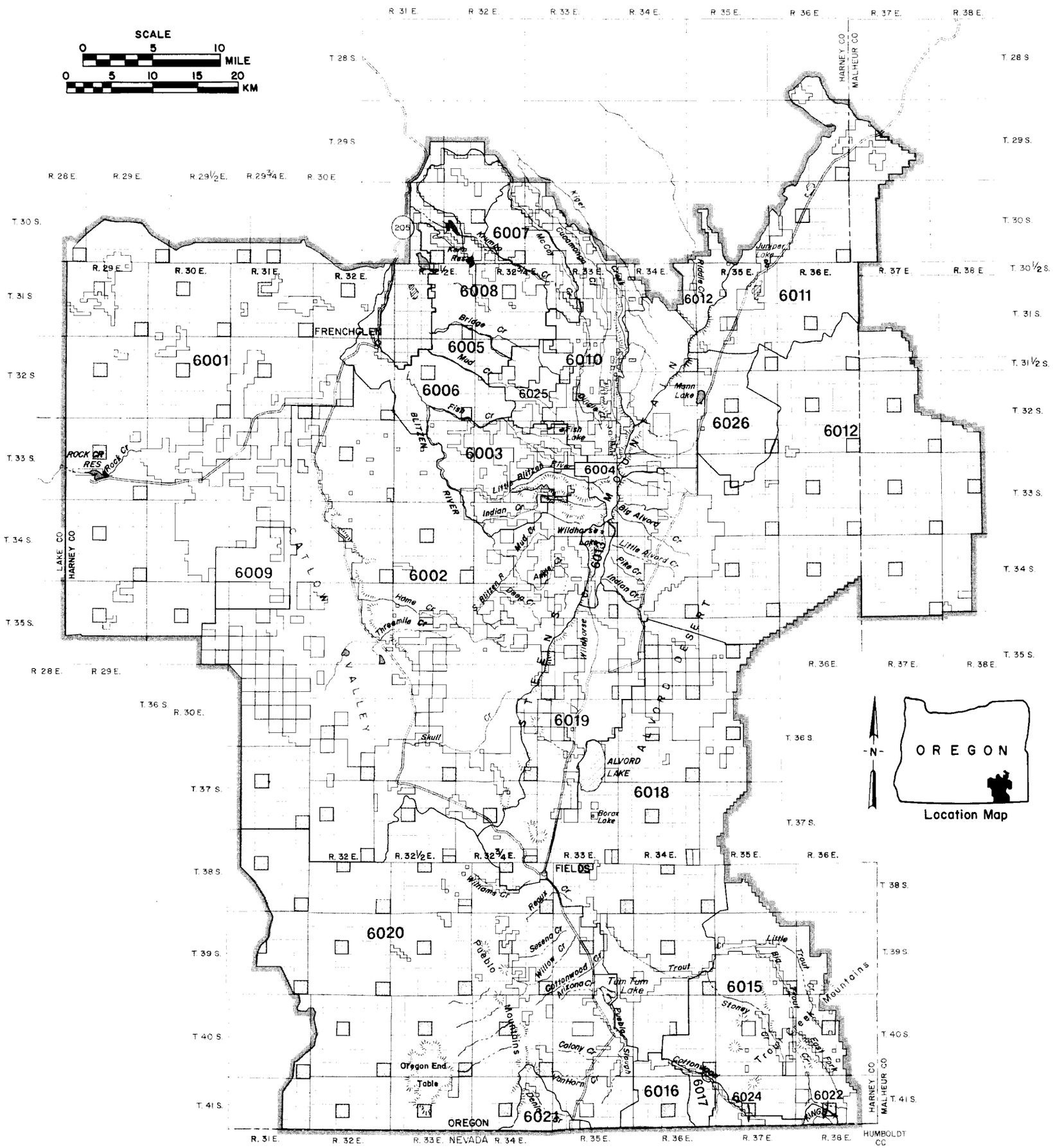
[2] Existing grazing systems are the same as Alternative 1, No Action.

[3] Includes 15,622 acres which were seeded to crested wheatgrass following wildfire.

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

ANDREWS GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

1982



LEGEND

- Public Land
- Malheur National Wildlife Refuge
- State Land
- Private

Allotment Numbers and Allotment Names

6001 North Catlow
6002 South Steens
6003 Fish Creek - Big Indian
6004 Steens Summit
6005 Mud Creek
6006 Frazier Field
6007 Ruby Springs
6008 Krumbo
6009 Blitzen
6010 Otley Brothers
6011 Pollock
6012 Alvord
6013 Wildhorse Canyon
6015 Trout Creek Mountain
6016 Sandhills Indian
6017 Grassy Basin
6018 Tule Spring
6019 Andrews Community
6020 Pueblo Lone Mountain
6021 Denio Basin
6022 King's River
6024 South Fork
6025 Hardie Summer
6026 Mann Lake

Allotment Boundary

FIGURE 1-1
LAND STATUS and ALLOTMENTS

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

ANDREWS GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

1982

SCALE
0 5 10 MILE
0 5 10 15 20 KM

LEGEND

EXISTING EXCLUSIONS
- Proposed Action and All Alternatives

PROPOSED EXCLUSIONS
- Proposed Action
- Emphasize Non-Livestock Values

Allotment Numbers and Allotment Names

6001 North Catlow
6002 South Steens
6003 Fish Creek - Big Indian
6004 Steens Summit
6005 Mud Creek
6006 Frazier Field
6007 Ruby Springs
6008 Krumbo
6009 Blitzen
6010 Otley Brothers
6011 Pollock
6012 Alvord
6013 Wildhorse Canyon
6015 Trout Creek Mountain
6016 Sandhills Indian
6017 Grassy Basin
6018 Tule Spring
6019 Andrews Community
6020 Pueblo Lone Mountain
6021 Denio Basin
6022 King's River
6024 South Fork
6025 Hardie Summer
6026 Mann Lake

Allotment Boundary

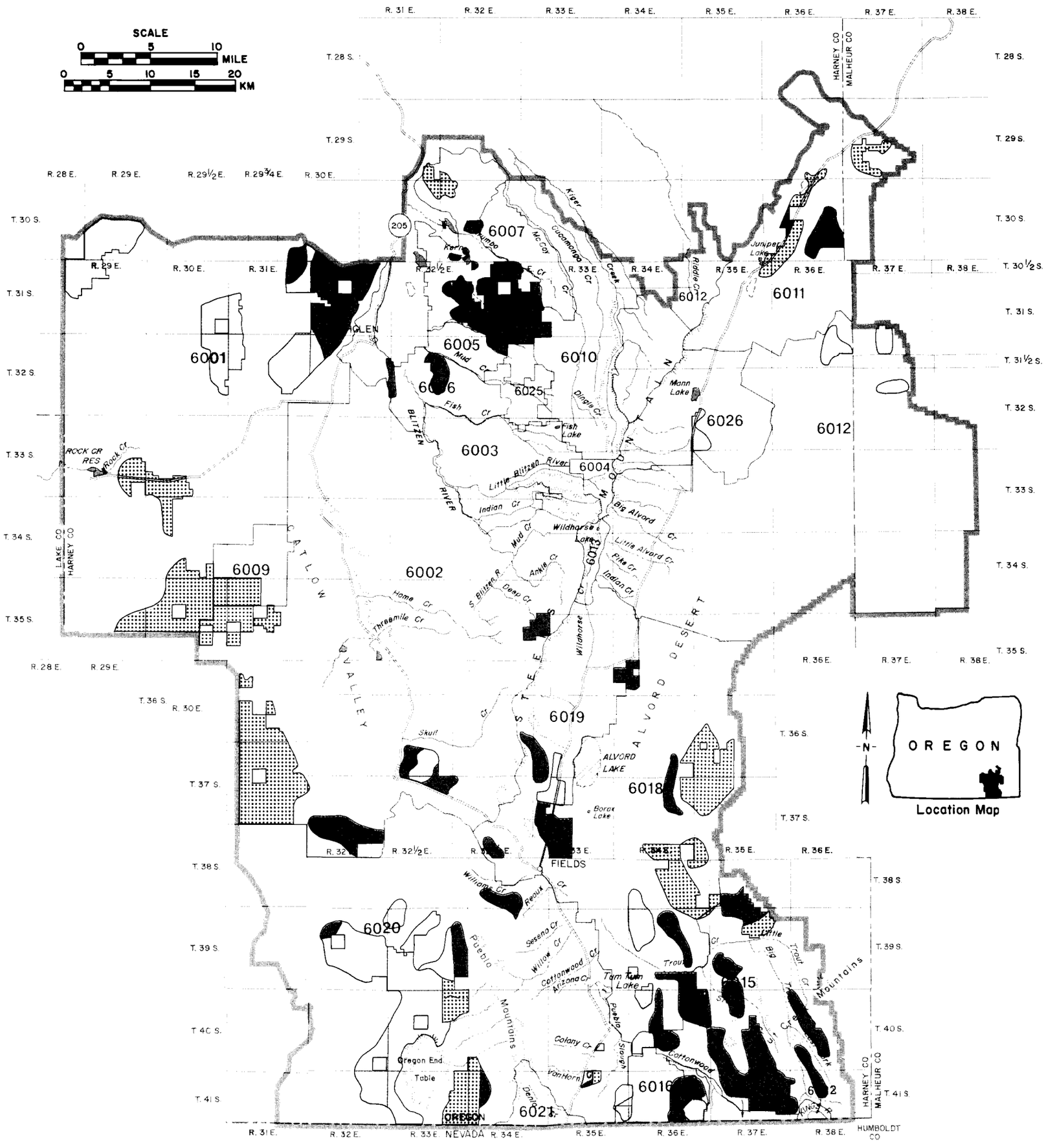
N
OREGON
Location Map

FIGURE 1-2
LIVESTOCK EXCLUSIONS

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

ANDREWS GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

1982



LEGEND

BRUSH CONTROL and SEEDING
- Emphasize Non-Livestock Grazing Values
- Proposed Action
- Emphasize Livestock Grazing

BRUSH CONTROL ONLY
- Emphasize Non-Livestock Values
- Proposed Action
- Emphasize Livestock Grazing

IRRIGATED PASTURE
- Emphasize Non-Livestock Values
- Proposed Action
- Emphasize Livestock Grazing

Allotment Numbers and Allotment Names

6001 North Catlow
6002 South Steens
6003 Fish Creek - Big Indian
6004 Steens Summit
6005 Mud Creek
6006 Frazier Field
6007 Ruby Springs
6008 Krumbo
6009 Blitzen
6010 Otley Brothers
6011 Pollock
6012 Alvord
6013 Wildhorse Canyon
6015 Trout Creek Mountain
6016 Sandhills Indian
6017 Grassy Basin
6018 Tule Spring
6019 Andrews Community
6020 Pueblo Lone Mountain
6021 Denio Basin
6022 King's River
6024 South Fork
6025 Hardie Summer
6026 Mann Lake

Allotment Boundary

FIGURE 1-3
PROPOSED VEGETATION MANIPULATION

capacity on three allotments totaling 400,289 acres. As shown in Appendix B, Table B-l, the forage allocation would continue at the present level of 102,988 AUMs for livestock (the present active preference level), 5,680 AUMs for wild horses and 3,399 AUMs for wildlife. For purposes of impact analysis. it is assumed that no additional range improvement projects would be undertaken or additional intensive grazing management implemented. By periodic control measures called for in the Wild Horse Herd Management Plans, wild horse numbers would be allowed to attain a maximum of 300 head in the South Steens Herd Management Area and a maximum 240 head in the Alvord/Sheepshead Herd Management Area.

ALTERNATIVE 2 - EMPHASIZE LIVESTOCK GRAZING

The objective of this alternative would be to allocate a high level of forage to livestock while maintaining or improving range conditions. (See Appendix B. Table B-1, for anticipated long-term vegetation allocation.)

This alternative would differ from the proposed action in the following ways:

- Allow livestock grazing throughout the EIS area except where currently excluded.

Table 1-2 Proposed Livestock Exclusions by Alternative[1]

	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Livestock
Stream miles	34	18*	18*	220
Vegetation Type (acres)				
Riparian	370	254	254	1,581
Wetland	156	149	149	156
Upland	13,044	7,327	7,327	254,570
Total	14,370	7,730*	7,730*	256,307
Exclusion Area (acres)[2]				
Pueblo Mountains Area				
Pueblo Foothills Proposed RNA	1,925	0	0	1,925
Turn Tum take Proposed RNA	0	0	0	1,700
Other Pueblo Mountains	0	0	0	96,420
Steens Mountain Area				
Lily Lake	25	0	0	25
Steens Potential ACEC	[4]	[4]	[4]	[4]
Alvord Peak Potential ACEC	0	0	0	14,700
Little Blitzen Proposed RNA	[4]	[4]	[4]	[4]
Rooster Comb Proposed RNA	0	0	0	490
South Fork Willow Creek Proposed RNA[6]	--	--	--	--
Steens Summit Allotment	4,890*	4,890*	4,890*	4,890*
Other Steens Mountain	6,021[3]	1,891*	1,891*	90,169[3]
Mickey Basin Proposed RNA	350	0	0	350
Long Draw Proposed RNA	210	0	0	210
Alvord Desert Potential ACEC	0	0	0	19,200
Trout Creek Mountains Area	0	0	0	24,430
Other	949*	949*	949*	2,288[5]
Total	14,370	7,730	7,730	256,307

* Existing exclusions

[1] See Appendix B. Table B-2 for other grazing systems by alternatives for exclusion areas.
[2] Areage of the exclusion area may be larger than the size of the potential ACEC or proposed RNA due to the use of natural barriers and/or fence location.
[3] Includes 1,891 acres of existing exclusions.
[4] Little Blitzen proposed RNA and the Steens potential ACEC (2,640 acres) are included within the Steens Summit Allotment (4,890 acres total), an existing exclusion area.
[5] Includes 949 acres of existing exclusions.
[6] The South Fork Willow Creek proposed RNA is inaccessible to livestock; therefore, exclusion is not proposed.

• Increase livestock forage production by implementing an additional 3,900 acres of irrigated pasture and approximately 142,160 additional acres of vegetation manipulation on native range. Proposed range improvements are shown in Appendix B, Table B-3. (This alternative may include range improvements which are not cost beneficial.)

• Initial and long term allocations for wildlife would be the same as under the proposed action. Sufficient forage for wild horses would be allocated to maintain a maximum herd size of 30 animals in the South Steens Herd Management Area and 60 animals in the Alvord/Sheepshead Herd Management Area. The present forage production would be allocated to livestock (96,775 AUMs), wild horses (840 AUMs), wildlife (3,399 AUMs) and nonconsumptive use (1,522 AUMs). For analysis purposes, over the long term any increases in forage production would be allocated to livestock.

ALTERNATIVE 3 - EMPHASIZE NON-LIVESTOCK VALUES

The objective of this alternative would be to emphasize non-livestock values (wildlife, special areas and water quality) in those areas where conflicts with livestock grazing have been identified.

This alternative would differ from the proposed action in the following ways:

• Develop 138,764 fewer acres of vegetation manipulation and 43 fewer miles of pipeline resulting in 42,811 AUMs less than under the proposed action. Livestock forage production would be increased only to satisfy the present demand of 104,880 AUMs. This alternative would not provide increases in forage production to satisfy any future increases in demand.

• Exclude livestock from an additional 241,937 acres above those areas described under the proposed action by constructing additional 74 miles of fence. These areas are proposed for exclusion to protect riparian areas, wetlands and two potential Areas of Environmental Concern (ACEC). Wild horses would also be excluded from 19,200 acres in the Alvord/Sheepshead Herd Management Area to protect a potential ACEC and from 3,980 acres in the South Steens Herd Management Area to protect riparian areas. In general, grazing systems would be the same as for the proposed action except where livestock would be excluded. Livestock grazing would not be allowed in any proposed exclusion areas. See Table 1-2 for exclusions by alternatives and Appendix B, Table B-2, for other grazing systems. Exclusion boundaries were designed in order to take advantage of existing fences and natural boundaries.

• Initial and long term allocations for wildlife and wild horses would be the same as those under the proposed action. The allocation to nonconsumptive use would be higher due to the larger area of livestock exclusion. The present forage production would be allocated to livestock (72,719 AUMs), wild horses (5,680 AUMs), wildlife (3,399 AUMs) and nonconsumptive use (20,738 AUMs).

COMPARISON OF IMPACTS

A summary of the comparison of impacts is displayed in Table 1-3. Detailed explanations of the impacts are given by resource in Chapter 3.

COMPONENTS OF THE PROPOSED ACTION AND ALTERNATIVES

The proposed grazing management is composed of three elements (vegetation allocation, grazing systems, and range improvements) which are interdependent. For purposes of analysis, they are described separately below and in Chapter 3, Environmental Consequences.

Vegetation Allocation

The vegetation allocation proposed for each alternative would allocate the existing and future livestock forage production to various uses including wildlife, wild horses, livestock and nonconsumptive uses. The allocation under the proposed action is designed to provide sufficient forage to maintain wild horse populations at the herd management plan levels, meet Oregon Department of Fish and Wildlife (ODFW) population objectives and make available increased amounts of forage for livestock. Appendix C describes the methodology used in determining the proposed allocations. Appendix B, Table B-1, shows the initial and long-term vegetation allocation for the proposed action and alternatives. The allocations for the alternatives are designed to emphasize different uses under each alternative. By implementing grazing management and range improvements, it is anticipated that the existing level of forage production would increase under the proposed action and Alternatives 2 and 3.

Grazing Systems

A grazing system consists of one or more planned livestock grazing treatments which bring about changes in or maintenance of the composition of key species. Key species are those plants which serve as indicators of objective accomplishment in the vegetation communities. Grazing systems which allow plants to complete the growth stages generally result in increases in, or maintenance of, key species. See Table 1-4 for approximate growth stage dates for upland key species. (Growth stage dates for riparian key species were not a major part of the rationale for grazing system design.) In the Andrews EIS area, the

Table 1-3 Summary Comparison of Long-Term Impacts of the Proposed Action and Alternatives

Significant Resource	Existing Situation	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Livestock
Soils					
Erosion		+L	-L	+L	+L
Streambank stability		+L	-L	NC	+M
Water					
Runoff		NC	NC	NC	NC
Fecal coliforms		+L	-L	-L	+L
Sediment yield		+L	-L	NC	+L
Vegetation					
Forage condition (1,573,990 acres total)					
Good	48%	75%	51%	80%	71%
Fair	43%	19%	23%	16%	17%
Poor	6%	3%	23%	1%	9%
Unknown	3%	3%	3%	3%	3%
Total residual ground cover		-H	-M	-H	-M
Forage production (AUMs)	102,536	158,224	102,536	190,429	134,381
Riparian					
Excellent	7%	22%	16%	16%	49%
Good	20%	47%	19%	22%	37%
Fair	23%	10%	15%	20%	3%
Poor	42%	13%	42%	34%	7%
Unknown	8%	8%	8%	8%	4%
Wildlife Populations					
Deer		+L	NC	-L	NC
Antelope		+L	NC	+M	NC
Small mammals		-L	NC	-M	+L
Water-associated birds		NC	NC	NC	+L
Upland game birds		NC	NC	-L	NC
Other birds		-L	NC	-M	+L
Reptiles		-L	NC	-M	+L
Amphibians		+L	NC	NC	+M
Fish		+L	-L	-L	+H
Wild Horses (Numbers)	1,438	540	540	90	540
Recreation					
Projected visitor use		NC	NC	NC	NC
Visual Resources(Contrast)		-L	NC	-L	-L
Special Areas					
Degradation		+L	NC	NC	+L
Socioeconomics[1]					
Local personal income: (in $1000's)		+$637	+$17	+$1,158	+39
Local employment (jobs)		+26	+1	+47	+2

Note: NC =No change, + = beneficial, - = adverse. L = low, M = medium, H = high

[1] Socioeconomic impacts are shown as changes from the existing situation. Personal income (at annual rates) is in thousands of 1978-80 dollars.

critical part of the growing season normally occurs from May 1 to August 15, depending on the elevation. In general, plant growth is delayed 10 days for every 1,000 foot rise in elevation. See Appendix B, Table B-2, for proposed grazing systems by allotment and pasture for each alternative.

Although each of the following descriptions outlines the typical period of grazing use, there is some variation among the different allotments. Figure 1-4 shows examples of the proposed systems with sequence of treatments.

Early grazing - grazing occurs for 1 to 2 months prior to the beginning of the critical growth period (see Glossary). Livestock are utilizing primarily the previous year's plant growth although some use of the early green growth occurs under this system,

Spring/Summer Grazing - grazing occurs during the critical growth period every year.

Deferred Grazing - grazing occurs after seedripe every year. No grazing occurs during the critical growth period. A variation of this system proposed for some areas containing riparian vegetation would allow a maximum of 1 month's grazing use during September.

Deferred Rotation Grazing - Spring/summer grazing and deferred grazing occur in alternate years.

Rest **Rotation** Grazing **-** several types of rest rotation grazing are proposed. The firs? type is a three pasture system which allows grazing daring the criticai part of the growing period 1 year, deferred grazing the 2nd year, and a full year of rest during the final year.

The second type of rest rotation allows 1 year of grazing during the critical part of the growing period. This is followed by 1 year of complete rest. The third type of rest rotation allows 2 years of grazing during the critical part of the growing period followed by 1 year rest. A fourth type allows 1 or 2 years of grazing during the growing period, followed by 2 years of rest.

Irrigated pasture - Grazing use would occur during the period May 1 to October 31 although no specific management system is proposed.

Exclusion - In exclusion areas, there would be no authorized livestock grazing. Temporary exclusion would exclude livestock grazing for a period of at least 2 years or until resource objectives are achieved. Grazing would then be resumed under a deferred system allowing a maximum of 1 month's use in September. Grazing use would be monitored to ensure that the condition of the resource is maintained at the improved level.

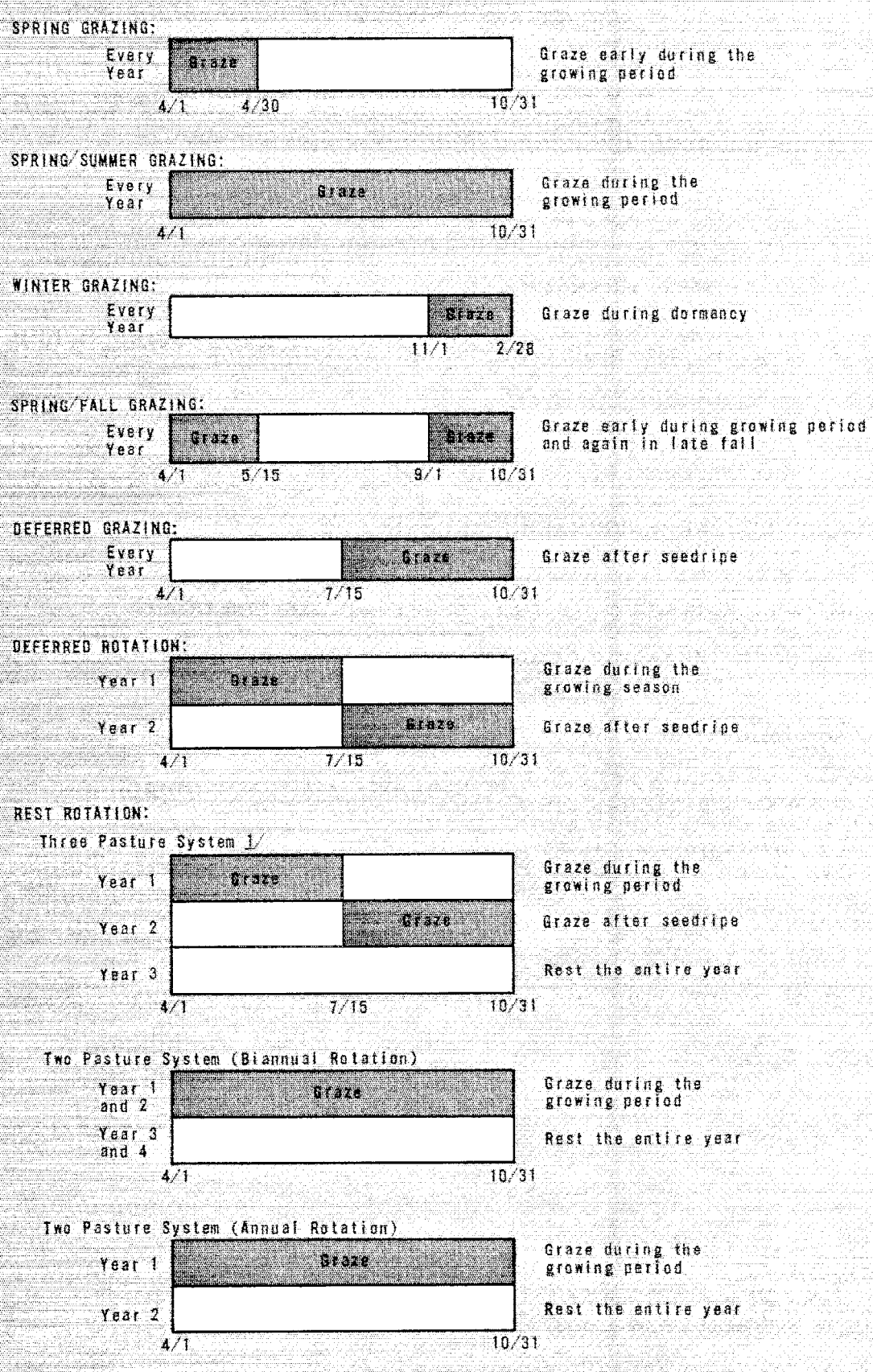
Fenced Federal Range - Fenced Federal Range consists of tracts of public land fenced into pastures, usually with large amounts of private land. Grazing use is authorized for the grazing capacity of the public lands only. Livestock numbers, kind of animals and period of use are most often not restricted. However, actual grazing use usually occurs after the growing season since the use is in conjuction with private land (often crop lands).

Table 1-4 Approximate Growth Stage Dates for Key Species[1]

	4,700' Elevation				7,500' Elevation			
Species[2]	Start of Growth	Peak of Flowering	Seed Ripe	Dormancy	Start of Growth	Peak of Flowering	Seed Ripe	Dormancy
Bluebunch wheatgrass	3/25	6/25	8/15	9/1	5/10	7/20	9/1	10/15
Idaho fescue	4/5	7/1	8/15	10/1	5/20	7/25	9/10	10/15
Crested wheatgrass[3, 4]	3/15	6/10	8/1	9/1	N/A	N/A	N/A	N/A
Squirreltail	3/25	6/1	7/1	8/1	5/1	6/25	8/1	9/1
Thurber's needlegrass	3/25	6/15	7/15	9/1	N/A	N/A	N/A	N/A
Sandberg's bluegrass[4]	4/1	5/5	6/15	7/15	5/1	7/1	8/1	9/1
Bitterbrush[5]	4/10	6/5	9/15	11/1	5/1	7/1	10/1	11/1
Cheatgrass[6]	3/20	5/15	6/15	6/25	4/25	6/20	7/15	8/15

[1] Average year at the 4,700 foot and 7,500 foot elevation.
[2] Scientific names for the plants listed are shown in Appendix D.
[3] Key species for seeded areas.
[4] Key species for deer and antelope spring range.
[5] Key species for deer winter range.
[6] Key species only on areas proposed for early spring use.
N/A Plant does not occur at this elevation.

FIGURE 1-4 EXAMPLES OF TYPICAL GRAZING SYSTEMS



1/ A variation of this system allows grazing during the growing period for two years followed by one year of rest.

Range Improvements

Range improvements are proposed for several reasons: to implement more intensive grazing systems; to allow deferment of grazing use on native range during the spring; to improve livestock distribution; and to increase forage production. Brush would be controlled prior to seeding on areas proposed for vegetation manipulation (see Figure 1-3). Some projects would have brush control only. Brush control would employ either burning or spraying; however, the treatment method has not been determined for individual projects. Generally, areas containing needlegrasses and/or rabbitbrush and areas with sandy soils would not be burned. Areas proposed for irrigated pasture would be plowed and leveled, seeded with pasture grasses and/or other plants such as alfalfa, and flood irrigated from proposed wells.

Standard Procedures and Design Elements for Range Improvements

The following standard procedures and design elements would be adhered to under the proposed action and all alternatives in constructing range improvements in the EIS area. Design elements have been standardized over time to mitigate adverse effects encountered during range improvement installations.

- Preparation of a site-specific environmental assessment prior to implementation of range improvements is required. Proposed range improvements may be modified or abandoned if this assessment indicates significant adverse environmental impacts cannot be mitigated or avoided.

- A wilderness inventory, required by the Federal Land Policy and Management Act, has been completed in the EIS area. All rangeland management activities in wilderness study areas will be consistent with the Interim Management Policy and Guidelines for Lands Under Wilderness Review unless and until the area is removed from this category. Impacts will be assessed before implementing management activities to ensure they meet guidelines.

- Every effort would be made to avoid adverse impacts to cultural resources.
  A Class III intensive cultural resources inventory would be completed on all areas prior to any ground-disturbing activities. This would be part of the preplanning stage of a project and the results would be analyzed in the environmental assessment addressing the action (BLM Manual 8100, Cultural Resources Management). If significant cultural values are discovered, the project could be relocated, redesigned or abandoned. However, where that is not possible the BLM would consult with the State Historic Preservation Officer and the Advisory Council on Historic Preservation in accordance with the Programmatic Memorandum of Agreement (PMOA) by and between the Bureau, the Council and the National Conference of State Historic Preservation Officers, dated January 14, 1980, which sets forth a procedure for developing appropriate mitigative measures. This PMOA identifies procedures for compliance with Section 106 of the National Historic Preservation Act (1966) and Executive Order 11593, as implemented by 36 CFR Part 800.

- Prior to vegetation manipulation and development of range improvements, BLM requires a survey of the project site for plants and animals listed or under review for listing on Federal or official State lists of threatened and endangered species. If a project might affect any such species or its critical habitat, every effort would be made to modify, relocate or abandon the project in order to obtain a no effect determination. Consultation with the U.S. Fish and Wildlife Service would be initiated (50 CFR 402; Endangered Species Act of 1973, as amended) when BLM determines that a proposed action may affect Federally-listed plant or animal species. In addition, some plants in the Andrews EIS area considered by BLM as sensitive and are managed under the same procedures as plants under review for Federal listing.

- Surface disturbance at all project sites would be held to a minimum. Disturbed soil would be rehabilitated to blend into the surrounding soil surface and reseeded as needed with a mixture of grasses, forbs and browse as applicable to replace ground cover and reduce soil loss from wind and water erosion.

- All State of Oregon water-well regulations would be adhered to.

- All water developments will provide standing water for wildlife outside of troughs where a need is identified. Significant spring sources and associated trough overflow areas would be fenced. Ramps, rocks or floatboards would be provided in all water troughs for small birds and mammals to gain access to and/or escape from the water.

- Fence construction in antelope areas would be coordinated with Oregon Department of Fish and Wildlife. All other fences would be constructed in accordance with Bureau standards. Gates or cattleguards would be installed where fences cross existing roads with significant use. Fence lines would not be bladed or scraped.

- Vegetation manipulation projects would be designed using irregular patterns, untreated patches, etc., to provide for optimum edge effect for visual and wildlife. Layout and design would be coordinated with local Oregon Department of Fish and Wildlife biologists.

- Seeding would be accomplished by use of the rangeland drill in most cases. Broadcast seeding would occur on small disturbed areas, rough terrain and rocky areas. Preparation for seeding (brush control) would be by burning or chemical means, Burning would use one or more of the following types of fire breaks: natural barriers, retardant lines. existing roads and/or bladed lines. Each fire would have its own prescription, to be based on the conditions needed (wind speed, air temperature, etc.) to burn the plant material within the project boundary to be burned. The chemical applied would be 2.4-D (low volatile formulation) using a water carrier at a rate of 2 pounds active ingredients per acre (3 pounds per acre if rabbitbrush is the target species). Ail applications of 2,4-D would be in accordance with the manufacturer's label, State regulations and ELM Manual 9226,. A more thorough description of design features applicable to the proposal may be found in BLM's final environmental impact statement! Vegetative Management with Herbicides--Western Oregon, These design features are also applicable in eastern Oregon. BLM would determine seeding mixtures on a site specific basis, using past experience and recommendations of the Oregon State University Extension Service and Experiment Stations and/or Oregon Department of Fish and Wildlife. Anticipated increases in production through vegetation manipulation projects would not be allocated until seedings are established and ready for USE. All seedings would be deferred from grating for at least two growing seasons to allow seedling establishment.

- It is anticipated that the existing road and trail system would provide access for range improvement construction.

- It is assumed that normal maintenance such as replacement of pipeline sections, fence posts and retreatment of vegetation manipulations would occur.

THE DECISION

The District Manager will review the public comments on both draft and final EISs and prepare a Record of Decision within 5 months after release of the final EIS. The decision may be to select one of the EIS alternatives (including the proposed action) intact, or to blend features from several alternatives that fall within the range of actions analyzed in the EIS. Significant conflicts, alternatives. environmental preferences, economic and technical considerations and the Bureau's statutory mission will be addressed in the Record of Decision.

Monitoring and Management Adjustments

A monitoring program would be developed to assure that resource objectives were being met. Water quality monitoring would be initiated in accordance with Executive Orders 11991 and 12088, BLM Manual 7240, and Sections 208 and 313 of the Clean Water Act (P.L. 95-217, P.L. 92-500 as amended). Standard analytical methods detailed in Federal directives would be followed.

Studies would be established in representative riparian zones to determine changes in the habitat conditions and populations of fish and wildlife resulting from implementation. Such monitoring would comply with Executive Orders 11514 and 11990 and BLM Manual 6740.

Existing browse studies would be continued. Wildlife habitat would be monitored in cooperation with Oregon Department of Fish and Wildlife to determine the effectiveness of design features for vegetation manipulation and grazing systems.

Climate, actual use, utilization and trend studies would be conducted in accordance with BLM Manuals 4412 and 4413 to evaluate vegetation changes. The data would then be used to assess progress toward achieving resource objectives and to recommend adjustments in the grazing system or stocking rate. The intensity of monitoring studies will vary depending on resource objectives and management proposals.

If an evaluation supports an increase in livestock grazing use, the additional use would first be granted on a temporary basis. An evaluation of forage production and the temporary use granted must confirm the availability of additional forage before an increase in use would become permanent. Grazing management would be revised if the evaluation determines that the specific objectives established for the allotments are not being achieved. Other revisions may include changes in the amount of livestock use permitted, grazing system, period of use, or any combination of these. Prior to these changes, further environmental assessment would be completed.

Each operator would be issued term permits which specify allotment, period of use, and numbers and kind of livestock. If unauthorized use should occur, action would be taken by BLM to eliminate it in accordance with regulations in 43 CFR 4150.

INTERRELATIONSHIPS

BLM Planning

The BLM planning system is essentially a decisionmaking process utilizing input from the public and data about the various resources and their uses. Land use objectives and rationale for each resource use category are developed and incorporated into the proposed Management Framework Plan (MFP). Specific MFP recommendations relating to the grazing program, with some modification to reflect public input. were used as a basis for developing the proposed action and alternatives. The EIS scoping summary set forth in Appendix A more fully explains the relationship between the MFP alternatives and the EIS alternatives. The proposed MFP is available for review in the Burns District Office.

Under the preferred MFP alternative, the existing Alvord/Sheepshead Wild Worse Herd Management Area (HMA) would be split into two HMAs, Heath Creek/Sheepshead in allotment 6011 and Alvord/Tule Springs in allotments 6012 and 6018. The existing HMAs would be reduced in size by eliminating areas within the HMAs that are not presently used by horses: however, the number of horses will remain the same, with forage allocated to those numbers of horses.

Federal Agencies

Grazing on lands administered by other Federal agencies is not contingent on grazing on BLM-administered lands. However, each portion is an integral part of the rancher's total operation. In the EIS area. 15 BLM permittees also have grazing permits on the Malheur National Wildlife Refuge, The timing of grazing use is very import to the operation of these ranches. Public lands offer livestock forage during the spring season when private meadows are flooded by normal runoff and/or during the crucial water fowl nesting season on the refuge. Coordinated planning among the concerned Federal agencies and ranchers assures that resource conflicts are resolved and management goals are met.

State and Local Governments

The Intergovernmental Relations Division for the State of Oregon acts as a clearinghouse for the various State agencies. All BLM planning and major actions are coordinated through this State Clearinghouse. Planning is also coordinated with county commissioners and/or county planning commissions,

Under Oregon Senate Bill 100, all counties and cities in Oregon are required to develop and adopt comprehensive plans and land use controls consistent with statewide planning goals and guidelines developed by the Land Conservation and Development Commission (LCDC). Malheur and Harney Counties have adopted comprehensive plans. The Harney County plan is presently in review status by LCDC far compliance with Statewide goals. LCDC has required revisions to the plan and deferred acknowledgement until ii is brought into compliance. LCDC review of the Malheur County plan has not yet occurred, The relationship of the proposed action and alternatives to LCDC goals is displayed in Table I-5. The proposed action and all the alternatives are consistent with the adopted comprehensive plans and LCDC goals.

TABLE 1-5

Relationship of the Proposed Action and Alternatives to LCDC Goals[1]

LCDC Statewide Goal Number and Description	Discussion
1. To ensure citizen involvement in all phases of the planning process.	BLM's land-use planning is a process providing for public input at various stages, Public input was specifically requested in developing the proposed action and other alternatives described in the EIS. Public input will continue to be utilized in the environmental decision processes.
2. To establish a land-use process and policy framework as a basis for ail decisions and actions.	The proposed action and other alternatives have been developed in accordance with the land-use planning process authorized by the Federal Land Policy and Management Act of 1976 which provides a policy framework for all decisions and actions.
5. To conserve open space and protect natural and scenic resources.	The Bureau planning system considered natural and scenic resources in the development of the proposed action and other alternatives. Fencing and vegetation manipulation projects in the proposed action and Alternatives 2 and 3 would impact natural and scenic resources.
6. To maintain and improve the quality of the air, water and land resources.	Water quality would he maintained and/or improved under the proposed action and Alternative 3, and would be maintained and/or degraded under Alternatives 1 and 2. Air quality would not be significantly impacted.
8. To satisfy the recreational needs of the citizens of the State and visitors.	The BLM actively coordinates its outdoor recreation and land-use planning efforts with those of other agencies to establish integrated management objectives on a regional basis, Under the proposed action and ail other alternatives, opportunities would be provided to meet recreational needs.
9. To diversify and improve the economy of the state.	The proposed action and Alternative 2 would induce economic gains in the long term due to increased forage production, resulting in improved local and State economy.

[1] Goals 3, 4, 7, 10, 11, 13 and 14 developed by the LCDC are not generally applicable to the proposed action or alternatives

Chapter 2
Affected Environment

CHAPTER 2 AFFECTED ENVIRONMENT

INTRODUCTION

This section describes the resources within the Andrews EIS area as they existed in 1980 (base year). The base year of 1980 was chosen because the primary data sources (Bureau planning system documents; were compiled during that year. The planning system documents, consisting of Unit Resource Analysis. Planning Area Analysis and Management Framework Plans are available for review in the Burns District Office in Burns, Oregon.

Emphasis has been placed on those resource components most likely to be impacted if the proposed action or one of the alternatives were implemented. Analysis, including the scoping process, indicated that resource components such as minerals, timber, and air quality would not be affected and, therefore, they are not discussed,

The EIS area lies in southeastern Oregon. and is characterized by rolling plains of lava flows and lava outcrops. and fault-block mountains. The area has a semiarid climate. with long, cool, moist winters and short, warm, dry summers. The area has a winter precipitation pattern. with about half of the annual total occurring during the months of November through February. Much of this come's as snow, especially in December and January. Spring rains occur in May and June while the months of July, August and September are generally quite dry. Precipitation tends to be elevation-dependent, ranging from less than 10 inches in the lowest part of the area. Alvord Basin (4,000 feet elevation) to 30 inches en Steens Mountain (9,700 feet), the highest point in the area. Most of the area receives 10 to 15 inches of precipitation annually.

VEGETATION

The Andrews EIS area has 11 major vegetation types as shown in Figure 2-1 and Table 2-I Big sagebrush. low sagebrush and juniper are the dominant vegetation types, covering approximately 83 percent of the area. Young juniper trees are invading the sagebrush vegetation type in some areas. Spot symbols on Figure 2-1 designate the approximate location of aspen communities, streamside riparian vegetation communities and major wetland-associated vegetation communities,

Table 2-1 Vegetation Types in the EIS Area

Vegetation Type	Public Land Acres	Percent of EIS Area	Common Plant Species[1]
Big Sagebrush	1,111,577	70.5	Big sagebrush, rabbitbrush, mountain mahogany, bluebunch wheatgrass, Idaho fescue, bottlebrush squirreltail, cheatgrass
Juniper	118,020	7.5	Western juniper, big sagebrush, low sagebrush
Low Sagebrush	81,760	5.2	Low sagebrush, Sandberg's bluegrass, Thurber's needlegrass
Greasewood	79,760	5.1	Greasewood, saltgrass
Seedings (Existing)[2]	49,160	3.1	Crested wheatgrass
Desert Shrub	73,240	4.7	Shadscale, spiny hopsage
Silver Sagebrush	2,040	0.1	Silver sagebrush, Nevada bluegrass, creeping wildrye
Barren and Rocky Areas[3]	41,940	2.7	Annuals, mountain mahogany
Streamside Riparian[4]	1,914	0.1	Willow, alder, quaking aspen, wild rose
Wetland[5]	4,339	0.3	Sedges, rushes, meadow grass, smartweed
Aspen	10,240	0.7	Quaking aspen, mountain bromegrass
Total	1,573,990		

[1] Scientific names for plants are listed in Appendix D.
[2] Acreage seeded to crested wheatgrass was actually 55,998 acres although only 49,160 acres are now classified as a crested wheatgrass type.
[3] Includes mountain mahogany and quaking aspen associated with rock outcrop.
[4] Includes riparian at selected springs and seeps.
[5] Includes vegetation associated with lakes, reservoirs, sloughs and playas. Also includes 4,066 acres of surface water and barren playa.

The total existing livestock forage production fcr the EIS area is 102,536 AUMs. Livestock forage production is that portion of the total vegetation production which is available and is suitable fer sustained use by livestock. Annual livestock forage production is dependent upon climate. soil characteristics and species composition. Annual variation in timing and amount of precipitation results in large annual fluctuations in total forage production. Soil characteristics which influence forage production are primarily those which affect moisture-holding capacity. Composition of the plant community by forage species is the third major factor which determines livestock forage production. Livestock forage production for each allotment is listed in Appendix B. Table B-1. The methodology for determining production is described in Appendix C.

Forage condition for the EIS area is summarized in Table 2-2. Neither range condition nor trend in range condition of the area have been measured. Forage condition. as the term is used in this document, is based on the percentage of desirable (for livestock and/or big game) and intermediate forage species present in the plant community The methodology for determining forage condition is described in Appendix E. Appendix B. Table B-2, shows the existing forage condition for each proposed pasture in the EIS area.

Table 2-2 Forage Condition Summary

	Public Land Acres	Percent of Public Lands EIS Area
Good	743,605	4%
Fair	676,855	43
Poor	101,990	6
Unknown	51,540	3
Total	1,573,990	

Residual ground cover expresses the amount of live vegetation, standing dead vegetation and litter which remains after grazing, Over time. the accumulation of this material provides protection for the soil surface and replaces soil nutrients. There is some decrease in live vegetative cover as forage condition declines in each vegetation type, but generally. as forage condition changes. one plant replaces another.

Streamside riparian vegetation occupies approximately 1,914 acres of public land. Neither range condition nor forage condition have been determined on these areas: however, a riparian wildlife habitat inventory (see Appendix G) rated the condition of streamside riparian areas as follows: excellent (7 percent), good (21 percent,!, fair (22 percent;. poor (46 percent) and unknown (4 percent). When relatively undisturbed. the vegetation along streams in the EIS area is generally composed of thick clusters of shrubs and trees interspersed with dense herbaceous vegetation. Fair and poor condition areas generally have fewer woody species (especially willow) than the excellent and good condition areas. With increasing disturbance, the dominant tree and shrub species are replaced by herbaceous species and the riparian area often decreases in size.

Vegetation associated with wetlands (lakes, reservoirs, sloughs and playas) occupies approximately 273 acres of public land. An inventory of the wildlife habitat in these areas determined approximately 85 percent was in good or excellent condition and 25 percent was in poor condition. In good condition (using the wildlife habitat rating), these areas are dominated by herbaceous species such as sedges, rushes and smartweed. The annual production and total extent of these areas is highly variable depending upon the seasonal fluctuations in the water level.

There are no plants found in the EIS area presently listed as either threatened or endangered under authority of the Endangered Species Act. Eleven plant species have either been sighted or are suspected to occur in the EIS area that are under review by the U.S. Fish and Wildlife Service for possible listing as endangered or threatened status (45 FR 82480). Information concerning these plant species is found in Table 2-3. In addition, 110 plant species considered by BLM as sensitive occur in the EIS area. The Andrews Unit Resource Analysis (on file at the Burns District Office) contains a full listing with habitat information for these sensitive species. Many of the sensitive plants occur at higher elevations of Steens Mountain and the Pueblo Mountains.

SOILS

Soils in the EIS area have been surveyed and described in Oregon's Long-Range Requirements for Water (Lindsay et al. 1969; Lovell et al. 1969). A summary of the soil units and their properties appears as Appendix F. These soil units have been combined into four general divisions based on similar soil properties within two broad land types, Basin Land and Terrace (occurs on about 30 percent of the EIS area) and Uplands (70 percent).

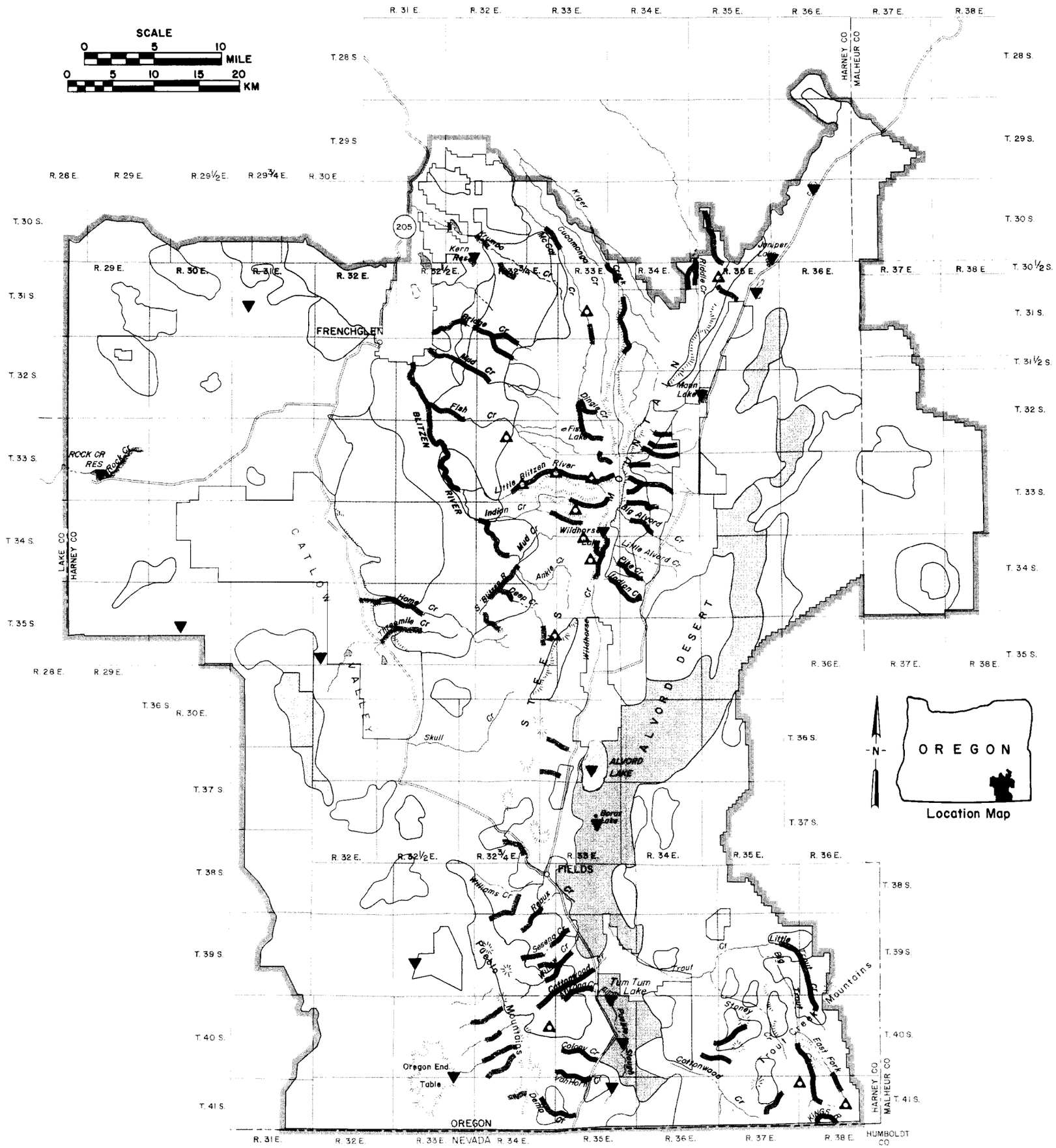
The Basin Land and Terrace soils occur in the valley areas. The soils are mainly loamy to clayey in texture, deep and well drained. Poorly drained soils occur in lakebeds which are inundated during the winter and spring. Sandy soils generally occur along the shorelines of old lake beds in association with sand dunes. Sandy soils are susceptible to wind erosion.

The Upland soils are derived from volcanic rocks and are generally loamy to clayey, shallow and stony. Rock outcrops and very shallow and/or very stony soils are low in productivity and support sparser stands of vegetation than the deeper soils.

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

ANDREWS GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

1982



LEGEND

- Low Sagebrush
- Big Sagebrush
- Desert Shrub
- Greasewood
- Juniper
- Seedings
- Silver Sagebrush
- Miscellaneous
- Riparian
- Wetland
- Aspen

FIGURE 2-1
VEGETATION TYPES

Table 2-3 Plant Species Under Review for Nomination for Threatened or Endangered Status[1]

Scientific Plant Species Name	Notice of Review Category[2]	Habitat Information	Allotments[3]
Agastache cusickii	2	South facing slopes; rock outcrop; talus	6012; 6026; 6020
Astragalus solitarius	2	Often with diatomaceous earth	6015; 6018;6019
Castilleja steenensis	1	Dry, rocky flats and slopes	6012
Collomia macrocalyx	1	Unknown; lower elevations	Suspected
Eriogonum chrysops	1	Unknown	Suspected
Eriogonum cusickii	1	Open flats, somewhat barren	Suspected
Eriogonum prociduum	1	Basalt outcrops	Suspected
Lepidium davisii	1	Hard clay playas	Suspected
Lupinus biddlei	1	Sagebrush flats and drainages	6018
Rorippa columbiae	2	Intermittently wet drainages and lakeshores	6010; 6003; 6004
Thelypodium howellii spp. spectabilis	1	Moist, somewhat alkaline sites in drainages and meadows	Suspected

[1] As published in "Endangered and Threatened Wildlife and Plants: Review of Plant Taxa for listing as Endangered or Threatened Species" Federal Register Vol. 45, No. 24, 12/15/80.
[2] Category 1 = Sufficient biological justification exists for listing as endangered or threatened status; Category 2 = Further study is needed to determine if biological justification for listing exists. Categories are subject to change as new information becomes available.
[3] Allotments are listed in which the subject plant has been sighted on public land.

Erosion on upland areas (areas other than along streams) is generally low. Streambank erosion is occurring along some streams. Streambank stability was surveyed during a 1972-73 fisheries habitat inventory on Steens Mountain. Of the 63 miles surveyed that were accessible to livestock. 33 miles had heavy streambank erosion damage. Some of the streams with the most damage include Blitzen and South Fork Blitzen River. and Krumbo, Deep. Home. McCoy. Kiger, Wildhorse and Mud Creeks Poor streambank stability has also been observed along Big Trout, Little Trout and Cottonwood Creeks in the Trout Creek Mountains. Streambank instability has been caused by the removal of protective riparian vegetation by livestock and/or beaver. Along some streams (e.g. Trout, Riddle. McCoy and Kiger Creeks) beaver have cut down dense stands of aspen allowing cattle access to stream bottoms resulting in riparian vegetation removal. stream bank trampling and soil compaction. This causes stream channels to become unstable and vulnerable to erosion and headcutting (see glossary).

WATER RESOURCES

Nearly the entire EIS area lies within the Oregon Closed Basin watershed, an extension of the Great Basin, The east-central section is in the Owyhee River drainage.

Water Quantity

Snowmelt in spring and early summer provides the major part of runoff for perennial streams. During the remainder of the year, groundwater and subsurface flow are the major contributors to streamflow. Most of the streams in the EIS area are intermittent. These flow only for brief periods as a result of snowmelt or rainfall in which the intensity exceeds the capability of the soil to absorb water (Branson et al, 1972)

Annual yieids from the area usually range from 1 to 15 inches per acre, with most of the area yielding less than 5 inches per acre. The total annual yield from public lands averages 323,144 acre-feet per year (Pacific Northwest River Basins Commission 1970).

Water on public lands is used mainly by livestock, wildlife and fish. The sources of water are streams, reservoirs, springs and wells, Over 90 percent of water on private land is used fcr irrigation.

Groundwater resources are found in alluvial deposits in valley areas and in volcanic rock materials. Studies made prior to 1970 indicated that groundwater withdrawal did not exceed the natural recharge in the watersheds (Pacific Northwest River Basins Commission 1970. Appendix V).

Water Quality

Groundwater quality is generally good; dissolved solids are usually less than 1,000 milligrams per liter (mg/l). Excessive sodium and boron cause problems in some places (Pacific Northwest River Basins Commission 1970).

According to the Oregon Department of Environmental Quality (ODEQ 1976), instream water

quality is generally good except during the summer when low dissolved oxygen levels and high water temperatures, pH and fecal coliform bacteria counts occur. These problems are mainly due to solar heating, often on diminishing flows and unshaded streams.

Sediment yields are generally low (.1 to .2 acre-feet per square mile per year). Streambank erosion is probably the major contributor to sediment in streams. Exposed streambanks contribute to increased sediment during flooding (e.g. Upper Blitzen River and Trout Creek).

WILDLIFE

Animals emphasized are those whose habitat or populations would be significantly changed by the proposed action or alternatives. Data for mule deer, pronghorn antelope, water-associated birds and sage grouse are summarized in Table 2-4. Fish data is summerized in Table 2-6. Mountain lion, bobcat, bighorn sheep and coyote are not discussed because populations are not expected to change significantly as a result of the proposed action or alternatives. A complete species list of the Burns District with general habitat relationships is published in Wildlife of the Pacific Northwest (Guenther and Kucera 1978). Another publication describes how each species use various plant communities (Thomas et al., in press). Habitat inventories and a more site specific discussion of wildlife are available at the Burns District Office.

Habitat Diversity

Habitat diversity refers to the mixture or variety of land forms, vegetation and water. Vegetation provides habitat diversity in three ways: (1) interspersion of vegetation types (edge effect), (2) variety of plant species (species composition) and (3) structure or the physical aspects of vegetation. Examples of structure are grazed versus ungrazed grass and two size classes of willow or aspen along a stream.

Habitat diversity can be correlated with the forage condition described in the vegetation section. Generally, vegetation communities in the EIS area with good forage condition would have greater habitat diversity than similar areas in poor or fair condition. Seedings are an exception since they have low habitat diversity although they are usually rated in good forage condition. Wildlife habitat in riparian areas rated as good has greater habitat diversity than areas rated poor. In general, the greatest numbers and kinds of wildlife are found in areas with the greatest habitat diversity. The Steens, Pueblo and Trout Creek Mountains have high habitat diversity.

Threatened, Endangered and Protected Animals

The American peregrine falcon is classified as endangered and the bald eagle is classified as threatened in Oregon under the Endangered Species Act, 1973. Although peregrines migrate through the EIS area, observations are rare and no active nests have been found. Bald eagles are attracted to the area by migrating waterfowl, especially in February and March.

The western snowy plover and kit fox are classified by Oregon Department of Fish & Wildlife (ODFW) as threatened (ODFW 1977). Herman et al. (1981) counted 15 plovers along the east shore of Alvord Lake and 24 in the vicinity of Borax Lake. Populations appeared healthy (Ibid). Kit fox are suspected to occur within the EIS area.

The Borax Lake chub (**Gila boraxobuis**) is a protected species under Oregon State Law (ODFW

Table 2-4 Summary of Wildlife in the EIS Area

Animal or Animal Groups	Habitat (Public Acres)		Population	
Mule Deer[1]	Winter Range Summer Range	171,000 304,000	Winter Summer	10,800 9,430
Pronghorn Antelope[2]	Winter Range Summer Range	280,000 521,000	Winter Summer	2,850 1,850
Water-Associated Birds	Wetlands	4,339	Annual Brood Production: 400 Ducks, 50 Canada Geese	
Sage Grouse	Nesting Habitat	60,000	(See Text)	

[1] Summer and winter ranges overlap, the total deer range is 374,300 acres.
[2] Summer and winter ranges overlap, the total antelope range is 566,000 acres.

1982 p. 5). The chub was proposed for Federal listing as an endangered species in January 1981 (45 FR 8: 6887, 1980). This proposal is still pending. The chub is found on private land in Borax Lake and in channels flowing out of the east side of the lake. Chubs do not occur on public lands.

Riparian Areas and Wetlands

Due to its scarcity. water and the water-associated vegetation are very important to wildlife as sources of food and cover (Thomas et al. 1979). For impact analysis these areas have been divided into two groups: riparian areas and wetlands.

In this document riparian areas are the linear strips of lush vegetation along streams. About 1,914 acres along 300 stream miles occur on public lands. Approximately 50 percent of the streamside riparian habitat has deteriorated to poor condition due to combined beaver and cattle activity (see Soils section). Wetlands are lakes, reservoirs, playas and sloughs which are permanently or seasonally covered with water. See Figure 2-I and Table 2-5.

Table 2-5 Existing Condition of Wildlife Habitat in Riparian Areas and Wetlands

Condition[1]	Streamside	Riparian		Wetlands
	Miles	Acres		Acres
Excellent	6	135	(7%)	65
Good	35	378	(20%)	260
Fair	37	433	(23%)	0
Poor	100	808	(42%)	110
Unknown	122	160	(8%)	3,904
Total	300	1,914		4,339

[1] Riparian and wetland inventory methodology shown in Appendix G.

Upland meadows not along streams and riparian areas adjacent to isolated springs have neither been quantified in acres nor mapped. Consequently. these areas are not illustrated on Figure 2-2 or included in riparian acreages. Habitat for wildlife is much below potential in most upland meadows because of heavy livestock use. Krumbo Creek is an example of how headcutting and resulting lowered water tables have eliminated meadow habitat.

A detailed, site specific listing of riparian areas and wetlands is listed in Appendix G. Tables G-I and G-2.

Fisk

About 119 of the 300 riparian stream miles are considered fish habitat. Approximately 70 percent of the 119 stream miles are in poor or fair condition for fish. Habitat condition and species occurence for each stream is displayed in Table 2-6,

Rainbow trout, Lahontan cutthroat trout and crappie are planted on public lands to maintain the sport fishery in four lakes (Juniper, Mann. Larkspur and Wildhorse). two reservoirs (Rock Creek, Granddad) and the Blitzen River.

Native fish in the EIS area include redband and cutthroat trout, minnows such as dace and redside shiners. bridgelip suckers. mountain whitefish and sculpins. Some of these fish are relicts of once widespread species, which evolved in isolation into new species and subspecies having a limited range. Because of limited range and declining habitat. the American Fisheries Society has recognized five kinds as being of “special concern” (Deacon et al, 1979): redband trout, Borax Lake chub, Alvord chub. Whitehorse cutthroat trout and the Catiow tui chub. Redband and Alvord trout are native to the EIS area. As a result of the introduction of rainbow trout, the Alvord trout became extinct and the redband trout populations were greatly reduced. The redband population in Three-Mile Creek, one of the few remaining pure strains, has been used by ODFW as a source of brood stock for rearing in a hatchery (Wilmont 1974).

The Whitehorse cutthroat trout has been introduced to Van Horn Creek, Denio Creek, Mosquito Creek and six others. Fish habitat on portions of these streams is not affected by livestock grazing because of steep topography. The Alvord chub is found in several springs and desert streams in Pueblo Valley. Four locations are on public lands. The Catlow tui chub is restricted to Skull, Rock and Home Creeks in Catlow Valley, See Threatened and Endangered Animals in this section for a discussion of the Borax Lake Chub.

Mule Deer

Deer are found primarily in areas illustrated on Figure 2-2. In 1980, populations were about 12 percent below ODFW objective levels for the EIS area (ODFW 1981 a, 1981 b; Polenz 1982). About 11,000 deer concentrate on winter ranges when snow forces them out of higher elevations. Food and cover provided by winter habitat are especially important because the deer’s fat reserves decrease during the winter. Winter ranges are the first areas to have green grasses and forbs in the spring. The spring growth of grasses and forbs on public lands provides forage needed by deer to improve their weakened condition.

Antelope bitterbrush is an important forage species for deer, especially in the fall and early winter, tleavy livestock use of bitterbrush decreases food for deer on portions of Allotments 6008 and 6010. Heavy livestock use and trampling decreases forage and cover for deer in upland aspen stands especially in Allotments 6023, 6015 and 6002.

Table 2-6 Fisheries Data

Stream (Drainage)	Condition (Public Miles)[1] Poor	Fair	Good	Excellent	Allotment	Species on Public Lands	Existing Livestock Use
Blitzen River	4 [2]			6.2	6006, 6003	RB, MW, TC, LD, SD, CM, NS, BS	Existing livestock exclosure improving habitat
	R 1						
S.F. Blitzen River	.		4	4	6003	RB, MW, TC, LD, SD, CM, NS, BS	Heavy livestock use
* Bridge Cr.	2		2.2		6005, 6008	RB	Existing exclosures improving habitat
Mud Cr. (East Camp)	4		3.2		6006	RB, BS	
* Fish Cr.	1	5	7	3.0	6005	RB	Heavy livestock use in some areas
Little Blitzen R.		2	6.7	1.5	6002	RB	
Big Indian Cr.	2.9				6003	RB	Heavy livestock use
Little Indian Cr.			2.7		6002	RB	
* Ankle Cr.	6		4		6002	RB	Heavy livestock use
Deep Cr. (Blitzen)	4	.6			6002	RB	Heavy livestock use
* Krumbo Cr.	9	7	.8		6008	RB, TC	Existing exclosures improving habitat
* McCoy Cr.	3.8	3.8	2.0	4	6007, 6010	RB, WCT	Heavy livestock use
Cucamonga Cr.	.3	4			6010	RB	
* Kiger Cr.	7.1	.2			6010	RB	Heavy livestock use
Rudie Cr.	3.3				6012	RB	Heavy livestock use
Mann Cr.		1.6			6026	RB	Light livestock use
Mosquito Cr.		1.6			6026	WCT	Light livestock use
Willow Cr.		1.5			6012	WCT	Light livestock use
Big Alvord Cr.		1.7			6012	WCT	Light livestock use
Pike Cr.		1.7			6012	WCT	Light livestock use
Indian Cr. (Alvord Basin)		3.3			6012	RB	Light livestock use
* Wildhorse Cr.	3.4	1.6			6013, 6019	RB/CT	Heavy livestock use
Skull Cr.	8				6002	CTC	Heavy livestock use
Three Mile Cr.		1.5			6002	RB	
Home Cr.	2.6	1.6		1.5	6002	RB, CTC	Heavy livestock use in some areas
Van Horn Cr.		1.0	1.0		6020	WCT, AC	Light livestock use
Deep Cr.	1.5	2.5			6021	WCT	Light livestock use in some areas
* Trout Cr.	8.3	1.5	2		6015	RB/CT	Heavy livestock use
Cottonwood Cr. (Trout Cr.)		3			6017	RB/CT	
Kings River	1.9				6022	RB/CT	Heavy livestock use
Rock Cr. 2					6001	CTC	
Totals	56.8	26.5	20.2	15.5			

Lake/Reservoir	Condition (Acres)[1] Poor	Fair	Good	Excellent	Allotment	Species on Public Lands	Existing Livestock Use
Rock Cr. Res.		145			6001	RB, WC	
Crandall Res.		5			6006	RB	
Juniper Lake			100		6011	LCT	Portions of public land excluded from livestock
Wildhorse Lake				16	6013	LCT	
Pueblo Slough (Demo)			40		6020	AC	Existing exclosure
Pueblo Slough (TumTum)		20			6020	AC	Existing exclosure
Mann Lake				200	6026	LCT	Portions of public land excluded from livestock
Larkspur		4			6006	RB	
Totals		169.5	140	216			

Key to Symbols

* Includes Tributaries	NS Northern Squawfish
AC Alvord Chub	MW Mountain Whitefish
BS Bridgelip Sucker	RB Rainbow or Redband Trout
CM Chiselmouth	RB/CT Rainbow & Cutthroat Hybrid
CTC Catlow Tui Chub	SD Speckled Dace
LCT Lahontan Cutthroat Trout	TC Tui Chub
LD Longnose Dace	WC White Crappie
	WCT Wildhorse Cutthroat Trout

[1] See Appendix G for criteria for evaluating stream conditions.
[2] Rock Creek unsurveyed - 4.6 miles unknown condition.

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

ANDREWS GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

1982

SCALE
0 5 10 MILE
0 5 10 15 20 KM

LEGEND

- Deer Habitat
- Deer Winter Range
- Sage Grouse Strutting Ground
- Fish Habitat - Streams
- Fish Habitat - Lakes and Reservoirs

Allotment Numbers and Allotment Names

6001 North Catlow
6002 South Steens
6003 Fish Creek - Big Indian
6004 Steens Summit
6005 Mud Creek
6006 Frazier Field
6007 Ruby Springs
6008 Krumbo
6009 Blitzen
6010 Otley Brothers
6011 Pollock
6012 Alvord
6013 Wildhorse Canyon
6015 Trout Creek Mountain
6016 Sandhills Indian
6017 Grassy Basin
6018 Tule Spring
6019 Andrews Community
6020 Pueblo Lone Mountain
6021 Denio Basin
6022 King's River
6024 South Fork
6025 Hardie Summer
6026 Mann Lake

Allotment Boundary

OREGON
-N-
Location Map

FIGURE 2-2
WILDLIFE HABITAT

About 9,500 deer summer on public lands, primarily on Steens M/fountain. Summer and early fall forage is important because it increases fat reserves needed to sustain deer through the winter. Riparian areas provide nutritious green forage late in the summer when upland vegetation has dried.

Pronghorn Antelope

Antelope populations have shown a slow, steady increase in recent years. During the summer, antelope are scattered throughout the EIS area, During severe winter weather antelope concentrate at lower elevations which are usually free from snow,

Antelope prefer low sagebrush flats with patches of big sagebrush and juniper. Competition for forage with cattle and wild horses is slight due to different forage preferences (Vavra and Sneva 1978). Lack of water is a serious problem during drought years.

Most BLM fences in the EIS area allow freedom of movement by having the bottom wire a minimum of 16 inches from the ground. Seedings and wildfire have converted dense stands of big sagebrush to low growing herbaceous vegetation which is preferred by antelope, Livestock water developments have expanded antelope use into areas previously unoccupied because of lack of water.

Upland Game Birds

Sage grouse are found throughout the EIS area primarily in the big and low sagebrush types (Figure 2-1) and are relatively abundant in some parts such as the Steens and Trout Creek Mountains. Fifteen strutting grounds and associated nesting areas have been located (Figure 2-2). Many additional strutting grounds are suspected to exist. Strutting grounds and nesting areas are crucial habitat because grouse mate each year in these natural clearings in the sagebrush. Most nesting occurs within 2 miles of a strutting ground. Sagebrush. besides being important as food, provides the necessary escape and nesting cover. Upland meadows and meadows aiong streams are crucial habitat because they supply insects and succulent forbs to young birds (Savage 1969).

Chukar partridge. the most common gama bird in the area, concentrate in steep rocky areas adjacent to streams and water developments. Chukars are abundant in the excellent habitat found in the Steens and Pueblo Mountains. California quail are closely associated with brushy riparian areas at elevations below 6,000 feet. Most populations are on private lands. Mourning doves are spring through fall breeding residents. Most nesting occurs in juniper trees.

Water-Associated Birds

Approximately 70 species of birds use the area's wetlands during migration or for nesting, Some representative species are the Canada goose. whistling swan, cinnamon teal, gadwal, long-billed curlew. American avocet, Wilson's phalarope and spotted sandpiper. Thousands of birds use the Malheur National Wildlife Refuge and adjacent private farmlands. In comparison with refuge and private lands, relatively little feeding and nesting habitat is found on public lands. Approximately 4,000 public acres of wetlands are periodically inundated and provide crucial nesting or feeding habitat {Figure 2-l). Some important use areas on public lands are Juniper Lake, Mann Lake, Pueblo Slough and numerous playas. Bird production is below potential on some of these wetlands because livestock remove food and cover. Crested wheatgrass seedings adjacent to the Malheur Wildlife Refuge are important feeding areas for Canada geese.

Other Mammals, Other Birds, Reptiles and Amphibians

Approximately 230 of these species inhabit the EIS area. Representative species include the black-tailed jackrabbit, beaver, ravens, golden eagle, western rattlesnake and spotted frog. Some species such as the beaver are found in specific habitat types: others, such as the deer mouse, are widespread over the EIS area. Highest species diversity occurs in riparian areas.

WILD HORSES

Ail unbranded and unclaimed horses in the EIS area as of December 15, 1971 are considered wild and free roaming as defined in the Wild Horse and Burro Act (Public Law 92-195). Two herd management areas, as discussed in Table 2-7. contained the wild horses in the EIS area in the base year 1980,

There are approximately 87.5 miles of existing interior fences within the herd management areas of which about 34 miles exclude wild horses from private lands or seedings. These fences generally do not cause injuries because the horses have become accustomed to fence locations. See the Wiid Horse Herd Management Plans on file at the Burns District Office for additionai information concerning the wild horses in the EIS area.

Table 2-7 Wild Horse Herd Management Areas

Herd Management Area[1]	Horses Counted 1980	Horses Counted 1982	Acres Public Land	Allotments Involved	Condition of the Horses
South Steens	187	200[2]	175,605	6001,6002, 6006,6019	Good, reproductive
Alvord/Sheepshead	1,251	870[3]	800,501[4]	6011,6012, 6015,6018, 6019	Good, reproductive

[1] The preferred MFP alternative would split the Alvord/Sheepshead HMA into 2 HMAs and would eliminate the acres from allotments 6001 and 6019 from the South Steens HMA and allotments 6015 and 6019 from the Alvord/Sheepshead HMA. See Chapter 1, Interrelationships, BLM Planning for discussion.
[2] There were 166 horses gathered in January 1982, leaving 200 head.
[3] There were 668 horses gathered between 9/81 and 12/81.
[4] The herd management area consists of 248,800 acres of public land in the Burns District and 551,700 acres in the Vale District. The 1,251 horses counted in 1980 are the total number for the 800,501 acres.

RECREATION

Developed recreation sites on public land include Page Springs, Fish Lake, and Jackman Park. A number of other primitive sites offer opportunities for camping and picnicking.

There are some unique recreational resources in the EIS area. In 1971, the Steens Mountain Recreation Lands (about 194,000 acres) were designated to be managed primarily for recreation and natural value protection. A desert trail extends 22 miles from Fields, Oregon to Denio, Nevada and provides hiking, backpacking and sightseeing opportunities.

A number of areas offer opportunities for geologic, zoologic, scenic, archeologic, historic and/or cultural sightseeing use. Examples of high quality sightseeing areas include Steens Mountain, Alvord Desert, Catlow Rim and Pueblo Mountains.

Hunting opportunities exist for big game, upland game, waterfowl and other species. Generally, high quality hunting opportunities occur for deer and antelope in the southwestern portion of the EIS area, for chukars in the lower Steens, Pueblo and Trout Creek Mountains and for ground squirrels and jackrabbits in the entire EIS area. Fishing opportunities are available for cold and warm water species in reservoirs, streams and creeks. Fish Lake, Wildhorse Lake and the South Fork-Blitzen River and tributaries offer high quality fishing opportunities.

Table 2-8 shows the estimated current recreational visitor use for the EIS area. Of the total visitor use in Harney County, about 14 percent is attributable to public land.

Table 2-8 Estimated Recreational Visitation

Recreational Activity	1978-9 Visitation Visitor Days/Year Total (Harney County)	Public lands within the EIS Area
Hunting		
Big game	74,300	12,050
Small game	12,200	5,660
Waterfowl	5,000	150
Fishing	81,630	33,530
Camping	304,700	59,220
Other Day Use[1]	402,600	14,030
Total	860,430	123,640

[1] Total area day use visitation excludes urban and semi-urban activities not generally associated with range lands administered by the BLM.

CULTURAL RESOURCES

BLM is required by law and executive order to identify, protect and enhance significant cultural resources on public lands. A number of procedures, including those specified in 36 CFR 800.4(a), were used to identify the cultural resources within the Andrews EIS area.

The BLM has a cultural resource inventory composed of three classes of inventory (BLM Manual 8111). A survey of existing cultural resource information (Class I inventory) has been completed for the area (Bright 1979) through a compilation of the area's existing site record data.

Class II field sampling inventories have been undertaken on 152,000 acres to provide a data base for making an objective estimate of the nature and

distribution of sites within the study area (Aikens et al. 1980). These inventories are consistent with requirements of the Programmatic Memorandum of Agreement between the BLM, Advisory Council on Historic Preservation and National Conference of State Historic Preservation Officers, dated January 14, 1980.

Class III intensive field inventories are undertaken prior to BLM actions which would result in ground disturbance or land ownership changes. The objective 04 a Class III inventory is to identify and record all observable cultural resource sites within a specified area. Class III intensive field inventories have been performed on 44.344 acres within the EIS area. The results of these intensive inventories are documented in each site-specific environmental assessment.

No sites on public land in the EIS area are currently on the National Register of Historic Places, The criteria used to assess the eligibility of identified cultural resources for inclusion in the National Register are described in 36 CFR1202.6.

There are 34-O archeologic sites and numerous isolated finds on or near public land within the EIS area.

There are 34 inventoried historic sites on or near BLM-administered land within the area, many of which remain unverified in the field.

Paleontologic sites which contain vertebrate and certain invertebrate fossils are protected within the scope of the Antiquities Act. While the EIS area has not been thoroughly surveyed, certain fossils are known to exist. Most sites are on private land, and there are few data dealing with site locations, significance and conditions.

VISUAL RESOURCES

Visual resources are the land. water, vegetation. animals and the other features (as described in this chapter) that are visible on public lands and comprise the scenic quality of the area. Visual resource management (VRM) objectives have been developed based on an inventory and evaluation of scenic quality. visual sensitivity and distance zone (see Glossary). Examples of highly scenic and sensitive areas on public land include Blitzen and Little Blitzen River canyons, Pueblo Mountains. Steens Mountain alpine ridge, Frenchglen to Steens Ranch, Mann Lake, Tencent Lake, McCoy Creek Canyon, Fish Greek Canyon, Alvord Desert Basin, Alvord Lake, Big and Little Indian Creek Canyons. and Page Springs Recreation Site,

VRM classes specify management objectives and allow for differing degrees of modification (BLM Manual 8411). Class I provides the highest level of protection for scenic values, and Class IV the lowest level. Public lands in the EIS area are VRM Class II (32 precent). Class III (12 percent) and Class IV (56 percent). VRM class delineations for the Andrews EIS area are available in the Burns District Office.

WILDERNESS VALUES

Under the terms of the Federal Land Policy and Management Act of 1976 (FLPMA). roadless areas of 5.000 acres or more that have wilderness characteristics are to be reviewed within 15 years for possible wilderness designation.

After consideration of public comments on the BLM wilderness review, the Oregon State Director has announced his final decisions for public lands in the EIS area included in the intensive wilderness inventory. In the EIS area. 22 areas {totaling about 739.260 acres} have been identified as Wilderness Study Areas [see Glossary).

The intensive wilderness inventory and accompanying maps for Oregon are available in the Burns District Office.

SPECIAL AREAS

Areas of Critical Environmental Concern (ACECs) are areas on the public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values. fish and wildlife resources, or other natural systems or processes! or tc protect life and safety from natural hazards (FLPMA Section 103(a)).

Of the areas nominated for ACEC consideration during the District's planning process, 5 have potential for designation (see Table 2-9). Ail potential ACECs meet the identification criteria (relevance and importance) as derived from the Federal Land Policy and Management Act (1976) and described in USDI, BLM (1980b). ACEC designation. if considered appropriate, will be part of the Management Framework Plan decisions for the area.

Five areas on public land (Steens Mountain, Little Blitzen Gorge, Kiger Gorge Plateau, Alvord Basin, Blitzen River) have been identified as potential National Natural Landmarks (see Glossary) by the National Park Service (NPS) (Daubenmire 1975: Bostick et al. 1975). The entire length of the Blitzen River has also been identified by the State of Oregon for potential scenic waterway designation.

Research Natural Areas (RNAs, see Glossary! are established and maintained primarily for research and educational purposes. Eight areas are being considered for RNA. designation (see Table 2-9). The plant community or habitat types listed represent cell

Table 2-9 Potential Special Areas

ACEC	Approx. Size (acres)	Description
1. Alvord Desert	16,700	Northern Great Basin desert with a diversity of plant and animal communities.
2. Steens	14,000	Subalpine/alpine natural system with high scenic value.
3. Borax Lake	520	Buffer zone around chub habitat.
4. Alvord Peak	14,700	Rugged, mountainous area with high zoologic and scenic value.
5. Pickett Rim	4,000	Rimrock with an abundant population of nesting raptors.
Total	49,920	
RNA		
1. Little Blitzen	2,200	Stream system originating in subalpine zone; vernal pond; aspen grove; fescue grassland.
2. Little Wildhorse	35	Mid to high elevation lake.
3. South Fork-Willow Creek	200	Stream system originating in a glacial cirque; alpine communities.
4. Rooster Comb	490	Mountain mahogany; black cottonwood riparian area.
5. Mickey Basin	300	Winterfat community.
6. Pueblo Foothills	1,925	Narrowleaf cottonwood and Mormon tea community.
7. Tum Tum Lake	1,170	Low elevation vernal pond.
8. Long Draw	210	Sagebrush, Indian ricegrass, needlegrass community.
Total	6,540	

needs for RNAs as identified in the Oregon Natural Heritage Plan (1981).

SOCIOECONOMIC CONDITIONS

The area is defined for socioeconomic purposes as Harney County. While several permittees live south of the State border in Nevada, and some business is done in Winnemucca, the people living in Harney County are those most affected by management actions concerning the subject lands.

Population and Income

The population of Harney County in 1981 was estimated to be 8,000 persons, a decline from the 1980 population of 8,314 persons. Population growth during the past two decades was moderate, averaging 0.7 percent per year during the 1960's and 1.4 percent per year in the 1970's. The decline in 1981 amounted to a 3.8 percent decrease.

Personal income in 1980 was $69.5 million. Income per capita was $8,344 as compared with a state-wide average of $9,296. The portion of income attributable to the work force, labor and proprietors' income, amounted to $45.1 million of which $9.4 million was farm income and $35.7 million was non-farm income.

Farm proprietors' income varies widely from year to year as shown by the figures for Harney County since 1974:

1974	$3,155,000
1975	970,000
1976	2,067,000
1977	2,507,000
1978	2,699,000
1979	6,726,000
1980	5,739,000

Economic Activity

The labor force--people working or looking for work averaged 3,670 in 1981, a decline from 4,120 in 1980 due primarily to the closure of a large lumber mill. Unemployment averaged 21.8 percent of the labor force in 1981. The industrial composition of non-agricultural wage and salary employment in 1981 is shown in Table 2-I 0.

Table 2-10 Non-Agricultural Wage and Salary Employment, 1981 (Average number of workers)

Industry	Employment	Percent
Lumber and wood products	130	6.8
Other manufacturing	10	0.5
Construction	60	3.3
Trade	460	24.2
Government	810	42.6
Other	430	22.6
Total	1,900	100.0

Source: Oregon Department of Human Resources, 1982a

Data on farm {and ranch) employment is not available for 1981, but in 1980 there were 423 farm/ranch proprietors and an average of 322 farm wage and salary workers employed (U.S. Department of Commerce, 1982).

The value of agricultural production in 1980 was $23.5 million including $5.0 million in crops sold and $18.5 million in livestock and livestock products, There were 1 10,000 cattle and calves in the county on January 1, 1980. The value of cattle and calves sold was $18.0 million. (OSU Extension Service, 1981).

The business of livestock production creates additional local sales activity through the purchases by ranchers and their suppliers. A portion of these gross sales are earned by individuals as personal income. Estimates of the relationships al ranchers' sales to total gross sales and to personal income generated have been obtained from inter-industry models for these counties developed by the Forest Service for the year 1977 (USDA, FS 7982). (See Appendix H.) Applying these estimates to 1980 livestock sales figures the total gross sales generated locally by livestock producers in 1980, was $38.7 million, Local personal income generated by the gross sates was $10.9 million,

Economic Significance of Public Land Resources

The following sections describe several measures of the value of BLM grazing privileges to the livestock industry, and estimate the amount of local income and empioymeot generated by the existing level of activities arising from public land use.

Dependence of Livestock Permittees on Public Forage

During the 1980 grazing year (3/1/80-2/28/81), 32 permittees held grazing privileges on public lands in the EIS area. Their active preference (see Glossary) totaled 102,988 AUMs, and their actual (paid j use in 1980 was 101.799 AUMs. They reported total herds of 30,085 cattle. Assuming 12 AUMs of forage for each animal per year. actual use of BLM forage provided 28 percent of total forage requirements. Six permittees were dependent on BLM forage for more than 50 percent of their annual requirements. The use of BLM forage is heaviest during the spring and summer. and it comprises 90 to 100 percent of the forage requirements in that season for half (16) of the permittees. Most permittees have very limited alternative forage sources during that period. Table 2-11 shows the average annual dependency (BLM forage as a percentage of total needs), and the distribution of permittees by peak level of dependence.

BLM Grazing Licenses and Ranch Property Values

The Bureau of Land Management does not treat grazing permits as vested property rights; however, effects on private asset valuation may occur. Based on BLM file data and contract appraisal studies, the asset value of public; forage is estimated to be about $40-$45 per AUM. Estimates of the capitalization values placed OR grazing permits associated with ranch properties when sold have varied widely from this estimate. A study of ranch sales in Grant and Umatilla Counties found no statistically valid evidence that public grazing use affected ranch sale values (Winter et al. 1979). However, grazing preferences have sold at prices ranging from $22 to $55 per AUM in southern Idaho according to the Owyhee Grazing Management FEIS (USDI, BLM 1980c), and an average price of $65 per AUM was indicated in interviews with parties to the sale of several ranch properties in eastern Oregon during the years 1977 to 1979 (USDI, BLM 1980d).

Table 2-11 Permittee Dependence on BLM Forage, By Herd Size Class[1] (Dependence based on paid use, 1980 grazing year)

Item	Herd Size Class			
	Under 400	400-999	1,000+	Total
Permittees	9	14	9	32
Cattle[2]	1,828	8,091	20,166	30,085
Active Preference (AUMs)	6,416	42,776	53,796	102,988
Actual Use (AUMs)	5,984	42,882	52,933	101,799
Average dependence[3]	27.3%	44.2%	21.9%	28.2%
Number of permittees by highest monthly dependence:[4]				
Under 50 percent	2	1	5	8
50-59 percent	-	-	1	1
60-69 percent	1	1	1	3
70-79 percent	2	-	1	3
80-89 percent	-	1	-	1
Over 90 percent	4	11	1	16
Total	9	14	9	32

[1] Data pertains to livestock permittees holding grazing permits within the EIS area. Forage on National Forest and State lands is not covered.
[2] Includes horses.
[3] Actual use of BLM forage during 1980 as percent of annual forage requirements. Computed by dividing actual use for a herd size group by the total forage requirements for the class (12 times the number of cattle involved), and converting to percentage terms.
[4] Actual use of BLM forage as percent of total needs during month of greatest BLM forage use.

Local Income and Employment Effects

Livestock sales of BLM permittees in the EIS area in 1980 amounted to $8.6 million (1978-80 average prices) according to estimates based on a survey of BLM permittees in Harney County (Gee 1981).

Local personal income derived from these sales accounted for $5.0 million, or 8.3 percent of personal income and 203 jobs in Harney County. The portion of their forage derived from public lands in the EIS area was responsible for about 2.4 percent of personal income in the county. Employment in livestock and other local industries, attributable to grazing on public lands, was about 57 workers.

Other Land Use Activities

Mineral exploration and quarrying, and wildlife trapping provide minor amounts of local income and employment. Hunting and fishing, camping, and general recreational use on BLM lands in the EIS area generate an estimated $557,300 in local income and 35 jobs.

Payments to Harney County derived from lands managed by BLM amounted to $634,164 in fiscal 1981. These payments are principally payments in lieu of taxes and mineral fees which would not be affected by the alternatives considered.

Social Conditions

Social conditions which might be affected by any of the alternatives are primarily those relating to the residents of Harney County. Groups interested in these public lands include the ranching industry, the mining industry, conservation groups, wild horse groups, historical groups, archeological groups, hunting and fishing groups, other recreation-oriented groups and local resident groups.

The group most likely to be affected is the ranching industry. The ranchers style of life is tied to the land and to the ranch operation.

Chapter 3
Environmental Consequences

CHAPTER 3 ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

Throughout this chapter. environmenial consequences (impacts) are compared to the existing situation, as described in Chapter 2.

The significant impacts resulting from implementation of the proposed action and each of the alternatives are analyzed in this section. If a resource is not affected or if the impacts are considered insignificant, no discussion is included. Analysis, including the scoping process, indicates that there would be no significant impacts upon air quality, minerals, climate, or energy consumption.

The major actions which cause impacts are allocation of existing and future forage production, implementation of grazing systems, change in period of use and implementation of range improvement projects. No change is expected from the existing situation on the unallotted areas (509 acres): therefore, these areas are not discussed further.

The following criteria were used to determine the nature and extent of impacts identified:

Beneficial impact: Resource conditions would improve relative to the existing situation.

Adverse impact: Resource conditions would deteriorate relative to the existing situation.

No impact: Resource conditions would remain the same as the existing situation.

Short term: The 1 O-year period needed to complete the range improvement projects and implement grazing systems.

Long term: Fifteen years after implementation of the proposed action or alternative (10 years for implementation plus 15 additional years).

The foliowing assumptions have been made as a basis for the impact analysis:

- The proposed action or any alternative selected would be fully implemented as described in Chapter 1. Grazing systems would be followed.
- Monitoring studies would be completed as indicated and adjustments made as needed,
- Vegetation is the only resource which would have primary impacts. Any changes in production, or composition of vegetation would affect other resources.
- Standard procedures and design elements would be effectively carried out for construction of range improvement projects in the proposal or any alternative.
- Regular maintenance would be carried out to maintain the functional capability of all range improvements.

IMPACTS ON VEGETATION

Changes in vegetative characteristics such as forage production, forage condition, residual ground cover, riparian vegetation and threatened or endangered plants are dependent upon plant species composition changes. A summary of the !ong-term impacts to vegetation is shown in Table 3-1.

Impacts to the 11 vegetation types will not be discussed separately because the plants most affected by the proposed action and the alternatives are found in almost every vegetation type. Consequently, the expected changes in key species would occur in nearly every vegetation type although in somewhat different proportions depending upon the present composition and potential of the site and the actions being proposed.

Plant Species Composition

The following analysis identifies the general changes in composition of the key species that are expected to result from the components of the proposed action and each alternative. (See Table I-I for components by alternative.) Since significant composition changes usually take several years, the following analysis is confined to a discussion of long-term impacts.

Estimates of changes in composition of key species were based upon observations by district personnel, professional judgment, analysis of similar grazing systems elsewhere and cited studies. No change from the current species composition is expected on areas managed under fenced Federal range or unallotted status,

Table 3-1 Long-Term Vegetation Impacts

Vegetative Characteristic	Existing Situation	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Livestock
Forage Condition (Acres)					
Good	743,605	1,190,573	803,775	1,255,742	1,116,861
Fair	676,855	293,418	360,952	245,562	272,099
Poor	101,990	38,459	357,723	21,146	133,490
No Data [1]	51,540	51,540	51,540	51,540	51,540
Total Residual Ground Cover (Acres)					
Increasing		174,187	379,623	85,866	766,526
Static		32,558	447,675	32,560	102,396
Decreasing		1,367,243	746,692	1,455,564	705,068
Long Term Forage Production (AUMs)	102,536	158,224	[2]	190,429	134,381
Streamside Riparian Vegetation [3] (Acres)					
Increasing		1,142	301	462	'1531
Static		416	661	682	178
Decreasing		218	810	631	11%
Unknown		138	142	139	87

[1] Acreage classified as "no data" includes surface water, fenced Federal range and unalloted areas.
[2] Over the long term, forage production under the no action alternative would probably decline by a significant but unquantifiable amount.
[3] Species composition of key woody riparian species only.

Forage Allocation and Grazing Systems

The livestock forage allocation and the grazing systems (Appendix B. Tables B-I and B-2) in the proposed action and the alternatives determine the degree and timing of utilization of the key species.

Grazing systems for riparian areas are summarized in Table S-5 and listed by stream in Appendix G. Table G-1 In the following discussion, each grazing system is discussed with respect to its effect on key species composition. Grazing systems which provide rest during the critical part of the growing season (normally May 1 to August 15, depending on the elevation) would result in increases in key herbaceous species. During this period plants are drawing on stored carbohydrates to develop flower stalks and vegetative growth. Carbohydrate reserves are replenished during the later stages of this period prior' to seedripe. The critical period of growth ends when the plant has replenished its carbohydrate reserves and has produced seed, Removal of foliage during the period of critical growth results in reduced vigor which is evidenced by fewer see&talks, lower vegetative production, and a smaller crown size. In the following discussion, each proposed grazing system is evaluated for its ability to allow plants to complete the critical stages of growth. Table 3-2 presents a summary of this discussion

Winter Grazing System - Increases in herbaceous key species are expected under this system because wit-de; use allows plants to complete the stages of development from initiation of growth through dormancy without interruption, Grazing would begin after the herbaceous species have become dormant and the carbohydrates have been stored in the roots. The effects orr woody species are somewhat different since shrubs store carbohydrates in the above-ground stems. Moderate utilization of shrubs is expected to result in the production of fewer flowers in the spring but no significant change in woody species composition. Some areas proposed for winter livestock use would have year long use by horses (e.g. Tule Springs allotment). No change in herbaceous key species is expected in these areas

Spring Grazing System - Spring grazing results in the removal of previous year's growth together with 20 to 30 percent of the current year's growth! primarily on perennial grasses, This system is proposed in some areas in order to allow grazing of annual grasses which are not as palatable later in the season.

Grazing during spring requires the plants to draw heavily on carbohydrate reserves in order to replace the grazed portions. However. since grazing ceases white adequate soil moisture is available, most plants are able to reach full growth, produce seed and replenish carbohydrate reserves.

Seedling establishment would depend upon the intensity of grazing in the spring following germination. If seedling plants are not physically damaged through trampling or being pulled up. they would normally he established by the start of the third growing season (Studdart, Smith and Box 1975, p. 483). As a result. an increase in key herbaceous species cornposition is expected. The effect of the spring system on woody key species is similar to winter. Utilization of woody species, expected to be light to moderate. would be sufficient to prevent any increase in woody key species composition,

Spring/Summer Grazing System - The effect of spring/summer grazing on species composition is largely dependent on the degree of utilization on the key species. Grazing would occur every year during the critical part of the growing season under this system. Some researchers (e.g. Laycock 1981) indicate that perennial grasses can maintain vigor under such a system if the distribution of grazing is uniform, the condition of the range is fair to good. and the intensity of utilization is light or moderate. Other studies (e.g. Cook 1971) indicate that even moderate levels of utilization may be too severe for a spring/summer grazing system. All researchers agree however, that heavy use levels under a spring; summer system results in lowered vigor of the grazed plants,

Although the proposed stocking rates are designed to achieve moderate levels of utilization on most areas. factors such as terrain, location of fences and water, and the type of vegetation found in the Andrews EIS area often prevent uniform patterns of grazing. Heavy grazing inevitably will occur on some portions of an allotment and light use will occur in other areas. A decrease in key species composition is expected on those areas within an allotment which receive heavy utilization -- primarily areas adjacent to water developments, riparian areas and fiat valley bottoms, Spring/summer grazing at the Squaw Butte Experiment Station, where stocking rates were designed to achieve a moderate level of grazing use, resulted in heavy utilization of 37 percent of the range. Over an 11-year period. this produced a change in species composition toward dominance by intermediate species such as Sandberg's bluegrass (Hyder 1951). Decreases in key woody and herbaceous species are expected to occur in streamside riparian areas which are accessible to livestock under spring/summer grazing. Livestock prefer green forage; consequently, as the upland herbaceous species become dry in !ate summer livestock begin grazing green woody species in the riparian areas.

Table 3-2 Key Species Composition Changes Due To Implementation of Grazing Systems [1]

Grazing System [2]	Upland Key Species [3]		Riparian Key Species [4]		Comments, Qualifications
	Woody	Herbaceous	Woody	Herbaceous	
Winter	No Change	Increase	Increase	Increase	--
Spring	No Change	Increase	None Present	None Present	--
Spring/Summer (SS)	No Change	No Change	No Change	No Change	Light to moderate utilization
Spring/Summer	Decrease	Decrease	Decrease	Decrease	Heavy utilization
Spring/Fall	No Change	Increase	None Present	None Present	--
Deferred (DF)	Decrease	Increase	Decrease	Increase	Change in woody varies according to utilization level
Deferred	No Change	Increase	Increase	Increase	One month grazing only in September and at moderate utilization levels
Deferred Rotation	No Change	No Change	None Present	None Present	--
Rest Rotation	Increase	Increase	No Change	Increase	1 year SS/1 year DF/1 year rest
Rest Rotation	No Change	No Change	Slow Increase	Increase	1 year SS/1 year rest
Rest Rotation	No Change	No Change	No Change	No Change	2 years SS/1 year rest
Rest Rotation	Increase	Increase	Increase	Increase	1 or 2 years SS/2 years rest
Exclusion	Increase	Increase	Rapid Increase	Increase	Stagnation may occur after several years
Temp. Exclusion	Increase	Increase	Rapid Increase	Increase	2 years exclusion
Irrigated Pasture	NonePresent	Increase	None Present	None Present	--
Trailing	Increase	Increase	Increase	Increase	Approximately 10 days use each year

[1] Species composition changes are expected on acres which are responsive to grazing management. Some areas, due to low site potential or poor forage condition are not expected to have any change in species composition.
[2] No changes in upland or riparian key species composition are expected to occur under the following grazing systems: Fenced Federal Range, Nonuse and Unallotted.
[3] The primary upland woody key species is bitterbrush. Important upland herbaceous key species include bluebunch wheatgrass, Idaho fescue, Thurber's needlegrass, squirreltail and crested wheatgrass.
[4] The primary riparian woody key species are willow, quaking aspen and alder. Riparian herbaceous key species include several species of meadow grasses, perennial forbs and sedges.

Spring/Fall Grazing System - The spring/fall system would allow two periods of grazing use every year. Livestock would be removed in the spring while sufficient soil moisture is available for regrowth. The fall season of use would occur after dormancy of herbaceous key species in order to utilize the summer's regrowth. This system is proposed primarily for seedings in which the key species is crested wheatgrass. This system would promote fine stemmed, leafy growth of crested wheatgrass in two ways: first, by allowing the plants to produce and store carbohydrate reserves and second by removing the coarse stem material from the previous year. Sharp (1970) demonstrated in Idaho that this system maintained stand vigor and plant density. No riparian areas occur in any of the areas proposed for spring/fall grazing.

Deferred Grazing System - The deferred system would allow grazing after most of the herbaceous key species have reached seedripe stage and replenished carbohydrate reserves. The composition by key herbaceous species such as Idaho fescue and bluebunch wheatgrass would increase and the composition by upland woody key species would decrease. The critical growth period for woody species occurs in late summer. Moderate utilization of shrubs at this time encourages growth of additional twigs and therefore increases forage production. Reproductive capacity, on the other hand, is decreased over the years, since increased twig growth reduces the development of flowers and fruits (Garrison 1953 Cited by Stoddart, Smith and Box 1975, p. 135). Where woody key species are found in limited numbers, some individual shrubs would be selected by cattle and heavily browsed, resulting in reduced vigor of these plants.

Livestock normally concentrate in riparian areas under deferred grazing resulting in heavy utilization of riparian woody species. However, deferred grazing which allows grazing for a maximum of 1 month in September (e.g. Little Blitzen River) would result in increases in woody and herbaceous riparian species due to the short duration of the grazing use. Longer periods of use under the deferred system in other areas would result in decreases in woody riparian species. For example, under Alternatives 1 and 2 further decreases in woody species along some segments of Big Trout Creek would occur.

Deferred Rotation Grazing System - Under the deferred rotation grazing system, 1 year of grazing use during the critical growing period would be alternated with a year of grazing after the seed of the key herbaceous species ripen. The late summer grazing would occur after carbohydrate reserves of the key herbaceous species have been stored. Although the deferred rotation system would improve the vigor of existing plants somewhat, the herbaceous key species composition is not expected to change significantly.

Woody key species in upland areas would not increase because the sequence of grazing use does not provide sufficient protection from grazing to allow seed production and because the seedlings are grazed every year. No streamside riparian vegetation is located within the areas proposed for deferred rotation grazing.

Rest Rotation Grazing System - Rest rotation grazing results in moderate (60 percent) utilization of key species in the use pasture. Most of the use occurs during the growing season. Approximately 25 to 50 percent of the area is completely rested from grazing each year.

Under the three pasture rest rotation system, herbaceous key species would not be grazed during the critical part of the growing period 2 out of 3 years. As a result, the vigor of existing plants would be significantly improved and seedlings would have a chance to become established. The two pasture system providing 2 consecutive years of full rest would result in a similar degree of improved vigor of existing plants. The composition of key upland herbaceous and woody species would increase under both types of rest rotation. The other variations of rest rotation (providing 1 year of rest alternating with one or two growing season's use) would maintain the current species composition on uplands.

The effect of rest rotation grazing on riparian key species would vary according to the amount of rest provided and the degree of utilization in the use pasture. Rest rotation systems which provide 2 continuous years of rest would result in increases in riparian woody and herbaceous species. Rest rotation systems which alternate 1 year of rest with 1 month's use during September would have a similar effect. Rest rotation systems which provide 1 year of rest followed by one season of summer-long grazing would result in a slow increase in riparian woody species if utilization of the woody species was below 60 percent during the year of use. Rest rotation systems which provide 1 rest year followed by 2 or more years of summer-long grazing would not change woody or herbaceous riparian key species.

Exclusion - In exclusion areas, there would be no authorized livestock grazing. There would be an initial improvement in the vigor of key species in exclusion areas because the absence of grazing during the growing season would allow plants the opportunity to complete vegetative growth and reproduction. Where the potential exists, a rapid increase in riparian woody species is expected during the first 5 years of exclusion. Observations of woody streamside riparian vegetation in the Burns district and in adjoining BLM districts in eastern Oregon indicate that during the first few years of protection from grazing there is a period of rapid shoot growth and establishment of seedlings. Normal growth resumes when the riparian vegetation reaches

an equilibrium with its source of nutrients, usually after a period of at feast 5 years. It is during this stage when periodic, light to moderate levels of grazing can maintain and even enhance the production of the woody species in the community.

Temporary exclusion of livestock would occur for a period of at least 2 years on 13,698 acres along Kiger and McCoy Creeks under the proposed action, This would allow the key woody and herbaceous species, particularly those in the riparian areas to improve vigor and increase in composition. Upon resumption of livestock grazing, the proposed management (deferred grating during September only) would maintain the riparian key species composition in these areas.

Trailing - Trailing use limited to two 5-day periods of use each year, would allow most plants the opportunity to complete the stages of growth. Increases in key woody and herbaceous species are expected in these areas.

Irrigated pasture - Specific proposals for periods of use and rotation of livestock on the irrigated pasture have not been formulated, but would be timed to maintain the seeded plant community.

Range Improvements

The removal of vegetation inherent in construction of the range improvements (Appendix B, Table E-3) would cause both a short term and long term disturbance of vegetation as shown in Table 3-4. In addition, a decrease in the composition of key species would occur on 5 to 10 acres around each new water development as a result of heavy utilization. The largest change in species composition would be caused by the proposed vegetation manipulation.

Vegetation manipulation (brush control, brush control with seeding and irrigation} is proposed primarily in portions of the big sagebrush vegetation type where significant improvement in the forage condition rating would require more than 15 years using grazing management alone. The acreage of vegetation manipulation shown in Table 1-1 represents a total conversion of approximately 27 percent of the big sagebrush type under Alternative 2, 14 percent under the proposed action, and 1 percent under Alternative 3.

The proposed methods of brush control are burning and spraying, Burning would temporarily reduce sagebrush because sagebrush does not resprout foliowing fire. The effect of burning on perennial bunchgrasses varies with the intensity of the fire, season of the burn and the species of grass in the burn area. The composition of Sandbergs bluegrass; junegrass, bluebunch wheatgrass, cheatgrass and squirreltail, where present, would increase on areas proposed for burning. Thurber's needlegrass and Idaho fescue have been shown in some studies to be significantly damaged by burning (Britton 1978). The amounts of these species are expected to be at least temporarily reduced in the burned areas, Several studies in Idaho indicate that fall burning does not harm most forb species (Britton 1978) and spring burning on Forest Service-administered lands near the EIS area significantly improved the vigor of forb species (Adams 1980).

The proposed spraying of 2.4-D for brush control would temporarily reduce sagebrush in the treated areas. Increases in native bunchgrass production of more than 200 percent have been shown to occur following spraying of sagebrush with 2,4-D (Hyatt 1966). Annual forbs such as mustards would increase, while perennial forbs such as lupine and buckwheat would decrease in composition immediately following spraying although reestablishment is expected over the long term. Mueggler and Blaisdell (1958) showed about a 30 percent increase in total {annual and perennial) forb production several years following spraying of sagebrush.

On the areas proposed for seeding and irrigation, brush control by burning or spraying would occur to prepare the site for seeding. Crested wheatgrass along with other suitable species would be seeded on 147,800 acres under Alternative 2, 78,520 acres under the proposed action, and 4,957 acres under Alternative 3. Based on observations of existing seedings in the EIS area and studies of similar areas in Oregon (Findley 1974), crested wheatgrass would comprise 50 to 90 percent cf the seeded area. Species composition following treatment would vary according to the success of the brush control, the survival of other species in the seed mixture and the amount of precipitation in the year following seeding. On the areas proposed for irrigation (2,500 acres under the proposed action and Alternative 3; 6,400 acres under Alternative 2), big sagebrush vegetation would be converted to a community composed entirely of pasture grasses and/or alfalfa.

Some of the new spring developments would cause a major change in species composition on a maximum of 12 acres of riparian vegetation areas at springs and seeps. As these springs are developed, water previously supporting small areas of riparian vegetation would be diverted to livestock water troughs. Fencing would protect any remaining vegetation on the overflow areas, Consequently, a net increase would occur over the long term in both woody and herbaceous riparian key species at springs,

Forage Condition

The future forage condition of the study area is highly dependent upon the changes in species composition described in the previous section. Expected long-term forage conditions (shown in Table 3-1) are based on several assumptions which are derived from observations by district personnel, study data, review of pertinent literature and professional judgement. See Appendix E for methodology. The assumptions used to predict future forage condition include the following:

- Grazing systems which satisfy the physiological requirements of key species for growth, reproduction and carbohydrate storage (see Plant Species Composition section) would improve forage condition from fair to good. Conversely, systems which do not allow plants the opportunity to make and store carbohydrates would result in the deterioration of forage condition from good to fair and fair to poor. Cook (1966) states that "Carbohydrate reserve exhaustion can be the primary cause of changes in range condition. The more palatable species are grazed more intensively and frequently than unpalatable plants. The carbohydrate reserves in the heavily grazed plants are gradually reduced while the less palatable species have optimum reserves." The "range condition" described in this study correlates with the definition of forage condition used in this EIS.
- It is assumed that approximately 100,000 acres of poor condition range would not respond to grazing management over the long term. Although some improvement of poor condition range can be expected, the rate of improvement is much slower than better condition range. Studies by McLean and Tisdale (1972) and Owensby et al. (1973) showed that at least 20, and as much as 40 years of complete rest would be required for poor condition range to completely recover.
- Available nutrients, primarily soil moisture, are now essentially fully utilized by the present vegetation. Consequently, any increase in the amount of key species would result in a similar but opposite change in the amount of some other species.

Forage Production

Forage production is highly dependent upon the composition of the key species and is thus also related to forage condition. This relationship is due to the key species being the preferred forage species. When key species increase under proper grazing management, forage production also increases; vice versa, as the key species composition decreases, forage production also declines. In a review of several grazing studies on western ranges, Van Poollen (1979) concluded that production increases between 5 and 21 percent were attributable to the implementation of grazing systems.

The future forage production as outlined on Table 3-1 was predicted using the methodology outlined in Appendix C. The future forage production of both the seeded and native range areas was based upon the present production of areas which have undergone similar treatments such as the Ruby Springs Allotment. Varying levels of increase in forage production are expected under the proposed action and Alternatives 2 and 3. The decline in key species composition under Alternative 1 would result in a significant but unquantifiable decrease in forage production over the long term.

Residual Ground Cover

The long-term estimated changes in total residual ground cover (see Glossary) shown in Table 3-1 are based on predicted changes in key species composition, livestock forage production and proposed changes in livestock allocations. Allotments with increases in livestock forage production, when accompanied by proportional increases in grazing use, would have decreases in total residual ground cover. The reason for this is that a larger proportion of the total annual vegetation production (which is not expected to change) would be removed in the form of livestock forage. In the simplified example below, the forage condition of a sagebrush/bunchgrass community is expected to change from fair to good in the long term due to an increase in the composition of bluebunch wheatgrass. Three aspects of the example should be noted: (1) the total annual vegetation production of the community remains constant between the existing situation and the long term while the composition varies between species; (2) the percent utilization for bluebunch wheatgrass remains constant; (3) fewer pounds of vegetation remain after grazing under the long term than the existing situation.

The total amount of vegetation removed would be higher in the long term than under the existing situation, resulting in a decrease in residual ground cover; however, in the long term, a larger proportion of the remaining vegetation would be herbaceous perennials rather than annuals. Perennial species provide more year around cover than annuals because there is less year-to-year variation in production and most of the above ground plant material remains intact throughout the fall and winter.

Vegetation manipulations would produce short-term decreases in live vegetative cover. Over the long-term residual ground cover would not return to original levels since the stocking rates on these areas would increase. A reduction of residual ground cover would occur on the areas using burning for the proposed method of brush control because persistent litter

Species Composition By Weight	Measured Utilization	Pounds Annual Production		Pounds Annual Consumption		Pounds Remaining After Grazing
Existing Situation (Fair)						
70 percent Big Sagebrush	0 percent	700	-	0	=	700
20 percent Bluebunch Wheatgrass	50 percent	200	-	100	=	100
10 percent Annuals	0 percent	100	-	0	=	100
Totals		1000	-	100	=	900
Long Term Situation (Good)						
55 percent Big Sagebrush	0 percent	550	-	0	=	550
40 percent Bluebunch Wheatgrass	50 percent	400	-	200	=	200
5 percent Annuals	0 percent	50	-	0	=	50
Totals		1000	-	200	=	800

would be consumed by the fire. Seed bed preparation would result in a significant short-term (1 to 3 months) reduction in cover on areas proposed for irrigation but a long-term increase due to the higher total production of vegetation on the site. Decreases in total residual ground cover would occur on sites disturbed by the construction of range improvements and areas of heavy utilization (5 to 10 acres) around each new water development.

Riparian and Wetland Vegetation

Impacts to riparian vegetation are based on the expected change in the composition of woody species (primarily willow). Impacts to vegetation in wetland areas are based on the expected changes in herbaceous species (primarily sedges and rushes), Table 3-2 shows the effect of grazing systems on riparian key species. Response to grazing management would occur primarily in the streamside riparian areas which are accessible to livestock and are currently in poor or fair condition (using the wildlife habitat ratings). Good or excellent condition areas are generally inaccessible to livestock due to dense shrub cover. existing fences or steep. rocky topography. Therefore, most would not be impacted by any of the alternatives.

Most of the poor and fair condition riparian areas are currently under spring /summer or deferred grazing management. These areas would have significant increases in riparian woody key species under Alternative 3 and the proposed action. due to exclusions from 86 percent and 28 percent. respectively, of the riparian vegetation in poor and fair condition. Alternatives 7 and 2 would provide protection for approximately 72 percent of these areas, The effect of exclusion is discussed under grazing systems in the preceeding section.

Under al! alternatives, small unquantified areas of access to water by livestock (water gaps) adjacent to exclusion areas would have virtually all woody vegetation removed.

The effect of spring developments on riparian vegetation at springs and seeps is discussed under range improvements in the Species Composition section.

Threatened, Endangered and Sensitive **Plants**

Site specific information concerning the impact of existing livestock grazing management is lacking for the eleven plant species under review for Federal listing as threatened or endangered status and the 1 10 plants considered as sensitive by BLM (shown in Table 2-3). For example, under Alternative 3, beneficial impacts could occur to plants which are palatable to livestock and are located within the proposed exclusion areas. The removal of livestock could allow these plants to expand into adjacent suitable habitat. On the other hand, livestock exclusion could favor plants which are preferred by livestock and which may be in competition with the sensitive plants. Without information on the response to grazing of these plants, the impact of proposed changes in grazing management cannot be predicted. Adverse impacts due to vegetation manipulation and range improvement construction would be avoided by conducting intensive plant inventories of the project area and modifying the design as needed in accordance with Bureau policy (Chapter 1).

Conclusions

The analysis of impacts to vegetation as quantified in Table 3-1 leads to the following major conclusions:

- The proposed action and Alternatives 2 and 3 would result in varying levels of improvement in forage condition and increases in livestock forage production. These impacts are chiefly due to the implementation of grazing systems which provide periodic rest during the critical part of the growing season and the implementation of vegetation manipulations which increase the herbaceous key species composition. Alternative 2 would result in the most improvement in forage condition due to the number of acres proposed for vegetation manipulations. Alternative 1 would result in a net decline in condition and an unquantified decrease in forage production primarily due to (1) the continuation of grazing in excess of proper grazing capacity and (2) the continuation of grazing systems which would not provide periodic rest during the critical part of the growing season.

- Due to long-term increases in forage production and proportional increases in livestock allocations, a decrease in total residual ground cover would occur on 92 percent of the area under Alternative 2, 87 percent under the proposed action, 47 percent under Alternative 1, and 45 percent under Alternative 3. This decrease would be offset by a change in the composition of ground cover from nonpersistent annuals to persistent perennials under the proposed action and Alternatives 2 and 3.

- The proposed action and Alternative 3 would result in significant increases in riparian woody key species. Alternatives 1 and 2 would result in decreases in riparian woody key species.

- Although no impacts due to range improvements are expected, impacts to threatened, endangered and sensitive plants from grazing management are largely unknown.

- An irretrievable loss of 270 acres (proposed action), 317 acres (Alternative 2) or 222 acres (Alternative 3) of vegetation would occur due to the construction of range improvements. This loss is reversible if the improvements are removed and the disturbed area reseeded.

IMPACTS ON SOILS

Under the proposed action and Alternatives 2 and 3, the proposed vegetation allocation and grazing systems would increase protection of the soil from erosion. Although total residual ground cover would decrease, the proportion of cover which is made up of perennial grass species would increase. Perennial grasses have a more extensive root system to hold soil in place and provide, on the average, more persistent ground cover than annuals. Bailey and Copeland (1961 Cited by Mattison et al. 1977) found that as perennial vegetation and litter cover increased, overland flow of water and erosion decreased. This protective cover would reduce soil movement, reduce raindrop impact and decrease compaction, thus increasing infiltration into the soil. Under Alternative 1, soil erosion would increase due to a reduction in the proportion of ground cover made up of perennials.

Streambank stability would be affected by changes in riparian vegetation. Increases of riparian vegetation, especially woody plants, would help stabilize streambanks and decrease erosion. Expected changes in riparian vegetation from grazing systems is shown on Table 3-2. See Table 3-3 for changes in streambank stability in miles by alternative.

The construction of range improvements under the proposed action and Alternatives 2 and 3 would temporarily disturb the soil surface (see Table 3-4). The disturbance would subject those acres to wind and water erosion. This impact would lessen as the areas became revegetated in 1 to 2 years.
No range improvements would be constructed under Alternative 1.

Livestock would concentrate around the proposed water developments. Approximately 10 acres around reservoirs, waterholes and troughs along pipelines, and 5 acres around springs would be heavily grazed (see Table 3-4). Residual ground cover would thus decrease thereby increasing erosion. Erosion would also increase along some new fence lines due to trailing by livestock under the proposed action and Alternatives 2 and 3.

On areas proposed for vegetation manipulation, short term increases in wind erosion would occur on Sandy soils if burning were the treatment used (worse case analysis). Vegetation manipulation would occur on 29,240 acres of Sandy soils under the proposed action, 44,360 acres under Alternative 2 and 3,580 acres under Alternative 3. In the long term, wind erosion would return to existing levels after the areas become revegetated. All the acres proposed for irrigation (2,500 acres under the proposed action and Alternative 3 and 6,400 acres under Alternative 2) have Sandy soils. Plowing these acres would expose the soil to wind erosion; however, such erosion would occur for less than one year due to rapid revegetation due to irrigating the areas.

Overall, erosion would decrease slightly under the proposed action and Alternative 1. Streambank stability would increase significantly under Alternative 3, increase slightly under the proposed action, remain mostly static under Alternative 2 and decrease or remain static under Alternative 1.

Table 3-3 Streambank Stability (miles)

Streambank Stability	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Livestock
Decreasing	106	24	47	179
Static	48	62	66	35
Increasing	36	100	76	14
Unknown	110	114	111	72

Table 3-4 Acres of Disturbance Due to Proposed Range Improvements [1]

Range Improvements	Proposed Action (Acres)			Alternative 2 Emphasize Livestock (Acres)			Alternative 3 Emphasize Non-Livestock (Acres)		
	Temp.	Perm.	Heavily Grazed	Temp.	Perm.	Heavily Grazed	Temp.	Perm.	Heavily Grazed
Fences	131	0	0	174	0	0	162	0	0
Springs	12	0	235	12	0	240	10	0	205
Wells	9	4	90	11	6	115	8	4	85
Pipelines	206	103	1,545	298	149	2,235	120	60	900
Reservoirs	110	110	550	110	110	550	106	106	530
Waterholes	52	52	260	52	52	260	52	52	260
Brush Control/seeding	78,520	0 [4]	0	147,800	0 [4]	0	4,957	0 [4]	0
Brush Control Only [3]	72,731	0 [4]	0	145,611	0 [4]	0	6,450	0 [4]	0
Irrigated [3]	2,500	0 [4]	0	6,400	0 [4]	0	2,500	0 [4]	0
TOTALS	154,271	269	2,680	300,468	317	3,400	14,365	222	1,980

[1] See Table 1-1 for proposed range improvements by alternative. There would be no range improvements constructed under Alternative 1.
[2] These acres would not have actual surface disturbance as would occur with construction of the other range improvements. However, if burned, the existing vegetation would be removed, exposing the soil to wind and water erosion. If sprayed instead, there would be no acres disturbed as the dead vegetation would help protect the soil surface from erosion.
[3] These acres would be plowed and then seeded.
[4] Long term changes in species composition would occur.

IMPACTS ON WATER RESOURCES

Water Quantity

A number of studies (Rauzi and Hanson 1966; Alderfer and Robinson 1974; Hanson et al. 1972) have shown that heavily grazed areas and areas in poor condition produce more runoff than lightly and moderately grazed areas and those in good condition. However, most of these studies were done on the effects of grazing on runoff from rainfall. Most of the annual runoff on sagebrush watersheds, such as in the Andrews EIS area, occurs during the snowmelt period (Sturges 1978), and thus occurs over frozen soils. Soil compaction by livestock, therefore, may not be significant since the runoff is not controlled by the rate of infiltration of water into the soil. Changes in grazing intensity and expected improvement in forage condition under the proposed action and Alternatives 2 and 3 are not expected to significantly affect total runoff. However, peak flows may moderate slightly, and exclusion of livestock along streams may lead to perennial flows along reaches of streams that were intermittent. Studies on Camp Creek (100 miles northwest of the EIS area) have shown perennial flows within an exclusion area, with the flow becoming intermittent outside the exclusion (Winegar 1980). Runoff is also not expected to change significantly under Alternative 1.

Less water would reach downstream users due to the construction of reservoirs under the proposed action and Alternatives 2 and 3. Since each reservoir would hold approximately 2 acre-feet the total impoundment would be 110 acre-feet/year under these alternatives. The total impoundment would be less than 0.1 percent of the annual runoff from public lands in the EIS area. No reservoirs are proposed under Alternative 1. Construction of waterholes would not affect downstream use since waterholes are built in dry lakebeds that are sinks for small internally-drained watersheds.

The amount of groundwater withdrawn from the proposed wells under any alternative would not significantly impact the resource.

Water Quality

Chemical constituents are not likely to change since the chemical composition depends on the source of the water and the geological substrate. Most fecal coliform degradation of water quality comes from use in or directly adjacent to streams (Johnson et al. 1978; Robbins 1978). Fencing 11.5 miles of streams in riparian areas under the proposed action and 199.5 miles under Alternative 3 would remove livestock concentration along perennial streams and thus decrease fecal coliforms from livestock. Under Alternatives 1 and 2, fecal coliform levels would remain the same as the present situation since there would be no additional livestock exclusion.

The herbicide 2,4-D would be used under the proposed action and under Alternatives 2 and 3. No significant impacts to water quality would be expected due to the use of buffer strips 100 feet wide on both sides of perennial streams and around other water sources. (See Chapter 1, Standard Procedures and Design Elements for Range Improvements.) No herbicides would be applied under Alternative 1.

The construction of range improvements would temporarily increase the existing sediment yield. The disturbed acres are expected to become revegetated within 1 to 2 years. After revegetation, sediment yields would return to the previous undisturbed levels or lower, since residual ground cover would return to existing levels. Headcutting would occur below the proposed reservoirs due to increased slope of the spillway. Reservoirs developed in Basin Land and Terrace soils could increase erosion and resultant sediment yield in streams because of these soils' erodible nature.

In the long term, the change in the composition of residual ground cover on upland areas due to the implementation of grazing systems and range improvements under the proposed action and Alternatives 2 and 3 would slightly decrease the sediment yield in the area. With the soil protected from erosion, less soil is detached and carried to streams resulting in an improvement in water quality. Under Alternative 1, residual ground cover composed of perennial herbaceous species would decrease on allotments that are presently overstocked and on areas with spring/summer grazing system, leading to an increase in erosion and thus sediment yield in streams.

The anticipated improvement in riparian vegetation and increase in streambank stability (see Table 3-3) would result in a decrease in sediment yield along those streams (Blitzen River, Bridge, Cottonwood, Fish, Home, McCoy, Kiger, Krumbo, Mud and Big Indian Creeks, and sections of others), mostly under the proposed action and/or Alternative 3. See Appendix G, Table G-1 for predicted condition and trend of riparian habitat by stream by alternative. As woody riparian vegetation increases, shading of the streams would occur, resulting in lower water temperatures.

In conclusion, there would be no significant changes in water quantity from the proposed action or any alternative. Water quality (sediment yield, water temperature, fecal coliforms) would improve under the proposed action and Alternative 3, mainly along streams to be excluded from livestock.

IMPACTS ON WILDLIFE

Wildlife would experience both primary and secondary impacts. Primary impacts affect wildlife populations directly, Some examples of adverse primary impacts are: avoidance of livestock by big game; deer and antelope fence mortalities: nest disturbance cr destruction from livestock trampling: and animal displacement from burning. Primary impacts are believed to be insignificant in the long term. Although individuals are lost, population trends are unaffected.

Secondary impacts affect wildlife populations indirectly by changing the vegetation or wildlife habitat and can be beneficial or adverse. Two adverse examples are loss of sagebrush cover from herbicide spraying and siltation of stream bottoms from exposed banks. Beneficial examples are increased nesting cover from improved riparian vegetation and new sources of water from water developments.

Wildlife populations in the EIS area have not beer! monitored to determine the impact of grazing systems and range improvements. Therefore. impact analysis was based on less direct methods which focus on wildlife habitat, Some considerations in predicting impacts were:

1. Condition of habitat as based on visual observation by district personnel and limited habitat inventory.
2. Potential of wildlife habitat to respond to a specific grazing system. livestock exclusion or range improvement.
3. Predicted impacts to vegetation as they affect wildlife.
4. Research applicable to the EIS area.
5. Field observations of past impacts to wildlife populations and their habitat.

All predicted impacts to populations were assumed to be from habitat changes. Weather. hunting, disease and predation were assumed to be constant. Actions which increase habitat diversity were assumed to also increase the numbers and kinds of wildlife although improved habitat does not always result in Increased animal numbers. Predation may prevent population increases. A recent study by ODFW found that 80 percent of the marked antelope fawns were killed by predators, primarily coyotes (Willis 1 982)

Threatened and Endangered Animals

The proposed action or any of the alternatives would have no effect on peregrine falcons, bald eagles, Borax Lake Chubs. kit fox or snowy plovers. Changes in bird and small mammal populations would not be great enough to significantly affect food for bald eagles or peregrine falcons. Active nesting or roost sites are not known in the EIS area The Borax Lake chub would not be impacted because It does not occur on public lands. Changes in vegetation and resulting small mamma! populations would nor be great enough to affect kit fox habitat. On public lands, the lake playas used by snowy plovers receive light or no livestock use,

Wildlife Habitat in Riparian Areas

Impacts in riparian area3 are significant because these areas contain the greatest densities and varieties of species (Thomas et al. 1979). See Figure 2-1 for location of major riparian areas. Fish populations in streams are largely dependent on the condition of adjacent riparian habitat Poor riparian habitat reduces soil water retention which results in drying of more stream area during summer and autumn. Portions of streams which are now perennial may become intermittent. (See Impacts on Water Resources. Water Quantity).

Impact predictions were made by comparing existing grazing system and condition with proposed grazing system at each riparian area (see Table 3-5, 3-6 and Appendix G. Table G-I). impact predictions from the vegetation section (Table 3-2) were used to predict wildlife habitat trend. For example, an increase in key riparian species would result in an upward wildlife habitat trend.

Livestock exclusion would improve riparian habitat to good or excellent condition where livestock grazing has been damaging riparian habitat Most of the improvement would occur daring the first 6 years. Successful streambank fencing projects have been documented in Oregon (Winegar 1977). Utah (Duff 1978) and Nevada (Crispin 1981). Livestock exclusion along Blitzen River has resulted in upward trend and greatly improved wildlife habitat condition as documented by photo studies in the Burns District Office. The removal of cattle allowed both woody and herbaceous plants to increase. resulting ir: increased habitat diversity. Similar riparian areas with a high potential for improvement would be expected to improve one or two condition classes. i.e., Trout Creek, Big Indian Creek, Little Blitzen River. McCoy Creek. South Fork Blitzen River. Kiger Creek. Riddle Creek. Cottonwood Creek. Kings River and others. Decreases in riparian plant species at watergaps would result in poor wildlife habitat at these locations.

Grazing systems other than exclusion which increase key riparian plant species composition (Table 3-2) would improve riparian habitat for wildlife at a very slow rate. Improvement from poor to fair condition may take up to 20 years. Grazing systems which decrease key riparian plant species would result in further deterioration of wildlife habitat

Development of springs would initially destroy some wildlife habitat in riparian areas at each spring site.

Table 3-5 Proposed Grazing Management in Streamside Riparian Habitat

Grazing System [1]	Proposed Action Acres	Proposed Action Miles	Alt. 1 No Action Acres	Alt. 1 No Action Miles	Alt. 2 Emphasize Livestock Acres	Alt. 2 Emphasize Livestock Miles	Alt. 3 Emphasize Non-Lvstk Acres	Alt. 3 Emphasize Non-Lvstk Miles
Exclusion	370	34	254	18	254	18	1,581	220
Temporary Exclusion	193	17						
Rest Rotation 1	60	47	43	32	60	47	11	6
Rest Rotation 2	200	34	400	26	461	46	56	13
Rest Rotation 3	132	68			150	72	24	16
Rest Rotation 4	273	28			80	10		
Deferred Rotation	1	1	1	1	1	1	1	1
Deferred	121	3	367	36		33	17	2
Deferred 1	139	4						
Spring/Summer	285	36	692	155	369	43	111	16
Trail	23	4	23	4	23	4		
Winter	2				2			
Fenced Federal Range	15	2	35	4	34	4	13	2
Inaccessible	100	22	100	22	100	22	100	22
Totals	1,914	300	1,914	300	1,914	300	1,914	300

[1] Rest Rotation 1 - 1 year Spring-Summer, 1 year deferred, 1 year rest.
Rest Rotation 2 - 1 year spring-Summer, 1 year rest
Rest Rotation 3 - 2 years Spring-Summer
Rest Rotation 4 - 1 or 2 years Spring-Summer, 2 years rest
Deferred 1 - 1 month grazing in September

Table 3-6 Expected Long-Term Condition and Trend of Wildlife Habitat in Streamside Riparian Areas

Condition	Existing Situation Acres	Existing Situation Miles	Proposed Action Acres	Proposed Action Miles	Alt. 1 No Action Acres	Alt. 1 No Action Miles	Alt. 2 Emphasize Livestock Acres	Alt. 2 Emphasize Livestock Miles	Alt. 3 Emphasize Non-Lvstk Acres	Alt. 3 Emphasize Non-Lvstk Miles
Excellent	135	6	416	21	302	10	302	10	831	59
Good	387	35	904	93	363	45	425	56	716	143
Fair	433	37	194	27	280	36	379	36	40	7
Poor	808	100	247	38	816	96	659	78	137	18
Unknown	160	122	153	121	153	121	153	121	99	73
Trend										
Up	-		1,142	106	301	24	462	47	1,531	179
Static	-		416	48	661	62	682	66	178	35
Down	-		218	36	810	100	631	76	118	14
Unknown	-		138	110	142	114	139	111	87	72

About 0.25 acre at each site would be affected. Where fencing of overflows is proposed, lost habitat would be replaced in the long term.

Fish

The analysis of impacts to fish habitat is based on expected impacts to riparian vegetation, water quality, streambank stability and erosion in uplands. See Figure 2-2 for location of major fish habitat.

High sediment loads, high water temperatures, low flows and a lack of riparian vegetation are primarily responsible for the poor or fair fish habitat on BLM administered lands. Generally, grazing systems which would improve riparian habitat would also improve fish habitat (see Vegetation, Table 3-2). Beneficial effects of improved riparian vegetation include reduced water temperatures, reduced silt, increased summer flows, and increased insects. Dense riparian vegetation stabilizes the streambanks and provides hiding places for fish. Grazing systems which

decrease key riparian plant species would allow fish habitat to deteriorate further.

Quantitative impact predictions were made by comparing existing grazing systems and fish habitat condition with grazing systems proposed for each alternative on over 90 individual stream segments totaling 119 miles.

Long term trend and site specific analysis at major stream segments appears in Table 3-7. The no action alternative would have significant adverse impacts in both the long term and short term. Continued bank sloughing and headcutting would result in further deterioration of fish habitat presently in poor or fair condition. Portions of the following streams can be expected to have significant short term impacts in

Summary For All Fisheries Streams (Miles)

Condition	Existing Condition	Proposed Action	Alt. 1 No Action	Alt. 2 Emph. Livestock	Alt. 3 Emph. Non-Lvstk
Excellent	16	78	18	18	26
Good	20	34	23	22	51
Fair	26	49	22	37	30
Poor	57	18	56	42	12
Total	119	119	119	119	119
Trend					
Up	-	52	8	22	67
Static	-	60	82	78	50
Down	-	7	28	19	2
Total		119	119	119	119

Table 3-7 Fish Habitat - Predicted Long-Term Condition and Trend

				PROPOSED ACTION			ALTERNATIVE 1 NO ACTION			ALTERNATIVE 2 EMPHASIZE LIVESTOCK			ALTERNATIVE 3 EMPHASIZE NON-LIVESTOCK		
MAJOR STREAMS	ALLOT	MILES	EXISTING CONDITION	GRAZING SYSTEM	TREND	CONDITION	GRAZING SYSTEM	TREND	CONDITION	GRAZING SYSTEM	TREND	CONDITION	GRAZING SYSTEM	TREND	CONDITION
ANKLE CR	6002	1.90	P	SS	S	P	SS	S	P	SS	S	P	SS	S	P
BLITZEN RIVER	6003	8.70	E	IN	S	E	IN	S	E	IN	S	E	IN	S	E
BLITZEN RIVER	6006	4.30	P	EX	U	G	EX	U	G	EX	U	G	EX	U	G
SOUTH FORK BLITZEN	6002	1.20	P	RR2	U	F	SS	S	P	RR2	S	P	SS	S	P
SOUTH FORK BLITZEN	6002	2.00	P	RR2	U	F	SS	S	P	RR2	U	F	SS	S	P
SOUTH FORK BLITZEN	6002	3.00	P	RR2	U	F	SS	D	P	RR2	U	F	SS	U	F
SOUTH FORK BLITZEN	6002	1.40	P	RR2	U	F	SS	D	P	RR2	U	F	SS	D	P
BRIDGE CR	6008	2.80	G	EX	S	G	EX	S	G	EX	S	G	EX	S	G
MUD CR	6006	1.40	P	EX	U	P	RR2	S	P	RR2	S	P	EX	U	F
MUD CR	6006	3.20	G	EX	S	G	RR2	S	G	RR2	S	G	EX	S	G
FISH CR	6003	2.40	E	IN	S	E	IN	S	E	IN	S	E	IN	S	E
LITTLE BLITZEN	6004	2.20	G	EX	U	E	EX	U	E	EX	U	E	EX	U	E
LITTLE BLITZEN	6002	4.50	G	DF1	U	E	RR2	S	G	RR2	S	G	EX	U	E
LITTLE BLITZEN	6002	1.50	E	DF1	S	E	RR2	S	E	RR2	S	E	EX	S	E
BIG INDIAN CR	6002	1.80	P	EX	U	G	SS	S	P	SS	S	P	EX	U	G
LITTLE INDIAN CR	6002	2.70	G	SS	S	G	SS	S	G	SS	S	G	EX	U	E
DEEP CR	6002	1.20	P	RR2	U	F	SS	S	P	RR2	U	P	RR2	U	F
KRUMBO CR	6008	0.30	P	TR	U	F	TR	U	F	TR	U	F	EX	U	G
MC COY CR	6010	1.40	P	TEX	U	F	DF	D	P	DF	D	P	EX	U	G
MC COY CR	6010	1.30	P	SS	D	P	SS	D	P	SS	D	P	EX	U	G
KIGER CR	6010	1.70	P	SS	S	P	SS	S	P	SS	S	P	EX	U	F
KIGER CR	6010	4.60	P	TEX	U	F	TEX	U	F	TEX	U	F	EX	U	G
WILDHORSE CR	6013	3.40	P	RR2	U	P	RR2	S	P	RR2	S	P	EX	U	G
SKULL CR	6002	0.80	P	SS	S	P	SS	S	P	SS	S	P	EX	U	F
THREE MILE CR	6002	1.50	F	EX	U	G	FFR	S	F	FFR	S	F	EX	U	G
HOME CR	6002	2.80	P	RR2	U	F	SS	D	P	RR2	U	F	EX	U	G
VAN HORN CR	6029	1.00	F	RR3	S	F	SS	D	P	RR3	S	F	EX	U	G
DENIO CR	6021	1.50	P	SS	S	P	SS	S	P	SS	S	P	SS	S	P
KINGS RIVER	6022	1.90	P	SS	S	P	SS	S	P	SS	S	P	EX	U	G
TROUT CR	6015	6.40	P	RR4	U	F	DF	D	P	DF	D	P	EX	U	G
FISH CR	6003	1.20	P	EX	U	G	SS	D	P	SS	D	P	EX	U	G
KRUMBO CR	6006	0.60	P	EX	U	F	EX	U	F	EX	U	F	EX	U	F

Key:
Grazing System
SS - Spring/Summer
EX - Exclusion
DF 1 - Deferred, 1 month in September
TR - Trail Use
FFR -Fenced Federal Range
TEX - Temporary Exclusion
IN - Inaccessible to Livestock
W - Winter
RR - Rest Rotation
RR1 - 1year SS/1 year DF/1 year rest
RR2 - 1 year SS/1 year rest
RR3 - 2 years SS/1 year rest
RR4 - 1 or 2 year SS/2 years rest
Trend
U - Up
D - Down
S - Static
? - Unknown
Condition
E - Excellent
G - Good
F - Fair
P - Poor

Alternative 1: South Fork Blitzen River, Upper Blitzen tributaries, Kings River, McCoy, Kiger, Denio, Riddle, Home and Fish Creeks.

Water-Associated Birds

Water-associated birds are primarily affected by livestock grazing in wetlands (Figure 2-1). Trampling, nest disturbance and removal of required herbaceous residual cover can reduce nesting success. Food plants such as smartweed and sedge are often grazed before they can be utilized by birds. Livestock trampling causes compaction and loss of vegetation which reduces food and cover for birds.

About 4,174 acres of wetlands are inaccessible or receive only light use by livestock. Habitat conditions would not be significantly affected under the proposed action or any alternative (i.e., Tum Tum, Alvord, and Ten Cent Lakes). About 165 acres of wetlands have the potential for impacts by livestock. Predictions of expected trend in these areas were made by comparing the existing grazing systems and condition with the proposed grazing systems at each wetland (Appendix G, Table G-2). Results from these site specific analyses are summarized in Table 3-8. Ninety-one acres of the more productive wetlands are presently excluded from livestock. Existing livestock exclusion at Mann Lake and Pueblo Slough would continue to improve nesting cover and food. Grazing systems (Table 3-2) which increase herbaceous species composition in wetlands would also improve or maintain habitat for water associated birds. However, grazed pastures in rest rotation systems would have poor nesting cover and food. In Alternative 1, spring/summer grazing at portions of Pueblo Slough would result in decreased food and cover. Wildlife use would decline.

Proposed waterholes and reservoirs (Table 1-1) would provide an additional 2 acres of habitat at each site. Bird distribution would be increased. Canada geese can be expected to benefit from forage in irrigated pastures.

Mule Deer and Antelope

Future trend of big game range was predicted by considering changes in grazing system, season of use and range improvement projects for each allotment and/or pasture and summarized in Tables 3-9 and 3-10. See Figure 2-2 for deer habitat.

Grazing systems would affect the quantity and quality of forage available to big game. In the proposed action and Alternatives 2 and 3, most of the existing acres of spring/summer grazing would be changed to rest rotation grazing (Table 1-1). Predicted improved forage condition (Table 3-1) would increase forage available to big game. Rest rotation grazing would also increase bitterbrush production for use by big game.

Several studies have shown that prescribed livestock grazing during certain seasons is beneficial to big game (Andersen et al. 1975, Leckenby et al. 1980, Tueller et al. 1979, Urness 1966). Summer livestock grazing removes rank grass growth which hinders use by big game and also improves the availability of fall regrowth for big game. Closely grazed grass plants produce new growth early in the spring which is critical to wintering deer. Livestock would be allowed to graze through October 31 on about 25 percent of the deer range (proposed action). Competition for browse and fall regrowth of grasses can be expected to continue. A variety of grazing treatments in the proposed action and Alternatives 2 and 3 would increase habitat diversity for big game. For example, rest rotation would provide grazed pastures adjacent to ungrazed areas.

In Alternative 3, livestock would be excluded from 140,000 acres of deer habitat and 50,000 acres of antelope habitat. Long term elimination of livestock grazing would decrease upland forage for deer and

Table 3-8 Expected Long-Term Wildlife Habitat Trend at Affected Wetlands [1] (Public Acres)

Trend	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Lvstk
Up	95	93	94	135
Static	70	52	71	30
Down	0	20	0	0

[1] These areas are listed in Appendix G, Table G-2

Table 3-9 Expected Trend of Deer Habitat - (Public Acres)

	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Livestock
Up	187,300	39,000	87,400	111,700
Static	183,700	318,300	192,700	174,400
Down	3,300	17,000	94,300	88,200

Table 3-10 Expected Trend of Antelope Habitat - (Public Acres)

	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Livestock
Up	409,000	0	439,000	159,000
Static	157,000	566,000	127,000	386,000
Down	0	0	0	21,000

antelope because of decreased availability of nutritious young grasses and reduced productivity of browse. Habitat in riparian areas, however, would improve greatly due to increased food and cover.

Under the proposed action and Alternatives 2 and 3, brush control and seedings (Figure 1-3 and Table 3-11) would increase habitat diversity for antelope by introducing herbaceous food within monotypic stands of sagebrush. Greatest habitat diversity would result from burning which would create the most edge between sagebrush cover and herbaceous food. Forbs, an important food source, would be increased with burning and decreased with herbicide spraying. In Alternative 2, brush control would adversely affect deer by greatly decreasing fawning cover on about 46,000 acres of summer range primarily in Allotments 6020, 6015 and 6001. Sheehy (1978) found that big sagebrush which had been treated with 2,4-D on fawning range was poor for fawning even after 19 years of brush reinvasion.

New water sources would reduce forage competition with livestock near existing waters and increase big game distribution. However, forage competition could result from the introduction of livestock grazing in areas previously used primarily by big game. Fences, which will be built primarily on upland sites, are not expected to have a significant impact. A minor number of mortalities may occur, especially immediately after construction. In general, existing fences on public lands in the EIS area have not had a significant adverse impact to big game.

Table 3-11 Acres of Big Game Habitat Affected by Vegetation Manipulation [1]

	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Livestock
Deer Range	3,000	0	57,300	1,300
Antelope Range	76,000	0	125,000	8,000

[1] About 12,000 acres of deer range and 23,000 acres of antelope range have been previously seeded to crested wheatgrass.

Other Mammals, Upland Game Birds, Other Birds, Amphibians and Reptiles

These animals are grouped to avoid repetition. Impacts are described in general terms and cover very broad areas; detailed analysis is not possible because site specific or species specific impacts from existing or proposed livestock management are largely unknown. Livestock grazing affects these species primarily through changes in condition of riparian habitat, amount of dried herbaceous vegetation in upland areas and plant species composition. Riparian areas in good condition support more kinds and numbers of wildlife than areas in poor condition (see Riparian Habitat Section, this chapter). Dried herbaceous vegetation which persists through winter and spring is very important for reproduction, escape from predators and maintenance of body temperatures. Long term changes in plant species composition (see Vegetation section) would improve habitat for some species and have adverse impacts on others. See Table 3-12 for summary of impacts to small animal population.

Livestock exclusion and certain grazing systems which significantly increase woody riparian key species (Table 3-2) would provide improved winter cover, nesting cover and food for wildlife. Increased shrub and tree growth in riparian areas would allow birds to nest in previously unoccupied areas. Species such as valley quail, spotted frog and beaver, which are strongly associated with riparian areas, would be greatly benefited. Sage grouse, which do not require dense riparian vegetation, would benefit only slightly. Studies at Camp Creek (100 miles northwest of the EIS area) have shown more kinds and total numbers of wildlife in protected riparian habitat as compared to adjacent grazed riparian habitat (Winegar 1977).

Grazing systems which increase perennial grass species composition would improve nesting cover for ground nesters such as horned larks. Rested pastures in rest rotation systems would have the greatest amount of dried herbaceous vegetation for thermal cover and nesting. Grazing treatments during the following 1 or 2 years would result in decreased cover. Spring/ summer grazing would provide the least amount of dried herbaceous vegetation for wildlife because of the long duration of grazing.

Proposed range improvements by alternative are summarized in Table 1-1. Vegetation manipulation has immediate and often adverse impacts because of dramatic changes in plant species composition. Removal of sagebrush through herbicide spraying or burning would have a severe adverse impact on species which are dependent on sagebrush for food and cover (e.g., sage grouse, black-tailed jackrabbit). Besides killing sagebrush, 2,4-D would also temporarily reduce perennial forbs which are an important wildlife food source. Decreased sagebrush would be adverse to brush-nesters such as sage sparrows and mammals such as the pygmy rabbit (Olterman and Verts 1972). Loss of thermal cover would be adverse to reptiles such as horned lizards and leopard lizards (Storm 1966). Grassland species such as horned larks and ground squirrels would increase along with predators such as badgers and raptors. Ferruginous hawks, however, would not increase because suitable nesting sites would not be available in the treatment areas.

Alternative 2 would decrease sage grouse nesting habitat because of sagebrush control adjacent to strutting grounds. About 12,000 acres (20 percent) of nesting habitat would be lost. Nesting cover would be greatly decreased at 5 of 15 known strutting grounds.

Increased "edge" from sagebrush control would increase numbers of certain species around the perimeter of sagebrush control areas (e.g., jackrabbits). Animals with small areas of use, however, would not occur in the interior of treatment areas (e.g., sagebrush lizard, voles, mice, etc.). Untreated or leave patches would not entirely offset losses of sagebrush habitat.

Sagebrush control and subsequent seeding increases numbers of a few species and completely eliminates most others. Species diversity or the number of kinds of animals always decreases when sagebrush is converted to grass. Thomas et. al (in press) lists 110 species as primary users of tall sagebrush habitat and only 15 for crested wheatgrass. Reynolds and Trost (1978) found that crested wheatgrass plantings, regardless of livestock use, supported fewer nesting

Table 3-12 Impacts To Wildlife Populations

	Proposed Alternative	Alternative 1	Alternative 2	Alternative 3
Small mammals	-L	NC	-M	+L
Upland game birds	NC	NC	-L	NC
Other birds	-L	NC	-M	+L
Reptiles	-L	NC	-M	+L
Amphibians	+L	NC	NC	+M

Note: NC = no change, + = beneficial, - = adverse, L = low, M = medium, H = high

bird species and a lower density of birds, mammals and reptiles than did areas dominated by sagebrush. Nesting birds were reduced to a single species, the horned lark. Similar impacts can be expected in the EIS area Seedings may be beneficial to curlews which have been observed in existing seedings in the Burns District. Seedings which have forbs and shrubs in addition to crested wheatgrass would have greater habitat diversity than a seeding composed primarily of crested wheatgrass. Adverse impacts would be less severe.

In the short term, burning would moderately reduce populations. Some animals would be killed during the fire; others would be displaced to areas where they could not compete with the existing populations. In the long term, burning would benefit wildlife by creating a significant amount of edges. More herbaceous food would be available adjacent to sagebrush cover.

Wells, springs and pipeiines would increase wildlife distribution because ground level water would he available. Occasional drownings of small birds and mammals would occur in troughs despite escape ramps, Increased sources of water provided by new reservoirs would increase distribution and numbers of species such as the mountain cottontail. Brewer's blackbird and spadefoot toad.

CONCLUSION

The analysis of impacts to wildlife as summarized in Table I-3 leads to the following major conclusions.

- Small mammals, birds and fish which are dependent on riparian areas would increase as key riparian plant species composition increases. Conversely, a decrease in populations can be expected as key plant species decrease. Exclusion can be expected to quickly improve habitat to at least good condition in 5 to 10 years. Certain grazing systems will slowly improve habitat over a period of 23 years.

- Fish numbers will increase as riparian habitat improves. The proposed action would slowly improve 27 percent of the stream miles with grazing systems. New exclosures would quickly improve habitat on 8 percent of the stream miles. Poor conditions and or downward trend will continue on 15 percent of the habitat. In Alternative:; 1 and 2, existing exclosures would continue to improve about 9 percent of the stream habitat, in Alternative 1. about 47 percent would continue in poor condition. primarily due to livestock grazing. Livestock exclusion of entire watersheds in Alternative 3 would greatly improve the fisheries in the Trout Creek. Pueblo and Steens Mountain. Approximately 56 percent of the stream miles would improve greatly: 10 percent would continue in poor condition due to livestock grazing, Neither the proposed action nor any of the alternatives would change fish size or number-s in any of the lakes or reservoirs.

- No change in water-associated bird production would occur in the proposed action or Alternatives 1 and 2 because most of the wetlands used by these birds are presently excluded from livestock. Additional livestock exclusion in Alternative 3 would increase bird production slightly.

- The proposed action would increase deer numbers to ODFW objectives. Alternatives 1 and 3 would maintain existing numbers Decreased cover from brush control in Alternative 2 would decrease deer numbers.

- Antelope would increase in Alternative 2 and the proposed action because of brush control. seedings and water developments. Brush control would convert dense stands of big sagebrush to low growing herbaceous vegetation preferred by antelope. Alternatives 1 and 3 would maintain existing populations.

- Sage grouse would decrease under Alternative 2 because of brush control adjacent to strutting grounds.

- Small animal populations would increase or decrease depending on the degree of habitat modification with each alternative. Vegetation manipulation would significantly reduce bird, mammal and reptile populations on 26 percent (Alternative 2). 14 percent (proposed action), or percent (Alternative 3) of the big sagebrush vegetation type. Bird and mammal populations can be expected to increase significantly at riparian areas excluded from livestock grazing, Amphibian populations would increase slightly due to riparian protection.

IMPACTS TO WILD HORSES

The proposed action and alternatives provide a forage allocation for the maximum planned number of horses as shown in Table 3-13 The numbers shown for the Alvord/Sheepshead HMA are for only those estimated to use the Burns District. portion of the HMA (see Chapter 2, Wild Horses, Table 2-7). There would be periodic removal of horses to maintain pianned numbers under the proposed action and all alternatives, Eased on observations of past reductions of the herds and subsequent rates of reproduction. the herd populations would be expected to remain viable.

The design, construction and maintenance of range improvements under the proposed action and Alternatives 2 and 3 would result in more people being in the herd areas, temporarily disturbing the wild horses with increased activity and noise. The

Table 3-13 Forage Allocation to Wild Horses

Herd Management Plan Numbers	Proposed Action	Alt. 1 No Action	Alt. 2 Emphasize Livestock	Alt. 3 Emphasize Non-Livestock
South Steens				
Minimum herd	150	150	20	150
Maximum herd	300	300	30	300
AUMs allocated	3,600	3,600	360	3,600
Alvord/Sheephead				
Minimum herd	100	100	30	100
Maximum herd	240	240	60	240
AUMs allocated	2,080	2,080	480	2,080

[1] The allocations reflect use for only 4 months each year in Allotment 6011, by 30 horses under Alternative 2 and 100 horses under the proposed action and Alternatives 1 and 3. The remainder of the time the horses are on the Vale District portion of the HMA.

eleven reservoirs, 3 waterholes and 4 springs proposed to be constructed under the proposed action and Alternatives 2 and 3 would be available to horses year-long and thus open up areas of forage previously unavailable to horses because of long distances from water. The construction of proposed fences could cause injuries to horses until the horses became accustomed to fence locations. No range improvements would be constructed in the herd management areas under Alternative 1.

Overall, there would be no significant impacts on horses from forage allocation or grazing systems and temporary disturbance from construction of range improvements.

IMPACTS ON RECREATION

Impacts on hunting, fishing and other wildlife-associated recreation would be dependent upon impacts to the species sought (see Impacts on Wildlife, this chapter). In some areas, livestock exclusions and riparian habitat protection would enhance fishing, and to a lesser extent waterfowl and upland game hunting.

Impacts on general sightseeing are related to the effects on scenic quality (see Impacts on Visual Resources, this chapter). Under the proposed action and Alternatives 2 and 3, visual contrasts would not cause short-term visitor use reductions due to recreational experience and scenic quality degradation. However, in the long term, sightseeing opportunities and recreational experiences would be slightly enhanced as scenic quality and range condition improve.

Range improvement projects which impair access and/or degrade site integrity or recreational experiences would result in site-specific adverse impacts within certain activity areas. Fencing would impede access for some recreationists (e.g. Catlow Valley, Pueblo Mountains). The resultant long-term impact would be more an annoyance to recreationists, causing slight localized reductions or relocation of visitor use in some activities (e.g., fishing, hunting, sightseeing). Elsewhere, fencing would stabilize streambanks and improve fishing. Water developments would attract wildlife and enhance hunting and sightseeing opportunities. Unimproved trails and tracks created during project construction would result in improved access for dispersed recreation. These trails and tracks may also create adverse impacts to those recreationists who perceive them as degratory to natural and pristine rangeland conditions. Alternative 1 would result in no impacts due to new range improvement project construction. The proposed action and Alternatives 2 and 3 would result in low to moderate impacts.

Slight adverse impacts would occur to localized visitor use in some high quality recreation areas. Under the proposed action and Alternatives 2 and 3, fencing would impair some localized high quality sightseeing opportunities. Under Alternative 2, brush control (1,280 acres) in the Catlow Valley and Frenchglen-Page Springs areas may result in further degradation of sightseeing opportunities there. The big game hunting experience in the Juniper-Beatty Butte area and upland game hunting in the Lower Steens, Pueblos and Trout Creek Mountains may be slightly impaired by fencing in those areas.

Improving fish habitat would result in enhanced sport fisheries in certain areas. Under the proposed action and Alternative 3, sport fishing would be enhanced in most of the area's high and moderate quality fishing streams (see Table 3-7). Increasing fish populations would lead to a corresponding increase in angler use under these alternatives. Under Alternatives 1 and 2, existing exclusion along portions of the Blitzen and Little Blitzen Rivers and Krumbo Creek would enhance fishing there. However, areawide decreasing fish populations under Alternatives 1 and 2 would result in slight decreases in angler use.

Under the proposed action and Alternatives 1 and 2. deterioration of fish habitat along a 1.8 mile segment of Denio Creek wouid result in some degradation of sport fishing. Under Alternatives 1 and 2, deferred grazing along portions of Trout Creek and its tributaries wouid degrade the fishing experience there.

Projected visitor use to 1990 would not be significantly impacted under any alternative. Visitor use reductions would be offset by increases in visitor use in activities beneficially impacted, Due to increasing demand on public lands, areawide projected use for public lands in the Andrews EIS area would increase about 26 percent over existing levels (see Table 2-8) for a total of about 155,710 visitor days in 1990.

In the long-term. increasing deer populations (proposed action) and antelope populations (proposed action, Alternative 2) would lead to slight corresponding increases in hunter use. Decreasing deer populations under Alternative 2 could lead to a slight decrease in hunter use.

IMPACTS ON CULTURAL RESOURCES

In accordance with National Historic Preservation Act of 1966, as amended, Executive Order 1 I593 and Bureau policy, appropriate measures would be taken to identify and protect cultural sites prior to ground disturbing activities (see Chapter 1, Standard Procedures and Design Elements for Range Improvements). Therefore, no adverse impacts would occur to known cultural sites of significance.

IMPACTS ON VISUAL RESOURCES

Under the proposed action and all alternatives. no significant impacts to visual resources would result due to vegetation allocation or grazing systems.

Each type of range improvement was examined to determine the degree of contrast it would create within the typical landscapes of the EIS area, Changes in the characteristic landscape (see Glossary! caused by range improvements vary in their potential to create contrast, Further. some improvements and vegetative manipulation projects would add visually acceptable variety in an otherwise monotonous, landscape. Table 3-14 identifies the range improvements under the proposed action and Alternatives 2 and 3 which have the potential to create impacts in areas with high scenic quality and sensitivity, Alternative 1 would create no impacts because there would be no new construction of range improvements.

Certain portions of the Andrews EIS area may experience slight degradation of visual quality. Project design features, as well as VRM program procedures and constraints, would minimize landform and vegetative contrast. In the long term, visual quality would improve as range condition improves.

IMPACTS ON WILDERNESS VALUES

All rangeland management activities in designated Wilderness Study Areas (see Glossary, would be consistent with the Interim Management Policy and Guidelines for Lands under Wilderness Review (USDI, BLM 1979). Generally, these guidelines state that changes in forage allocation. grazing systems or range improvements may be implemented as long as such changes would not impair an area's wilderness suitability. New permanent range improvements must also enhance wilderness values by better protecting the rangeland in a natural condition.

Table 3-15 identifies the proposed rangeland improvements in WSAs by alternative. Those improvements which comply with interim management policy guidelines could be constructed prior to a final decision regarding wilderness designation Other improvements (e.g., vegetative manipulations) not in compliance with policy guidelines would be delayed pending a decision regarding the area's wilderness designation. Such improvements would then only be implemented ii the areas were not designated wilderness Site specific environmental assessments will identify which of those improvements listed in Table 3-15 have the potential to impair an area's suitability For wilderness designation,

IMPACTS ON SPECIAL AREAS

Livestock exclusion from special areas currently being grazed would have the potential to create beneficial impacts to certain natural values in potential ACECs and RNAs (see Table 1-2). Under Alternatives 1 and 2, the Steens potential ACEC would continue to have 4.890 acres excluded from livestock use. Under the proposed action, 7,390 acres would be excluded and under Alternative 3 the area wouid be fully excluded, The Little Blitzen potential RNA would continue to be excluded under all alternatives.

Under the proposed action the following special areas would be excluded from livestock use: Steens potential ACEC (7,390 acres) and Little Blitzen, Pueblo Foothills, Long Draw and Mickey Basin potential RNAs. Under Alternative 3. all special areas which are currently being grazed except Borax Lake would be excluded. The Borax Lake potential ACEC would continue to receive winter use under all alternatives.

Table 3-14 Potential Impacts to Areas with High Scenic Quality and Visual Sensitivity

Area	Project	Alternative [1]	Allotment(s)
Upper Kiger Creek	Fencing (12 miles)	PA, 2,3	6020
Mann Lake - Tencent Lake	Reservoirs (2); Brush Control Only (5,120 acres); Pipeline (2 miles)	PA, 2,3	6011,6026
	Brush Control/Seed (2,560 acres); Brush Control Only (1,920 acres)	2	6011,6026
Page Springs	Reservoirs (6)	PA, 2,3	6007
	Brush Control/Seed (3,200 acres)	2	6007,6008
Bridge Creek Canyon	Reservoirs (3)	PA, 2,3	6005
Blitzen River Canyon	Reservoir (1)	PA, 2,3	6005
	Brush Control only (1,280 acres)	2	6006
Frenchglen-Steens Ranch	Waterhole (1)	PA, 2,3	6008
Upper Cottonwood Creek	Pipeline (3 miles); Reservoir (1); Well(1)	PA, 2,3	6019
	Brush Control only (6,080 acres)	2	6019
Pueblo Mountains Upland Valleys	Brush Control only (2,560 acres)	2	6020

[1] No range improvements would be constructed under Alternative 1.

Table 3-15 Proposed Improvements Within WSAs [1]

Project	PA	Alt.2	Alt. 3
Fences (miles)	108	111	25
Springs (each)	27	27	0
Pipelines (miles)	46	46	0
Wells (each)	10	10	0
Reservoirs (each)	19	19	0
Waterholes (each)	18	18	0
Brush Control/Seed (acres)	32,320	38,560	0
Brush Control only (acres)	35,840	51,680	1,280

[1] These projects would be implemented only if they were found to be in compliance with interim management guidelines and wilderness management policy (USDI, BLM, 1979). No improvements would occur under Alternative 1, No Action.

IMPACTS ON SOCIOECONOMIC CONDITIONS

Introduction

The economic impacts of the proposed action and alternatives are expressed in terms of the effects on: dependence on public forage; ranch property values: and local income and employment from grazing and the construction of range improvements. No significant impacts on income and employment related to hunting and fishing and other recreational activity have been identified. Social impacts, not primarily economic in nature, are discussed as appropriate. The long term effects of changes in forage availability on individual operators or on herd

size classes have not been estimated because the disposition of projected forage increases has not been determined,

Effect on Dependence on Public Forage

In determining the effect on dependence, actual (paid) use in 1980 was subtracted from future allocations based on 1980 active preference in each allotment, and the resultant changes for each permittee were converted to a proportion of the permittee's forage needs,

Table 3-16 shows how individual permittees would be affected in the short term by the alternative actions in terms of their annual forage requirements. The table shows the number of operators in each herd size class classified by whether they would have a loss, no change or a gain in public forage (forage from BLM-administered lands) in terms of their annual forage requirements. Also shown in the table is the average change in public forage as a percent of annual requirements. This figure equals the total change in public forage expressed as a percentage of the annual forage needs of all permittees' herds combined.

In the short term, six permittees would experience a loss of forage greater than 10 percent of their annual requirements under the proposed action and Alternative 2. Under Alternative 3, 14 permittees would lose 10 percent or more of their annual requirements.

The effect of forage losses would be more severe in terms of forage needs at the time of greatest depencence on BLM forage. Permittees with forage losses are tabulated in Table 3-17 by the percentage of their month-to-month forage requirements which would be lost.

A permittee experiencing a substantial and continuing loss of forage during a period of peak dependency might be forced to sell out. The social impact for the permittee and family would probably be severe because of the close connection between the ranching occupation and lifestyle. The intense involvement of the ranch family in the business means a substantial social adjustment in changing livelihoods. A second factor increasing the difficulty of change is the relative isolation from other occupations and lifestyles.

Table 3-16 Number of Permittees Affected in Short Term by Change in Public Forage (Change from 1980 actual use)

Change in forage as percent of annual requirements	Herd Size Group			All Permittees	Herd Size Group			All Permittees
	Under 400	400-999	1000+		Under 400	400-999	1000+	
	PROPOSED ACTION				ALTERNATIVE 1			
Loss over -30.0%	-	-	-	-	-	-	-	-
-20.0 to -29.9%	1	-	-	1	-	-	-	-
-10.0 to -19.9%	1	4	-	5	-	-	-	-
Loss under -10%	2	7	2	11	5	6	1	12
No change	2	1	3	6	2	3	3	8
Gain to 9.9%	3	2	4	9	1	4	5	10
10.0 to 19.9%	-	-	-	-	1	1	-	2
20.0 to 29.9%	-	-	-	-	-	-	-	-
30.0 to 49.9%	-	-	-	-	-	-	-	-
50.0% or more	1	-	-	-	-	-	-	-
Average change	-1.6%	-7.1%	-1.2%	-2.8%	2.0%	-0.1%	0.4%	0.3%
	ALTERNATIVE 2				ALTERNATIVE 3			
Loss over -30.0%	-	-	-	-	1	1	-	2
-20.0 to -29.9%	1	-	-	1	-	5	-	5
-10.0 to -19.9%	1	4	-	5	3	3	1	7
Loss under -10%	4	7	1	11	4	3	5	12
No change	-	1	3	4	-	1	1	2
Gain to 9.9%	3	2	5	10	1	1	2	4
10.0 to 19.9%	-	-	-	-	-	-	-	-
20.0 to 29.9%	-	-	-	-	-	-	-	-
30.0 to 49.9%	-	-	-	-	-	-	-	-
50.0% or more	-	-	-	-	-	-	-	-
Average change	-1.1%	-6.3%	0.5%	-1.4%	-5.6%	-14.7%	-5.6%	-8.1%

In the long term, changes in forage as a percentage of the annual forage requirements of permittees' existing herds would amount to:

Proposed Action	+5.5 percent
Alternative 1	+0.3 percent(difference between 1980 use and active preference)
Alternative 2	+ 23.0 percent
Alternative 3	+0.8 percent

The seasonal distribution of public forage use is not expected to change significantly from current patterns.

Effect on Ranch Property Values

The effect on ranch values as collateral for loans or in the sale of the enterprise has been calculated by valuing public forage licenses at $45 per AUM. As shown in Table 3-18, under the proposed action, 15 permittees would have the value of their property temporarily depressed by the loss of public forage. Nineteen permittees would be adversely affected under Alternative 2, and 22 permittees under Alternative 3.

The effect on ranch values in total for the proposed action and each alternative would be as follows:

Action	Short Term	Long Term
Proposed Action	-$ 509,000	+$1,997,000
Alternative 1	-0-	-0-
Alternative 2	- 208,000	+3,676,000
Alternative 3	-1,362,000	+71,000

Effects of Changes in Public Forage Use on Income and Employment

The effects of the various potential management actions on personal income and employment in the livestock industry and in the community as a whole are shown in Table 3-19.

In the short term under the proposed action and Alternatives 2 and 3, local income and employment attributable to public forage use would be reduced. Under Alternative 1, income and employment would be increased slightly assuming that all active grazing preferences were utilized. A total of seven jobs would be lost temporarily under Alternative 3.

Table 3-17 Number of Permittees with Forage Loss by Size of Loss at Time of Greatest Dependence on BLM Forage

Loss as Percent of Forage Requirements [1]	Herd Size Group: Under 400	400-999	1,000 or more	All Permittees	Herd Size Group: Under 400	400-999	1,000 or more	All Permittees
	PROPOSED ACTION				ALTERNATIVE 1			
90-100 percent	-	-	-	-	-	-	-	-
80-89 percent	-	-	-	-	-	-	-	-
70-79 percent	-	-	-	-	-	-	-	-
60-69 percent	-	-	-	-	-	-	-	-
50-59 percent	1	-	-	1	-	-	-	-
40-49 percent	-	-	-	-	-	-	-	-
30-39 percent	1	2	-	3	-	-	-	-
20-29 percent	-	3	-	3	-	-	-	-
10-19 percent	1	4	1	6	-	-	-	-
Less than 10 percent	1	2	1	4	3	3	-	6
Total	4	11	2	17	3	3	-	6
	ALTERNATIVE 2				ALTERNATIVE 3			
90-100 percent	-	-	-	-	1	-	-	1
80-89 percent	-	-	-	-	-	-	-	-
70-79 percent	-	-	-	-	-	-	-	-
60-69 percent	-	-	-	-	1	-	-	1
50-59 percent	1	-	-	1	1	3	-	4
40-49 percent	-	-	-	-	-	4	-	4
30-39 percent	1	1	-	2	-	2	1	3
20-29 percent	-	4	-	4	1	-	-	1
10-19 percent	1	4	1	6	1	1	3	5
Less than 10 percent	1	1	-	2	3	2	2	7
Total	4	10	1	15	8	12	6	26

[1] Reduction in BLM permitted forage as percentage of total herd needs during the period (1 month or more) of greatest reliance on BLM forage. *Reductions amounting to less than 0.5 percent of BLM forage use are omitted.*

In the long term, increased public forage would generate 26 more local jobs under the proposed action, 47 more jobs under Alternative 2, and 2 more under Alternative 3.

Range Improvements

Table 3-20 shows the effects of implementing range improvements under the alternative actions.

Table 3-18 Number of Permittees with Short Term Loss in Ranch Value (Losses calculated on assumed value of $45 per AUM active preference)

Loss in Ranch Value	Proposed Action				Alternative 2				Alternative 3			
	Under 400	400-999	1,000 or more	All Permittees	Under 400	400-999	1,000 or more	All Permittees	Under 400	400-999	1,000 or more	All Permittees
Less than $5,000	2	-	-	2	2	4	-	6	-	1	1	2
$5,000-$9,999	-	-	-	-	-	1	-	1	-	2	1	3
$10,000-$19,999	1	1	-	2	1	2	-	3	2	-	1	3
$20,000-$29,999	-	3	-	3	-	2	-	2	-	1	-	1
$30,000-$39,999	1	3	1	5	1	3	-	4	-	-	-	-
$40,000-$49,999	-	1	-	1	-	1	-	1	1	1	-	2
$50,000-$59,999	-	1	-	1	-	1	-	1	-	1	-	1
$60,000-$69,999	-	-	-	-	-	-	-	-	-	2	-	2
$70,000-$79,999	-	-	-	-	-	-	-	-	-	1	-	1
$80,000-$89,999	-	-	-	-	-	-	-	-	-	1	-	1
$90,000-$99,999	-	-	-	-	-	-	-	-	-	1	-	1
$100,000-$199,999	-	-	1	1	-	-	1	1	-	1	3	4
$200,000-$299,999	-	-	-	-	-	-	-	-	-	-	1	1
Over $300,000	-	-	-	-	-	-	-	-	-	-	-	-
Total	4	9	2	15	4	14	1	19	3	12	7	22

Table 3-19 Effects of Changes in Public Forage on Personal Income and Employment [1] (Income in thousands of dollars, 1978-80 prices)

Action	Livestock Industry		Harney County	
	Personal Income	Employment	Personal Income	Employment
		SHORT TERM		
Proposed Action	-$ 37.8	- 2	-$141.3	- 6
Alternative 1	+4.5	+ *	+ 16.6	+ 1
Alternative 2	-18.8	- 1	- 70.2	- 3
Alternative 3	- 108.8	- 5	- 406.2	-56
		LONG TERM		
Proposed Action	+$170.6	+ 7	+$636.7	+26
Alternative 1	+4.5	+ *	+16.6	+ 1
Alternative 2	+ 310.2	+13	+ 1,157.7	+47
Alternative 3	+10.3	+ *	+38.6	+ 2

* Less than one-half

[1] Effects of changes in forage (from actual use in 1980) estimated by factors shown in Appendix Table H-1.

Table 3-20 Effects of Range Improvements on Cumulated Personal Income and Employment [1] (Thousands of dollars, 1978-80 average prices)

Alternative Action [2]	Construction Costs of Improvements	Personal Income	Employment (work-years)
Proposed Action	$5,518	$ 4,393	238
Alternative 2	9,640	7,674	416
Alternative 3	2,854	2,272	123

[1] Income and employment estimated by factors for construction industry derived from inter-industry models as applied to estimated costs of improvements (see Appendix H, Table H-1). Represents total amount generated over the whole construction period.
[2] Alternative 1 would not involve construction activity.

LIST OF AGENCIES, ORGANIZATIONS AND PERSONS TO WHOM COPIES OF THE STATEMENT ARE SENT

Federal Agencies

Advisory Council an Historic Preservation
Department of Agriculture
Forest Service
Soil Conservation Service
Department of Defense
U.S. Army Corps of Engineers
Department of the Interior
Fish and Wildlife Service
Geological Survey
National Park Service
Bureau of Mines
Bureau of Reclamation
Environmental Protection Agency

State and Local Government

Harney County Planning Commission
Malheur County Planning Commission
IDA-ORE Regional Planning and Development Association
Oregon State Clearinghouse
Oregon State Historic Preservation Officer

Approximately 150 ether individuals.

Copies of this draft environmental impact statement will be available for public inspection at the following BLM offices:

Washington Office of Public Affairs
18th and C Streets
Washington, DC 20240
Phone (202) 343-5717

Oregon State Public Affairs Office
825 N.E. Multnomah
P.O **Box 2965**
Portland. Oregon 97208
Phone (503) 231-6277

Reading copies will be placed in the following libraries: Portland State University, Portland; Oregon State University, Corvallis; University of Oregon, Eugene; Central Oregon Community College. Bend; and the Harney and Malheur County Libraries.

Interest Groups

Ail Grazing Permittees in the Andrews EIS Area
American Fisheries Society
American Horse Protection Association
Defenders of Wildlife
Desert Trails Association
Natura! Resources Defense Council
National Wildlife Federation
Oregon Cattlemen's Association
Oregon Environmental Council
Oregon High Desert Study Group
Oregon Natural Heritage Program
Oregon Sheepgrowers
Oregon Wilderness Coalition
Public Lands Council
Sierra Club
Society for Range Management
Southern Oregon Resource Alliance (SORA)
The Wilderness Society
Wild Horse Orgnaized Assistance
Wildlife Management Institute
Wildlife Society, Oregon Chapter

Burns District Office
74 S Alvord St.
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LIST OF PREPARERS

While individuals have primary responsibility for preparing sections of an EIS, the document is an interdisciplinary team effort. In addition, internal review of the document occurs throughout preparation. Specialists at the District and State Office levels of the Bureau both review the analysis and supply information. Contributions by individual preparers may be subject to revision by other BLM specialists and by management during the internal review process.

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Gerry Fullerton	Team Leader	Range Conservation	20 years, BLM (Range Conservationist, Natural Resource Specialist, Environmental Specialist)
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Jeanne Johnson	Editorial Secretary	Administrative	6 years, BLM(Secretary, Editorial Assistant
Richard Nawa	Wildlife	Zoology	7 years (Wildlife Biologist) 2 years BLM, Elko, Nev. 3 years BLM, Portland, Oreg. 2 years Cooperative Wildlife Research Lab., Southern Illinois Univ.
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Appendices

APPENDICES

A Summary and Results of EIS Scoping

B Allotment Specific Tables
Table B-1, Initial and Long Term Forage Allocations
Table B-2, Existing Forage Condition, Grazing Systems and Period of Use
Table B-3, Proposed Range Improvements

C Determination of Forage Production and Vegetation Allocation

D Scientific Names of Plants Mentioned in the EIS

E Determination of Existing and Predicted Forage Condition and Trend

F Properties and Qualities of the Soils in the Andrews EIS area

G Riparian and Wetland Inventory Methodology
Table G-1, Riparian Habitat - Predicted Trend and Condition
Table G-2, Wetland Habitat - Predicted Trend and Condition

H Estimates of Gross Sales, Personal Income, and Employment
Table H-1, Economic Effects per Unit of Physical Measure

Appendix A

Summary and Results of EIS Scoping

Public meetings for the purpose of scoping the Andrews Grazing Management Environmental Impact Statement (EIS) were combined with the meetings to discuss the development of the preferred alternative for the Andrews Management Framework Plan (MFP). The MFP at that stage consisted of four land use allocation alternatives which had been developed from criteria established with earlier public imput. The four alternatives called for various allocations of forage to livestock and different amounts of pro-tection for special areas such as ACECs, RNAs, WSAs and riparian vegetation.

The MFP Alternatives were discussed in public meetings in Denio, Nevada; Burns, Oregon and Portland, Oregon during early March 1982. Both oral and written comments were received and used in developing the proposed action and other alternatives to be analyzed in the Andrews EIS. These comments led to the development of the proposed action (preferred alternative) and three other alternatives.

- Proposed Action
- Alternative 1, No Action (continue existing level of livestock grazing). This alternative is required by law.
- Alternative 2, Emphasize livestock grazing.
- Alternative 3, Emphasize non-livestock values.

The proposed action contains elements adopted primarily from MFP Alternatives B and C as modified by a preliminary benefit-cost analysis and public comments.

The emphasize livestock grazing alternative consists primarily of elements of MFP Alternative A.

The emphasize non-livestock values alternative would exclude livestock grazing in riparian areas and other areas with special values. Range improvements outside of the livestock exclusion areas would be limited to those needed to develop forage to satisfy existing livestock user preference. This alternative would also limit wild horse numbers to the same as proposed under the preferred alternative for each of the herd management areas.

Public comment from the environmental groups, wild horse advocates and the ranching industry opposed increasing wild horses in any alternative. Specific comments suggested that the allocation to wild horses presented in MFP Alternatives A, B & C displayed a sufficient range for purposes of EIS analysis.

Public comment also opposed the analysis in the EIS of a "No Grazing" alternative. The Emphasize Non-Livestock Values Alternative would exclude livestock from approximately 16 percent of the EIS area.

APPENDIX B,TABLE B-1 INITIAL AND LONG TERM FORAGE ALLOCATIONS[1]

Allot No.	Proposed Action					Alternative 1 No Action				
	STLV	LTLV	WL	WH	NC	STLV	LTLV	WL	WH	NC
6001	7,224	17,894	74	0	3	7,224	7,224	74	0	3
6002	21,485	30,676	708	3,492	150	21,935	21,935	708	3,492	0
6003	1,410	2,050	191	0	12	1,410	1,410	191	0	12
6004	0	0	0	0	500	0	0	0	0	500
6005	561	668	60	0	54	561	561	60	0	1
6006	2,215	2,621	70	108	800	2,210	2,210	70	108	800
6007	2,366	2,366	114	0	0	2,366	2,366	114	0	0
6008	5,188	5,459	81	0	86	5,188	5,188	81	0	86
6009	548	1,773	5	0	0	548	548	5	0	0
6010	3,654	3,654	367	0	0	3,654	3,654	367	0	0
6011	4,760	6,356	54	400	44	4,760	4,760	54	400	44
6012	8,803	12,335	249	1,200	23	8,803	8,803	249	1,200	0
6013	209	254	67	0	0	209	209	67	0	0
6015	7,299	10,129	566	0	0	13,791	13.791	566	0	0
6016	420	1,490	12	0	0	420	420	12	0	0
6017	275	401	23	0	0	275	275	23	0	0
6018	3,170	11,450	66	480	22	1,718	1.7'18	66	480	22
6019	1,863	2,140	63	0	10	3,728	3,728	63	0	10
6020	15,651	30,626	492	0	38	19,648	19,648	492	0	24
6021	369	369	41	0	0	323	323	41	0	0
6022	113	113	18	0	0	113	113	18	0	0
6024	91	96	3	0	0	91	91	3	0	0
6025	413	413	10	0	8	413	413	10	0	0
6026	3,600	4,042	65	0	20	3,600	3,600	65	0	20
Totals	91,687	147,375	3,399	5,680	1,770	102,988	102,988	3,399	5,680	1,522

Key
STLV-Short Term (Initial) Livestock
LTLV-Long Term Livestock
WL-Wildlife
WH-Wild Horses
NC-Nonconsumptive

[1] Initial and long term allocations are the same within each alternative for wildlife, wildhorses or nonconsumptive uses.

Alternative 2 Emphasize Livestock					Alternative 3 Emphasize Non-Livestock				
STLY	LTLV	WL	W H	N C	STLV	LTLV	W L	W H	N C
7.224	2'3,185	74	0	3	7.183	11.262	74	0	44
24,778	34,657	708	349	0	19.138	25,108	708	3,392	2.397
1,410	2,050	191	0	12	1.410	1.865	191	0	12
0	0	0	0	500	0	0	0	0	500
614	721	60	0	1	561	668	60	0	54
2,312	3.284	70	11	800	1.895	2,132	70	108	1,120
2,366	2,366	114	0	0	2,366	2,366	114	0	0
5,188	6,506	81	0	86	4,938	5,116	8:	0	336
548	1,773	5	0	0	548	759	5	0	0
3,654	3,654	367	0	0	973	973	367	0	2.681
5,040	7,511	54	120	44	4,760	4,760	54	400	44
9,762	13,526	249	264	0	5.819	5,819	249	1,200	3.007
209	254	67	0	0	0	0	67	0	209
7'299	12,553	566	0	0	5,104	7.575	566	0	2,195
420	2,643	12	0	0	420	1,490	12	0	0
275	461	23	0	0	275	333	23	0	0
3,554	18,699	66	96	22	3,170	10,504	66	480	22
1.863	13,718	63	0	10	1,337	1,614	63	0	526
15,665	37.803	492	0	24	9,056	18,076	492	0	6,633
369	369	41	0	0	0	0	41	0	369
113	113	18	0	0	0	0	18	0	113
91	96	3	0	0	91	96	3	0	0
421	42'	10	0	0	413	413	10	0	8
3,600	4.305	65	0	20	3,262	3,635	65	0	35%
96.775	184.665	3,359	840	1,522	72,719	104,564	3,399	5.680	20.738

APPENDIX B, TABLE B-2 EXISTING FORAGE CONDITION, PROPOSED GRAZING SYSTEMS AND PERIODS OF USE

Allot. No.	Pasture No. and Name	BLM Acres	Existing Forage Condition				Proposed Grazing System				Maximum Periods of Use	
			Good	Fair	Poor	Unknown	P.A.	Alt.1	Alt.2	Alt.3	Existing (Month/day)	Proposed (Month/day)
6001	01 PICKETT RIM	12,800	8,960	3,840	0	0	DR	SS	DR	DR	4/16-10/31	4/16-10/31
	02 LAVOY TABLES	15,005	9,245	5,760	0	0	DR	SS	DR	DR	4/16-10/31	4/16-10/31
	03 WALLS LAKE	11,520	11,520	0	0	0	RR1	SS	RR1	RR1	4/16-10/31	4/16-10/31
	04 JUNIPER FIELD	9,600	9,600	0	0	0	DR	SS	DR	DR	4/16-10/31	4/16-10/31
	05 KEG SPRINGS	17,280	17,280	0	0	0	DR	SS	DR	DR	4/16-10/31	4/16-10/31
	06 TUCKE LAKE	51,835	51,835	0	0	0	RR1	SS	RR1	RR1	4/01-10/31	4/01-10/31
	07 WEST GENE MILLER	2,973	2,973	0	0	0	RR2	RR2	RR2	RR2	4/01-10/31	4/01-10/31
	08 EAST GENE MILLER	5,406	0	5,406	0	0	RR2	RR2	RR2	RR2	4/01-10/31	4/01-10/31
	09 ROCK CREEK	46,724	45,444	1,280	0	0	RR1	SS	RR1	RR1	4/01-10/31	4/01-10/31
	10 GUANO SLOUGH	63,975	2,563	61,415	0	0	RR1	SS	RR1	RR1	4/01-10/31	4/01-10/31
	11 N. DUHAIME	3,685	3,685	0	0	0	SF	SF	SF	SF	4/16-10/31	4/16-10/31
	12 S. DUHAIME	3,640	3,640	0	0	0	SF	SF	SF	SF	4/01-10/31	4/16-10/31
	13 ROCK CR EX	1,300	0	1,300	0	0	RR1	SS	RR1	EX	4/01-10/31	4/01-10/31
	14 ROCK CR EX2	5	0	0	0	5	EX	EX	EX	EX	No Use	No Use
	15 MUD SPRING EX	5	5	0	0	0	EX	EX	EX	EX	No Use	No Use
	16 N. CATLOW FFR	2,275	0	0	0	2,275	FFR	FFR	FFR	FFR	4/01-10/31	4/01-10/31
6002	01 NORTH	30,450	19,960	16,520	0	0	RR2	SS	RR2	SS	4/16-10/31	4/16-7/15
	02 SOUTH	43,800	29,080	14,720	0	0	RR2	SS	RR2	SS	4/16-10/31	4/16-7/15
	03 MOUNTAIN	23,906	23,906	0	0	0	SS	SS	SS	SS	7/01-10/31	7/01-10/31
	04 ECKERT FIELD	2,930	0	2,930	0	0	SS	SS	SS	SS	5/15-7/15	5/15-7/15
	05 SKULL CREEK FIELD	11,990	0	11,990	0	0	SS	SS	SS	SS	5/01-7/15	5/01-7/15
	06 SKULL LAKE FIELD	9,600	0	9,600	0	0	SS	SS	SS	EX	5/01-7/15	5/01-7/15
	07 HOLLYWOOD FIELD	5,533	5,533	0	0	0	SS	SS	SS	SS	4/16-10/31	4/15-6/15
	08 GARRISON LAKE FIELD	5,600	5,600	0	0	0	RR2	SS	RR2	SS	4/16-10/15	4/16-10/15
	09 WEST FIELD	11,520	11,520	0	0	0	RR2	SS	RR2	SS	4/16-10/15	4/16-10/15
	10 N. COYOTE	5,320	0	0	5,320	0	RR2	N	RR2	SS	No Use	4/16-10/15
	11 S. COYOTE	13,440	0	1	3 440	0	RR2	N	RR2	RR2	No Use	4/16-10/15
	12 S. CATLOW FIELD	33,920	21,040	0	12,880	0	W	SS	W	SS	4/16-10/15	4/15-10/15
	13 LITTLE BLITZEN	3,200	3,200	0	0	0	DF	RR2	RR2	EX	6/01-8/31	9/01-10/15
	14 BIG INDIAN EX	2,000	0	0	0	2,000	EX	DF	DF	EX	9/01-9/30	9/01-9/30
	15 THREE MILE CR EX	200	0	0	0	200	EX	SS	RR2	EX	4/16-10/31	4/15-6/30
	16 THREE MILE CR FFR EX	800	800	0	0	0	FFR	EX	FFR	EX	1/01-12/31	1/01-12/31
	17 SOUTH STEENS FFR	7,900	0	0	0	7,900	FFR	FFR	FFR	FFR	2/01-4/15	2/01-4/15
	18 MOUNTAIN EX	6,300	6,300	0	0	0	SS	SS	SS	EX	7/01-10/31	7/01-10/31
	19 S. FORK BLITZEN EX	1,600	1,600	0	0	0	RR2	SS	RR2	EX	4/16-10/31	4/16-10/31
	20 HOME CREEK EX	800	0	0	0	800	RR2	SS	RR2	EX	4/16-10/31	4/16-10/31
	21 HOME CREEK FFR EX	500	0	0	0	500	FFR	FFR	FFR	EX	11/01-4/15	11/01-4/15
	22 SKULL CREEK EX	1,080	0	0	0	1,080	SS	SS	SS	EX	5/01-7/15	5/01-7/15
6003	01 WATSON	4,644	0	4,644	0	0	RR2	RR2	RR2	RR2	4/16-5/15	4/16-5/15
	02 DRY CREEK	4,487	0	4,487	0	0	RR2	RR2	RR2	RR2	4/16-5/15	4/16-5/15
	03 LITTLE BLITZEN	1,600	1,600	0	0	0	DF	DF	DF	DF	9/01-9/30	9/01-9/30
	04 MUD CREEK	6,010	6,010	0	0	0	SS	SS	SS	SS	6/16-9/30	6/16-9/30
	05 COLD SPRING	8,685	8,685	0	0	0	SS	SS	SS	SS	6/01-9/30	6/01-9/30
	06 BIG INDIAN	521	521	0	0	0	DF	DF	DF	DF	9/01-9/30	9/01-9/30
	07 FISH CR EX	250	0	0	0	250	EX	SS	SS	EX	6/01-9/30	6/01-9/30
	08 GROVE CREEK EX	80	0	0	0	80	EX	SS	SS	EX	6/01-9/30	6/01-9/30
	09 FISH CREEK FFR	170	0	0	0	170	FFR	FFR	FFR	FFR	6/01-9/30	6/01-9/30
6004	01 STEENS SUMMIT	4,890	4,890	0	0	0	EX	EX	EX	EX	No Use	No Use
6005	0 UPPER MUD	4,662	0	0	4,662	0	RR2	RR2	RR2	RR2	6/01-6/30	6/01-6/30
	02 LOWER MUD	3,191	0	0	3,191	0	RR2	RR2	RR2	RR2	6/01-6/30	6/01-6/30
	03 MUD CREEK EX	900	0	0	900	0	EX	RR2	RR2	EX	6/01-6/30	6/01-6/30
	04 GRANDAD RES EX	1	1	0	0	0	EX	EX	EX	EX	No Use	No Use
6006	01 N. HIGHWAY	1,320	1,320	0	0	0	EA	EA	EA	EA	4/01-4/31	4/01-4/31
	02 P. HILL	2,320	2,320	0	0	0	SS	SS	SS	SS	5/01-10/31	5/01-10/31
	03 CATLOW RIM	4,962	4,962	0	0	0	SS	SS	SS	SS	5/01-10/31	5/01-10/31
	04 W. LOWER RIVER	2,680	2,680	0	0	0	RR2	RR2	RR2	RR2	4/16-5/31	4/16-5/31
	05 W. UPPER RIVER	2,240	2,240	0	0	0	SS	SS	SS	SS	6/01-8/31	6/01-8/31
	06 LOWER SEEDING	900	900	0	0	0	RR2	RR2	RR2	RR2	4/16-5/31	4/16-5/31
	07 E. RIVER FIELD	5,092	5,092	0	0	0	RR2	RR2	RR2	RR2	4/01-6/15	4/16-5/31
	08 ROAD	4,160	4,160	0	0	0	RR2	RR2	RR2	EX	4/01-6/15	4/01-6/15
	09 OLD FRAZIER FIELD	4,080	4,080	0	0	0	SS	SS	SS	SS	6/16-9/30	6/16-9/30
	10 BLITZEN RIVER EX	1,100	1,100	0	0	0	EX	EX	EX	EX	No Use	No Use
6007	01 RUBY SPR SEEDING	2,037	2,037	0	0	0	RR2	RR2	RR2	RR2	4/16-5/31	4/16-5/31
	02 FRAZIER LAKE SEED	2,050	2,050	0	0	0	RR2	RR2	RR2	RR2	4/01-4/30	4/01-5/31
	03 KRUMBO CREEK SEED	2,410	2,410	0	0	0	RR2	RR2	RR2	RR2	4/16-5/31	4/16-5/31
	04 RUBY SPR FOUR	2,737	2,737	0	0	0	RR2	RR2	RR2	RR2	4/01-4/30	4/01-4/30
	05 BASS LAKE	3,037	3,037	0	0	0	SS	SS	SS	SS	5/01-4/30	5/01-6/30
	06 KRUMBO MTN	2,095	2,095	0	0	0	SS	SS	SS	SS	6/01-8/26	6/01-8/26
6008	01 ONE SDG	891	891	0	0	0	RR1	RR1	RR1	RR1	4/01-5/31	4/01-5/31
	02 TWO SDG	1,333	1,333	0	0	0	RR1	RR1	RR1	RR1	4/01-5/31	4/01-5/31
	03 THREE-A SDG	796	796	0	0	0	RR2	RR2	RR2	RR2	4/01-5/31	4/01-5/31
	04 THREE-B SDG	1,706	1,706	0	0	0	RR1	RR1	RR1	RR1	4/01-5/31	4/01-5/31
	05 FOUR SDG	3,459	3,459	0	0	0	RR1	RR1	RR1	RR1	4/01-5/31	4/01-5/31
	06 FIVE SDG	2,995	2,995	0	0	0	RR1	RR1	RR1	RR1	4/01-5/31	4/01-5/31
	07 SIX SDG	2,490	2,490	0	0	0	SS	SS	SS	SS	4/01-5/31	4/01-5/31
	08 SEVEN SDG	1,444	1,444	0	0	0	RR2	RR2	RR2	RR2	4/01-5/31	4/01-5/31
	09 UPPER KRUMBO	53	53	0	0	0	T	T	T	T	7/16-7/20	7/16-5/31
	10 RESERVOIR FIELD SDG	1,684	0	1,684	0	0	RR2	RR2	RR2	RR2	4/01-5/31	4/01-5/31
	11 WEBB SPRING SDG	2,321	2,321	0	0	0	RR1	RR1	RR1	RR1	4/01-5/31	4/01-5/31
	12 KNOX SPRING SDG	3,170	3,170	0	0	0	RR1	RR1	RR1	RR1	4/01-5/31	4/01-5/31
	13 TWELVE-A SDG	512	512	0	0	0	RR2	RR2	RR2	RR2	4/01-5/31	4/01-5/31
	14 THIRTEEN SDG	8,360	8,360	0	0	0	RR2	RR2	RR2	RR2	4/01-5/31	4/01-5/31
	15 FOURTEEN SDG	8,035	8,035	0	0	0	RR2	RR2	RR2	RR2	4/01-5/31	4/01-5/31
	16 DUTCH OVEN SDG	1,948	1,948	0	0	0	RR1	RR1	RR1	RR1	4/01-5/31	4/01-5/31
	17 BRIDGE CR EX	290	0	0	0	290	EX	EX	EX	EX	No Use	No Use
	18 UPPER RUMBO CR EX	500	0	0	0	500	EX	EX	EX	EX	No Use	No Use
	19 KRUMBO EX ENLARGMNT	1,217	0	0	0	1,217	T	T	T	EX	7/16-7/20	7/16-5/31
	20 KRUMBO FFR	691	0	0	0	691	FFR	FFR	FFR	FFR	6/01-9/30	6/01-9/30

APPENDIX B, TABLE B-2 EXISTING FORAGE CONDITION, PROPOSED GRAZING SYSTEMS AND PERIODS OF USE

Allot. No.	Pasture No. and Name		BLM Acres	Existing Forage Condition				Proposed Grazing System				Maximum Periods of Use	
				Good	Fair	Poor	Unknown	P.A.	Alt.1	Alt.2	Alt.3	Existing (Month/day)	Proposed (Month/day)
6009	01	ONE	2,240	2,240	0	0	0	W	W	W	W	12/01-2/28	12/01-2/28
	02	TWO	1,920	1,920	0	0	0	W	W	W	W	12/01-2/28	12/01-2/28
	03	THREE	1,929	1,929	0	0	0	W	W	W	W	12/01-2/28	12/01-2/28
	04	BLITZEN FFR	1,110	0	0	0	1,110	FFR	FFR	FFR	FFR	12/01-2/28	12/01-2/28
6010	01	LOWER FIELD	3,200	0	3,200	0	0	SS	SS	SS	SS	4/16-5/15	4/16-5/15
	02	CUCAMONGA FIELD	3,840	0	3,840	0	0	SS	SS	SS	SS	5/16-6/30	5/16-7/15
	03	KIGER FIELD	2,240	0	2,240	0	0	SS	SS	SS	EX	6/16-9/15	6/16-9/15
	04	HOMESTEAD FIELD	1,280	1,280	0	0	0	SS	SS	SS	SS	4/16-5/15	4/16-5/15
	05	OTLEY 1	640	640	0	0	0	SS	SS	SS	SS	4/16-5/15	4/16-5/15
	06	OTLEY 2	160	160	0	0	0	SS	SS	SS	SS	4/16-5/15	4/16-5/15
	07	LOWER MCCOY FIELD	2,560	2,560	0	0	0	DF	DF	DF	EX	9/01-10/31	9/01-10/31
	08	UPPER MCCOY FIELD	10,618	10,618	0	0	0	TEX	DF	DF	EX	9/01-10/31	9/01-10/31
	09	KIGER TEX	2,880	0	2,880	0	0	TEX	SS	SS	EX	6/16-9/15	6/16-9/15
6011	01	JUNIPER LAKE	12,970	6,920	5,760	290	0	RR1	SS	RR1	RR1	4/01-10/31	5/01-10/31
	02	FOLLY FARM	12,336	4,486	7,850	0	0	RR1	SS	RR1	RR1	4/01-10/31	10/31-4/01
	03	HEATH LAKE	14,281	12,162	540	1,579	0	RR1	SS	RR1	RR1	4/01-10/31	4/01-5/01
	04	LAMBING CANYON	6,020	2,846	3,174	0	0	DR	SS	DR	DR	6/10-10/31	5/01-10/31
	05	STONEHOUSE SEEDING	4,498	4,498	0	0	0	DR	DR	DR	DR	4/01-10/31	4/01-10/31
	06	ALBERSON SEEDING	3,790	3,790	0	0	0	DR	DR	DR	DR	4/01-10/31	4/01-10/31
	07	NIGGER SEEDING	3,400	3,400	0	0	0	DR	DR	DR	DR	4/01-10/31	4/01-10/31
	08	SULFUR SPRING	10,180	0	10,180	0	0	W	W	W	W	11/01-12/31	11/16-2/28
	09	TABLE MOUNTAIN	10,420	0	10,420	0	0	W	W	W	W	11/01-12/31	11/16-2/28
	10	JUNIPER RANCH FFR	21	0	0	0	21	FFR	FFR	FFR	FFR	11/01-4/15	11/01-4/15
	11	RENWICK FFR	9	0	0	0	9	FFR	FFR	FFR	FFR	11/01-4/15	11/01-4/15
	12	HEATH LAKE SEEDING	4,040	0	2,020	2,020	0	SS	SS	DR	SS	4/01-10/31	4/01-10/31
	13	JUNIPER LAKE SDG EX	160	160	0	0	0	EX	EX	EX	EX	4/01-10/31	4/01-10/31
	14	FIVE CENT SEEDING	115	115	0	0	0	N	N	N	N	No Use	No Use
6012	01	ALVORD SEEDING	2,782	2,782	0	0	0	RR1	RR1	RR1	RR1	4/16-7/15	4/16-7/15
	02	TABLE MOUNTAIN	20,005	14,885	5,120	0	0	RR1	RR1	RR1	RR1	4/16-7/15	4/16-7/15
	03	NORTH FOOTHILLS	9,520	6,520	3,000	0	0	RR1	RR1	RR1	EX	4/16-7/15	4/16-7/15
	04	SOUTH FOOTHILLS	9,441	6,600	2,841	0	0	RR1	RR1	RR1	EX	4/16-7/15	4/16-7/15
	05	WARD	1,660	1,660	0	0	0	RR4	SS	RR4	EX	7/16-9/15	7/01-9/30
	06	RIDDLE CREEK	1,550	1,550	0	0	0	RR2	SS	RR2	EX	7/16-9/15	7/01-9/30
	07	STONEHOUSE CREEK	3,921	3,921	0	0	0	RR2	SS	RR2	EX	7/16-9/15	7/01-9/30
	08	DEEP CREEK	3,560	3,560	0	0	0	RR4	SS	RR4	EX	7/16-9/15	7/01-9/30
	09	GRASSY RIDGE	55,120	0	55,120	0	0	EA	EA	EA	EA	12/01-4/15	12/01-4/15
	10	ANCIENT LAKE	113,040	13,466	75,850	0	23,724	EA	EA	EA	EA	12/01-4/15	12/01-4/15
	11	MICKEY BASIN RNA	350	350	0	0	0	EX	EA	EA	EX	12/01-4/15	12/01-4/15
	12	ALVORD DESERT ACEC	19,200	0	19,200	0	0	EA	EA	EA	EX	12/01-4/15	12/01-4/15
	13	MICKEY DIKES Ex	50	50	0	0	0	EX	EX	EX	EX	No Use	No Use
	14	GETTY SPRINGS EX	18	18	0	0	0	EX	EX	EX	EX	No Use	No Use
	15	COYOTE CK (DREWSEY)	600	600	0	0	0	DF	DF	DF	DF	7/16-9/30	7/16-9/30
6013	01	BIG WILDHORSE	1,226	1,226	0	0	0	RR2	RR2	RR2	EX	8/01-9/30	9/01-9/30
	02	LITTLE WILDHORSE	1,286	1,286	0	0	0	RR2	RR2	RR2	EX	8/01-9/30	9/01-9/30
	03	LOWER WILDHORSE	1,328	0	1,328	0	0	RR2	SS	RR2	EX	6/16-8/01	9/01-9/30
	04	LITTLE WILDHORSE RNA	45	45	0	0	0	N	N	N	N	No Use	No Use
	05	WILDHORSE FFR	684	0	0	0	684	FFR	FFR	FFR	FFR	11/01-4/15	11/01-4/15
6015	01	FLAGSTAFF SEEDING	1,711	0	0	1,711	0	SS	SS	SS	SS	4/16-6/30	4/16-6/30
	02	BUCKSKIN MTN	8,562	0	0	8,562	0	RR3	SS	RR3	RR3	4/16-6/15	4/16-6/15
	03	LITTLE TROUT CR SDNG	2,771	0	2,771	0	0	RR3	SS	SS	RR3	5/16-7/31	6/16-7/31
	04	CHALK CNYN OLD SDNG	305	0	0	305	0	RR3	SS	RR3	RR3	4/16-6/15	4/16-6/15
	05	POLE PATCH	5,324	5,324	0	0	0	RR3	SS	RR3	EX	6/16-7/31	6/16-7/31
	06	STONEY	9,897	0	9,897	0	0	RR3	SS	RR3	RR3	4/16-6/15	4/16-6/15
	07	ANTELOPE SEEDING	4,530	0	0	4,530	0	RR3	SS	RR3	RR3	4/16-6/15	4/16-6/15
	08	DRY CREEK	4,225	0	0	4,225	0	RR3	SS	RR3	RR3	4/16-6/15	4/16-6/15
	09	RED MTN	12,502	0	12,502	0	0	RR3	SS	RR3	RR3	4/16-6/15	4/16-6/15
	10	NO NAME	9,535	0	9,535	0	0	RR3	SS	RR3	RR3	6/16-7/31	6/16-7/31
	11	TROUT CRK SUMMER	17,504	17,504	0	0	0	RR4	DF	DF	EX	8/01-9/30	8/01-9/30
	12	CHALK CNYN BURN	2,600	2,600	0	0	0	RR3	SS	RR3	RR3	4/16-6/15	4/16-6/15
	13	TROUT CREEK FFR	2,290	0	0	0	2,290	FFR	FFR	FFR	FFR	11/01-12/31	11/01-12/31
6016	01	LONG CANYON	4,777	4,777	0	0	0	RR4	SS	RR4	RR4	4/16-6/30	4/16-7/30
	02	NORTH SANDHILLS	4,279	0	0	4,279	0	RR4	SS	RR4	RR4	4/16-6/30	4/16-7/30
	03	SOUTH SANDHILLS	1,265	0	0	1,265	0	RR2	SS	RR2	RR2	4/16-6/30	4/16-7/30
	04	S. SANDHILLS IRRIG	200	0	0	200	0	IR	W	IR	IR	12/01-2/28	5/01-10/31
	05	S. SANDHILLS RESDNG	300	0	0	300	0	EA	W	IR	EA	12/01-2/28	5/01-10/31
	06	S. SANDHILLS SDNG	750	0	0	750	0	W	W	W	W	12/01-2/28	12/01-2/28
	07	SANDHILLS FFR	421	0	0	0	421	FFR	FFR	FFR	FFR	11/01-4/15	11/01-4/15
6017	01	LITTLE CROW CREEK	2,469	0	2,469	0	0	RR1	RR1	RR1	RR1	4/16-8/31	4/16-8/31
	02	GRASSY BASIN	1,720	1,720	0	0	0	RR1	RR1	RR1	RR1	4/16-8/31	4/16-8/31
	03	LOWER CROW CREEK	60	0	0	0	60	RR1	RR1	RR1	RR1	4/16-8/31	4/16-8/31
6018	01	UPPER BUCKSKIN SDNG	4,160	0	4,160	0	0	RR1	W	RR1	W	11/01-2/28	4/16-10/31
	02	MIDDLE BUCKSKIN SDNG	5,440	0	5,440	0	0	RR1	W	RR1	W	11/01-2/28	4/16-10/31
	03	LOWER BUCKSIN SDNG	2,560	0	2,560	0	0	RR1	W	RR1	W	11/01-2/28	4/16-10/31
	04	LITTLE BUTTE	36,480	5,000	31,480	0	0	W	W	W	W	11/01-2/28	11/01-2/28
	05	TULE SPRINGS	71,065	13,556	57,509	0	0	W	W	W	W	11/01-2/28	11/01-2/28
	06	LOWER TUM TUM	3,400	0	2,600	800	0	RR2	W	RR2	W	11/01-2/28	4/16-5/31
	07	UPPER TUM TUM	2,700	0	2,700	0	0	DR	W	DR	W	11/01-2/28	4/16-5/31
	08	STONE CABIN SDNG	5,000	400	4,600	0	0	W	W	W	W	11/01-2/28	12/01-2/28
	09	TROUT CRK IRRIG	200	0	200	0	0	W	W	IR	W	11/01-2/28	5/01-10/30
	10	GROVE IRRIG	500	0	500	0	0	W	W	IR	W	11/01-2/28	5/01-10/30
	11	PUEBLO IRRIG	1,400	0	0	1,400	0	IR	W	IR	IR	11/01-2/28	5/01-10/30
	12	ALVORD SLOUGH EX	400	0	0	0	400	EX	EX	EX	EX	No Use	No Use
	13	LOWER ANTELOPE	5,120	0	5,120	0	0	SS	SS	SS	SS	4/16-5/30	4/16-5/30
	14	TULE SPRINGS FFR	1,971	0	0	0	1,971	FFR	FFR	FFR	FFR	11/01-4/15	11/01-4/15
6019	01	A	4,588	0	4,588	0	0	SS	SS	SS	SS	4/16-8/15	4/16-8/15
	02	B	5,075	0	5,075	0	0	SS	SS	SS	SS	4/16-7/15	4/16-7/15
	03	C	2,096	0	2,096	0	0	SS	SS	SS	SS	4/16-7/15	4/16-7/15
	04	D	4,758	4,758	0	0	0	SS	SS	SS	SS	4/16-6/30	4/16-6/30
	05	E	6,746	0	6,746	0	0	RR1	RR1	RR1	EX	4/16-11/15	4/16-11/15
	06	SCHOUVER FLAT IRRIG	1,000	0	1,000	0	0	SS	SS	IR	SS	4/16-8/15	4/16-8/15

APPENDIX B, TABLE B-2 EXISTING FORAGE CONDITION, PROPOSED GRAZING SYSTEMS AND PERIODS OF USE (con't)

Allot. No.	Pasture No. and Name	BLM Acres	Existing Forage Condition				Proposed Grazing System				Maximum Periods of Use	
			Good	Fair	Poor	Unknown	P.A.	Alt.1	Alt.2	Alt.3	Existing (Month day)	Proposed (Month day)
	07 G	2 959	0	2 460	1 499	0	RR1	RR1	RR1	RR1	4 16-11 15	4 16-11 15
	08 H	5 297	5 297	0	0	0	RR1	RR1	RR1	RR1	4 16-11 15	4 16-11 15
	09 FIELDS SEEDING	2 847	2 847	0	0	0	RR1	RR1	RR1	RR1	4 16-11 15	4 16-11 15
	10 BURKE SPRING EX	11	0	0	0	11	EX	EX	EX	EX	No Use	No Use
	11 FIELD G EX	4 824	4 824	0	0	0	RR1	RR1	RR1	EX	4 16-11 15	4 16-11 15
	12 ANDREWS FFR	120	0	0	0	120	FFR	FFR	FFR	FFR	11 01-4 15	11 01-4 15
	13 PONY EXPRESS	800	0	800	0	0	RR1	RR1	IR	RR1	4 16-11 15	4 16-11 15
	14 SCHOUVER FLAT SDNG	372	0	0	372	0	SS	SS	SS	SS	4 16-8 15	4 16-8 15
6020	01 N RINCON SDG	670	670	0	0	0	DP	RR2	DR	DR	5 16-7 15	4 16-10 31
	02 M RINCON SDG	1 550	1 550	0	0	0	DR	SS	DR	DR	4 16-10 31	4 16-10 31
	03 S RINCON SDG	3 480	3 480	0	0	0	DP	SS	DR	DR	4 16-10 31	4 16-10 31
	04 COLONY SDG	340	0	340	0	0	SF	SF	SF	SF	4 16-1 15	4 16-1 15
	05 N SANDHILLS	900	0	0	900	0	IR	N	IR	IR	4 16-10 31	4 16-10 31
	06 COLONY WINTER	8 366	0	8 366	0	0	W	W	W	EX	11 15-1 15	11 16-1 15
	07 BASQUE HILLS	35 840	35 840	0	0	0	RR2	W	RR2	RR2	12 01-2 28	4 16-5 30
	18 PUEBLO SLOUGH NORTH	40	0	0	0	40	EX	EX	EX	EX	No Use	No Use
	19 PUEBLO SLOUGH SOUTH	200	0	0	0	200	EX	EX	EX	EX	No Use	No Use
	20 STARR SDG	2 900	0	900	2 000	0	RR3	SS	DR	EX	4 16-10 31	4 16-10 31
	21 DIP SPRING SDG	2 560	0	0	2 560	0	RR3	SS	DR	RR3	4 16-10 31	4 16-10 31
	22 COLONY IRRIG	900	0	900	0	0	SF	SF	IR	SF	4 16-10 31	4 16-10 31
	23 PUEBLO FOOTHILL SRNA	1 925	0	1 925	0	0	EX	SS	RR3	EX	4 16-10 31	4 16-8 15
	24 MILLER	200	0	200	0	0	RR3	SS	IR	EX	4 16-10 31	4 16-8 15
	25 N SANDHILLS	50	0	0	50	0	N	N	N	N	No Use	No Use
6021	01 DENIO BASIN	8 085	4 995	3 072	0	0	SS	SS	SS	EX	6 01-10 31	6 01-10 31
6022	01 KINGS RIVER	1 602	0	1 602	0	0	SS	SS	SS	EX	6 01-10 31	6 01-10 31
6024	01 SOUTH FORK	400	400	0	0	0	FFR	FFR	FFR	FFR	4 16-6 30	4 16-6 30
6025	01 HARDIE SUMMER	1 207	1 207	0	0	0	SS	SS	SS	SS	7 01-9 30	7 01-9 30
	02 LILY LAKE	25	25	0	0	0	EX	SS	SS	EX	7 01-9 30	7 01-9 30
6026	01 N SEEDING	1 517	1 517	0	0	0	RR1	SS	RR1	RR1	5 21-6 15	4 16-6 30
	02 S SEEDING	1 732	1 732	0	0	0	RR1	SS	RR1	RR1	5 01-6 15	4 16-6 30
	03 FOOTHILLS	2 425	0	2 425	0	0	RR1	SS	RR1	RR1	5 16-6 15	4 30-6 30
	04 S DESERT	5 742	4 142	1 600	0	0	RR1	W	RR1	RR1	11 16-2 28	4 16-5 31
	05 N DESERT	6 386	5 986	400	0	0	W	W	W	W	11 16-12 15	11 16-12 15
	06 E DESERT	12 950	12 950	0	0	0	W	W	W	W	11 16-2 28	11 16-12 15
	07 FOOTHILLS EX	7 040	5 877	1 163	0	0	RR1	SS	RR1	EX	5 16-6 15	5 01-6 30
	08 MANN LAKE EX	60	60	0	0	0	EX	EX	EX	EX	No Use	No Use

Key:

Grazing Systems

W-Winter
EA-Spring
SS-Spring Summer
SF-Spring Fall

DF-Deferred
DR-Deferred Rotation
IR-Irrigated
FFR-Forced Federal Range
N-Non Use

TEx-Temporary Exclusion
EX-Exclusion
Rest Rotation (RR)
RR1-1 year ss 1 year DF 1 year rest
RR2-1 year ss 1 year rest

RR3-2 years ss 1 year rest
RR4-1 or 2 years ss 2 years rest

APPENDIX B,TABLE B-3 PROPOSED RANGE IMPROVEMENTS[1]

	Proposed Action									Alternative 2			
Allot No.	Miles Fence	Spring Dev.	Miles Pipe	Wells	Rsvr.	Water Holes	Brctl/ Seed	Irrig.	Brctl/ Only	Miles Fence	Spring Dev.	Miles Pipe	Wells
6001	21	0	30	4	12	6	19,220	0	24,700	25	0	30	5
6002	57	0	23	4	0	8	26,400	0	2,240	62	0	23	6
6003	0	0	0	0	0	0	0	0	0	0	0	0	0
6004	0	0	0	0	0	0	0	0	0	0	0	0	0
6005	0	0	0	0	4	0	0	0	0	0	0	0	0
6006	0	3	0	0	6	1	0	0	0	0	3	0	0
6007	0	0	0	0	0	0	0	0	0	0	0	0	0
6008	0	2	0	0	5	0	1,080	0	0	0	2	0	0
6009	4	0	4	1	0	0	4,480	0	0	4	0	4	1
6010	10	0	0	0	0	0	0	0	0	10	0	0	0
6011	21	3	2	2	3	0	4,740	0	0	28	3	13	3
6012	51	2	0	0	5	0	0	0	4,990	51	2	0	0
6013	0	0	0	0	0	0	0	0	0	0	0	0	0
6015	5	10	0	0	1	0	1,500	0	0	12	10	11	0
6016	4	0	2	1	2	0	0	200	0	4	0	2	1
6017	0	0	1	0	0	0	0	0	1,140	0	1	1	0
6018	28	4	10	3	4	3	8,200	1,400	4,100	69	4	29	4
6019	5	11	2	0	3	0	0	0	0	16	11	7	0
6020	53	12	29	3	3	7	12,900	900	34,301	64	12	29	3
6021	0	0	0	0	0	0	0	0	0	0	0	0	0
6022	0	0	0	0	0	0	0	0	0	0	0	0	0
6024	0	0	0	0	0	0	0	0	0	0	0	0	0
6025	0	0	0	0	1	0	0	0	0	0	0	0	0
6026	3	0	0	0	6	1	0	0	1,260	3	0	0	0
Totals	262	47	103	18	55	26	78,520	2,500	72,731	348	48	149	23

[1]No range improvements are proposed under Alternative 1, No Action

Emphasize Livestock								Alternative 3 Emphasize Non-Livestock					
Rsvr.	Water Holes	Brctl/ Seed	Irrig.	Brctl/ Only	Miles Fence	Spring Dev.	Miles Pipe	Wells	Rsvr.	Water Holes	Brctl/ Seed	Irrig.	Brctl/ Only
12	6	31,520	0	39,680	21	0	20	3	12	6	0	0	0
0	8	31,520	0	6,720	74	0	0	4	0	8	3,257	0	0
0	0	0	0	0	0	0	0	0	G	0	0	0	0
0	0	0	0	0	0	0	0	cl	0	0	0	0	0
4	0	0	0	0	0	0	0	0	4	0	0	0	0
6		0	0	1 1.040	0	3	0	0	6	1	0	0	0
0	0	0	0	0	0	0	0	0	0	G	0	0	0
5	0	4,680	0	1 5.000	5	2	0	0	5	0	0	0	0
0	0	4,480	0	0	0	0	4	1	0	0	0	0	0
0	0	0	0	0	10	0	0	0	0	3	0	0	0
3	0	9,020	0	0	21	3	2	2	3	0	0	0	0
5	0	0	0	6,750	93	2	0	0	5	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	13,600	0	17.900	5	10	cl	0	1	0	0	0	0
2	0	1,700	500	1,200	4	0	2	1	5	0	0	200	0
0	0	0	0	2,600	0	1	1	0	0	0	0	0	0
4	3	29,900	2,100	4,100	12	4	0	3	4	3	0	1,400	0
3	0	2,500	2,800	2,760	12	6	2	0	3	0	0	0	0
3	7	17,400	2,000	36,601	60	10	29	3	3	7	1.700	900	6,450
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	3	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
6		1,280	0	1,260	3	0	0	0	6	1	0	0	0
55	26	147,300	6,400	145,611	323	41	60	17	53	26	4.957	2,500	6,450

Appendix C

Determination of Forage Production and Vegetation Allocation

Determination of Present Forage Production

Forage production for the EIS area was originally determined using the Weight Estimate Method (BLM Manual 4412.11B) in the late 1950's in the northern part of the area, and the Occular Reconnaissance Method (BLM Manual 4412.11A) in the early 1960's in the southern part of the area. Three allotments (6015, 6019, 6020) were left over obligated after the surveys and resultant livestock adjudication. The Wildhorse Unit in the southern part of the area was surveyed in 1979, and deductions were made for useability and suitability (rock outcrops, steepness of slope, distance from water, etc.). Estimated forage condition has been compared with recent levels of use by cattle, horses and wildlife to further refine the estimation of forage production.

Determination of Initial Allocations

The existing livestock forage production is proposed for allocation among livestock, wildlife, wild horses and nonconsumptive uses. Proposed allocations were designed to be consistent with the goals and objectives of the land use alternatives as presented in the Andrews Resource Area Summary of Proposed Land Use Alternatives brochure published in August 1982.

Wild horse forage allocations are based on population objectives set forth in the above brochure. The proposed allocation would satisfy the forage requirement of the planned maximum number of horses (which varies by alternative) occupying the area of use. The area of use most preferred by horses is also used by livestock. The proposed allocations show the amount of competitive forage which would be used by livestock or horses but could be used by each within these areas of use.

Oregon Department of Fish and Wildlife (ODFW) supplied big game numbers and season of use. Only competitive livestock AUMs were formally allocated to big game. Thus, only a portion of the big game's total diet is formally allocated. A competitive AUM is forage composed of palatable shrubs, grasses and forbs eaten by both livestock and wildlife. The portion of total big game forage which is competitive is based on the dietary overlap or percentage of competion by deer or antelope. Dietary overlap is 10 percent for antelope and 18 percent for deer.

Big game unit months were converted to AUMs using the following conversion ratios:

5.3 Deer Unit Months = 1 AUM
7 Antelope Unit Months = 1 AUM

Big game was allocated forage in proportion to the percent of public land in the allotment. A mathematical equation illustrates the method used to derive wildlife AUMs.

$$\text{Deer Numbers} \times \text{Months of Use} \times \%\ \text{BLM} \times \frac{1\ \text{AUM}}{5.3} \times \%\ \text{Dietary Overlap} = \text{AUM Allocation For Deer}$$

The same formula with the 7:1 AUM conversion factors was used for antelope.

Nonconsumptive allocations are made in order to quantify the amount of livestock forage which could be consumed in areas which are proposed for livestock exclusion.

Determination of Future Forage Production

The analysis of predicted changes in grazing capacity is based on the expected change in key species composition and vegetative production. These changes would occur as a result of changes in livestock distribution provided by water developments, timing and intensity of livestock grazing, and the conversion of shrub plant communities to perennial bunchgrass plant communities.

In Allotment 6026 for example, the implementation of rest rotation grazing on approximately 150,000 acres and the construction of 7 water developments would result in improved livestock distribution and periodic rest for the key forage species. Forage production would increase, accounting for an estimated increase of 373 AUMs. Brush control on 1,260 acres would result in an additional 69 AUMs of forage production. Fifteen years following implementation, the forage production of the allotment is thus expected to increase by 442 AUMs. Added to the current production of 3,685 AUMs, the future forage production of the allotment would be approximately 4,127 AUMs.

Determination of Long-Term Allocations

The determination of the long-term allocation uses the same methodology as the short-term allocation. The long-term allocation is for analysis purposes only. The actual allocation would occure only after forage becomes available and would depend upon the multiple use resource objectives of future resource management plans.

Appendix D

Scientific Names of Plants Mentioned in the EIS

alder	Alnus ssp
alfalfa	Medicago sativa
basinwildrye	Elymus cinereus
big sagebrush	Artemisia tridentata
bitterbrush	Furshiatridentata
bluebunch wheatgrass	Agropyron spicatum
bottlebrushsquirreltail	Sitanion hystrix
buckwheat	Eriogonum spp.
bulrush	Scirpus spp.
cheatgrass	Bromus tectorum
chokecherry	Prunus virginiana
creek dogwood	Cornus stolonifera
creeping wildrye	Elymus triticoides
crestedwheatgrass	Agropyron cristatum
dock	Rumex spp.
greasewood	Sarcobatus vermiculatus
Idaho fescue	Festuca idahoensis
junegrass	Koeleria cristata
Kentucky bluegrass	Poa pratensis
knotweed	Polygonum spp
low sagebrush	Artemisia arbuscula
mountain brornegrass	Bromus margiriatus
mountain mahogany	Cercocarpus ledifolius
needlegrass	Stipa spp.
Nevada bluegrass	Poa nevadensis
pondweed	Potamogeton spp.
quaking aspen	Populus tremuloides
rabbitbrush	Chrysothamnus spp.
rush	Juncus spp.
saltgrass	Distichlisspp.
Sandberg's bluegrass	Poa sandbergii
sedge	Carex spp.
shadscale	Atriplex confertifoiia
silver sagebrush	Artemisia cana
spiny hopsage	Grayia spinosa
smartweed	Polygonum spp.
Thurber's needlegrass	Stipa thurberiana
western juniper	Juniperus occidentalis
wild rose	Rosa spp.
willow	Salix spp.

Appendix **E**

Determination of Existing and Predicted Forage Condition and Trend

Determination of Existing Forage Conditions

The determination of existing forage condition was based on the percentage of desirable and intermediate forage species present. Ecological condition for the EIS area has not been determined. Species composition percentages were estimated by field personnel. Average forage condition by pasture may not reflect the condition of livestock concentration areas or areas which receive little or no use.

Good condition range has a species composition of 40 percent or more desirable or intermediate forage species with at least 20 percent made up of desirable In the Andrews EIS area, desirable species include crested wheatgrass, mountain bromegrass, bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue, basin wildrye, squirreltail, bitterbrush, aspen and willow. Intermediate species include Sandberg's bluegrass, low sagebrush and greasewood.

Fair condition range has a species composition of 15 to 39 percent desirable or intermediate species with at least 5 percent made up of desirable species or at least 60 percent intermediate species.

Poor condition range has a species composition which has less than 15 percent desirable and intermediate species or the range has critical to severe erosion.

Determination of Predicted Forage Condition

The determinations of predicted condition are based on the discussion of vegetation allocation and grazing systems in Chapter 3. Variables such as large year-to-year fluctuations in precipitation make a precise quantification of impacts to vegetation impossible. The impact analysis methodology, therefore, produces a result which is most useful as a relative comparison between alternatives rather than as an absolute prediction of the impacts of implementing any one alternative.

The following analysis of impacts to forage condition on Allotment 6026 illustrates for one allotment how the components of the proposed action and alternatives would result in changes in long-term forage conditions summarized in Table 3-1. Approximately two-thirds of the 37,852 acres of public land in Allotment 6026 is currently under a spring/summer grazing system. One-third is grazed in the winter only and 60 acres are currently excluded. Existing forage conditions are good (31,864 acres) and fair (5,988 acres). The existing level of livestock use is within the grazing capacity.

Range improvements called for under the proposed action include six reservoirs, one water hole, and 1,260 acres of brush control. Grazing systems under the proposed action include rest rotation (18,456 acres), winter (19,336 acres) and exclusion (60 acres).

Significant increases in desirable forage species are expected to result from the above proposal for three reasons:

1) utilization of forage would be in a more uniform pattern due to the increased availability of stockwater, thus reducing the size of heavy use areas;

2) storage of carbohydrate reserves by key herbaceous species would occur in at least three out of four years under the rest rotation system and every year under the winter system, thus improving vigor; and

3) removal of brush competition on 1,260 acres, thus allowing herbaceous species the opportunity to increase.

Appendix F
Properties and Qualities of the Soils in the Andrews EIS Area

Soil Unit	Narrative Soil Divisions[1]	Classification Subgroup--Family	Slope Gradient (percent)	Bedrock or Underlying Material	Perma-bility	Effective Root Depth (in)	Available Water Holding Capacity
1	B-2	Xerollic Camborthid--Coarse-silty, mixed, mesic	0-3	Alluvium	Mod.	60	High
2	B-1	Xerollic Torrifluvent--Coarse-loamy, mixed, noncalcareous, mesic	0-3	Alluvium	Rapid	20-40	Low
3	B-2	Xerollic Camborthid--Coarse-loamy, mixed, mesic	0-3	Alluvium	M. Rapid	15-30	Low
4	B-2	Andic Haploxeroll--Fine-loamy, mixed, mesic	7-20	Alluvium	Mod.	20-40	Low
5	B-1	Lithic Xerollic Camborthid--Loamy, mixed, frigid	0-12	Eolian	Rapid	10-20	Low
6	B-1	Xerollic Torriorthent--Coarse-loamy, mixed, noncalcareous, frigid	0-3	Alluvium	Rapid	60	Mod.
10	B-2	Cumulic Haplaquoll--Fine-silty, mixed, calcareous, mesic	0-3	Alluvium	Mod.	60	High
11	B-2	Histic Haplaquoll--Fine-silty, mixed, noncalcareous, mesic	0-3	Alluvium	M. Slow	30-40	Mod.
13	B-2	Fluventic Haplaquoll--Fine-silty, mixed, calcareous, mesic	0-3	Alluvium	Mod	20-40	Mod.
15	B-2	Cumulic Haplaquoll--Fine-silty, mixed, noncalcareous, mesic	0-3	Alluvium	Mod.	60	High
16	B-2	Xeric Torrifluvent--Coarse-loamy, mixed, calcareous, mesic	0-3	Alluvium	Mod.	15-24	Low
25	B-2	Xerollic Paleargid--Clayey, montmorillonitic, frigid, shallow	0-3	Lacustrine	Slow	15-24	Low
26	B-2	Xerollic Camborthid--Loamy, mixed, frigid, shallow	0-3	Lacustrine	Mod.	15-24	Low
30	B-2	Typic Pelloxerert--Montmorillonitic, frigid	0-3	Alluvium	V. Slow	20-40	Mod.
31	B-2	Xerertic Torriorthent--Fine, montmorillonitic, noncalcareous, frigid	0-3	Alluvium	V. Slow	20-40	Mod.
42	B-2	Typic Natraquoll--Fine, montmorillonitic, calcareous, mesic	0-3	Alluvium	V. Slow	20-30	Mod.
43	B-2	Fluventic Haplaquept--Coarse-silty, mixed, calcareous, mesic	0-3	Alluvium	M. Slow	60	Mod.
44	B-2	Xerollic Natrargid--Fine-silty, mixed, mesic	0-3	Lacustrine	M. Slow	60	Mod.
45	B-2	Aquic Durorthid--Coarse-silty, mixed, mesic	0-3	Alluvium	V. Slow	20-40	Mod.
50	B-1	Xerollic Durorthid--Coarse-loamy, mixed, mesic	0-12	Alluvium	Slow	10-20	Low
51	B-1	Xerollic Camborthid--Coarse-loamy, mixed, mesic	0-12	Alluvium	M. Rapid	60	Mod.
55	B-2	Xerollic Durargid--Fine-loamy, mixed, mesic	3-12	Alluvium	Slow	10-20	Low
56	B-2	Xerollic Durargid--Fine, montmorillonitic, mesic	3-7	Alluvium	Slow	10-20	Low
57	B-2	Xerollic Haplargid--Fine-loamy, mixed, mesic	0-7	Alluvium	Mod.	60	High
75	U-1	Lithic Xerollic Haplargid--loamy, mixed, frigid	30-60	Volcanic	Mod.	10-20	Low
S75	U-2	Lithic Xerollic Haplargid--Loamy-skeletal, mixed, frigid	3-35	Volcanic	Mod.	10-20	Low
76	U-1	Lithic Xerollic Paleargid--Clayey, montmorillonitic, frigid	3-20	Volcanic	M. Slow	10-20	Low
S76	U-2	Lithic Xerollic Paleargid--Clayey-skeletal, montmorillonitic, frigid	3-20	Volcanic	Slow	10-20	Low
77	U-2	Lithic Torriorthent--Loamy, mixed, frigid	3-60	Volcanic	Mod.	5-10	V. Low
78	U-1	Lithic Xeric Torriorthent--Sandy-skeletal, mixed, frigid	7-12	Volcanic	Rapid	10-20	V. Low
79	U-1	Xerollic Camborthid--Fine-loamy, mixed, mesic	3-12	Eolian	Mod.	60	High
82	U-1	Pachic Cryoboroll--Fine-loamy, mixed	3-60	Volcanic	Mod.	20-40	Mod.
83	U-1	Argic Lithic Cryoboroll--Loamy, mixed	12-60	Volcanic	M. Slow	10-20	Low

Appendix F
Properties and Qualities of the Soils in the Andrew EIS Area

Soil Unit	Narrative Soil Divisions[1]	Classification Subgroup--Family	Slope Gradient (percent)	Bedrock or Underlying Material	Perma-bility	Effective Root Depth (in)	Available Water Holding Capacity
84	U-2	Lithic Cryoboroll--Loamy, mixed	3-60	Volcanic	Mod	5-10	V. Low
95	B-1	(Sand dunes)	0-20	Sand	V. Rapid	60	V. Low
96	U-2	(Rockland)	20-60	Volcanic	Vari.	Vari.	Vari.
97	B-2	(Playas)	0-3	Sed	Vari.	Vari.	Vari.

[1] B-1 Basin Land and Terrace--Sandy (occurs on 10 percent of the EIS area)
B-2 Basin Land and Terrace--Loamy to clayey, deep (occurs on 20 percent of the EIS area)
U-1 Upland--Loamy to clayey, shallow, stony (occurs on 40 percent of the EIS area)
U-2 Upland--Loamy to clayey, very shallow and/or very stony (occurs on 30 percent of the EIS area)

Note M = moderately
V = very

Source Lindsay et al. 1969
Lovell et al. 1969.

Appendix G

Wildlife Habitat Inventory Methodology

Riparian Inventory

Methods

During the summer of 1979 BLM personnel collected field data from riparian areas along public streams in the Burns District. Some of the data included: miles of stream, acres of riparian habitat, plant utilization, species composition (particularly trees and shrubs), type of plant community, understory vegetation, percent cover, slope, height categories of trees and wildlife observations. A narrative for each stream segment describes livestock and wildlife impacts, stream channel damage, recreational use, plant reproduction, apparent habitat trend and management recommendations. Photographs were taken at most stream segments.

Rating System

Condition of habitat for wildlife was rated as excellent, good, fair or poor. As with any rating system, the selection of condition classes is subjective and reflects the biologists professional opinion. Habitat potential was an important factor in rating condition. Sparsely vegetated areas which once supported dense growths of trees, shrubs and grasses would be rated poor or fair. Positive and negative factors affecting wildlife were listed to help make condition class selection.

Wetland Inventory

Wetlands were rated by using Malheur National Wildlife Refuge's "Wildlife Output Criteria" (1977) as a guide. Five key factors are used in this rating system: 1) breeding territory available prior to the onset of nesting, 2) nesting habitat available including the density of nesting cover, 3) brood water available for the rearing of young, 4) available vegetation or aquatic organisms for food, 5) the availability of loafing sites used by aquatic birds. This includes islands and mud bars.

Additional factors included water depths, adequacy of the water supply, water quality, and records of aquatic bird use, including brood production, from 1972 through 1981.

Nesting cover density was evaluated for herbaceous cover by using the method described by Robel et al. (1970). Nesting cover on woody/herbaceous sites was an ocular estimate based on cover density, plant species composition, and plant height.

Aquatic bird species vary in their habitat requirements. No one aquatic bird species was used for evaluating habitat quality.

APPENDIX G, TABLE G-1 Riparian Habitat - Predicted Trend & Condition

					PROPOSED ACTION			ALTERNATIVE 1 NO ACTION			ALTERNATIVE 2 EMPHASIZE LIVESTOCK			ALTERNATIVE 3 EMPHASIZE NON-LIVESTOCK		
STREAM NAMES	ALLOT	MILES	ACRES	EXIST-ING CONDI-TION	GRAZ-ING SYSTEM	TREND	CONDI-TION	GRAZ-ING SYSTEM	TREND	CONDI-TION	GRAZ-ING SYSTEM	TREND	CONDI-TION	GRAZ-ING SYSTEM	TREND	CONDI-TION
*LITTLE BLITZEN R	6002	0.60	41.00	F	DF	U	G	RR2	S	F	RR2	S	F	EX	U	E
*LITTLE BLITZEN R	6002	1.55	22.00	G	DF	U	E	RR2	S	G	RR2	S	G	EX	U	E
*LITTLE BLITZEN R	6002	1.84	76.20	F	DF	U	G	RR2	S	F	RR2	S	F	EX	U	E
*LITTLE BLITZEN R	6002	.88	103.85	E	DF	S	E	RR2	S	E	RR2	S	E	EX	U	E
*LITTLE BLITZEN R	6004	0.25	10.00	F	EX	U	E	EX	U	E	EX	U	E	EX	U	E
*LITTLE BLITZEN R	6004	0.95	60.45	P	EX	U	E	EX	U	E	EX	U	E	EX	U	E
*LITTLE BLITZEN R	6004	0.95	64.00	G	EX	U	E	EX	U	E	EX	U	E	EX	U	E
LITTLE BRIDGE CR	6008	3.56	12.24	P	RR2	S	P	RR2	S	P	RR2	S	P	RR2	S	P
LITTLE INDIAN CREEK	6002	3.88	89.77	G	SS	S	G	SS	S	G	SS	S	G	EX	U	E
LITTLE CROW CR	6015	0.32	0.32	?	PR1	?	?	RR1	?	?	RR1	?	?	RR1	?	?
LITTLE MC COY CR	6026	4.00	4.80	?	RR1	?	?	SS	?	?	RR1	?	?	EX	?	?
*LITTLE TROUT CR	6015	1.00	6.60	P	RR3	S	P	SS	S	F	RR3	S	P	RR3	S	P
*LITTLE TROUT CR	6015	1.46	8.42	P	RR4	U	G	DF	D	P	DF	D	P	EX	U	E
*LITTLE TROUT CR	6015	1.69	24.69	F	RR4	U	G	DF	D	P	DF	D	P	EX	U	E
*LITTLE TROUT CR	6015	2.60	22.62	P	RR3	U	F	SS	D	P	RR3	U	F	EX	U	E
LITTLE WILDHORSE CR	6013	0.50	3.90	F	RR2	U	G	RR2	S	F	RR2	S	F	EX	U	G
LITTLE WILDHORSE CR	6013	0.70	4.10	G	IN	S	G	IN	S	G	IN	S	G	IN	S	G
LITTLE WILDHORSE CR	6013	2.10	21.80	F	RR2	U	G	RR2	S	F	RR2	S	F	EX	U	G
LONG CAN CR	6017	0.30	0.30	?	RR2	U	?	SS	?	?	RR2	U	?	RR2	U	?
MANN CR	6026	2.50	4.20	?	RR1	?	?	SS	?	?	RR1	?	?	EX	?	?
MC COY CR	6010	0.25	0.30	?	SS	?	?	SS	?	?	SS	?	?	SS	U	G
MC COY CR	6010	0.80	1.60	?	SS	?	?	SS	?	?	SS	?	?	EX	U	G
MC COY CR	6010	1.84	11.15	F	SS	S	F	SS	S	F	SS	S	F	EX	U	G
MC COY CR	6010	1.96	23.60	P	SS	D	P	SS	D	F	SS	D	P	SS	D	P
*MC COY CR	6010	1.96	26.26	G	TEX	U	E	DF	S	G	DF	S	G	EX	U	E
*MC COY CR	6010	2.48	20.14	F	TEX	U	G	DF	S	F	DF	S	F	EX	U	G
*MC COY CR	6010	4.84	61.00	F	TEX	U	G	DF	D	P	DF	D	P	EX	U	G
MC COY CR TRIB	6010	0.40	1.64	F	SS	S	F	SS	S	F	SS	S	F	SS	S	P
MIRANDA CP	6019	0.40	0.50	?	SS	?	?	SS	?	?	SS	?	?	SS	?	?
MOSQUITO CR	6026	3.00	3.00	?	RR1	?	?	SS	?	?	RR1	?	?	EX	?	?
MT CR	6015	3.60	4.20	?	RR3	?	?	SS	?	?	RR3	?	?	RR3	?	?
MUD CR	6002	0.40	1.12	G	SS	S	G	SS	S	G	SS	S	G	SS	S	G
*MUD CR	6006	0.40	2.20	F	EX	U	E	RR2	D	P	RR2	D	P	EX	U	E
*MUD CR	6006	1.50	8.20	P	EX	U	G	RR2	D	P	RR2	D	P	EX	U	G
*MUD CR	6006	2.70	23.50	F	EX	U	E	RR2	D	P	RR2	D	P	EX	U	E
*MUD SF	6001	0.40	2.00	?	EX	U	G	EX	U	G	EX	U	G	EX	U	G
NO NAME CR	6015	0.50	0.50	?	RR3	?	?	SS	?	?	RR3	?	?	RR3	?	?
NO NAME CR	6015	0.75	0.90	?	RR2	?	?	SS	?	?	RR3	?	?	RR3	?	?
OREANNA CR	6015	0.50	0.60	?	RR3	?	?	SS	?	?	RR3	?	?	RR3	?	?
OREGON END CR	6020	2.00	2.40	?	RR3	?	?	SS	?	?	RR3	?	?	EX	U	G
PASS CR	6019	4.00	4.80	?	RR1	?	?	RR1	?	?	RR1	?	?	RR1	?	?
PIKE CR	6012	2.00	2.40	?	RR1	?	?	RR1	?	?	RR1	?	?	EX	?	?
POLE CR	6015	0.30	2.40	P	RR2	U	G	DF	D	P	DF	D	P	EX	U	E
POLE PATCH CR	6015	0.17	1.20	P	RR3	S	P	SS	D	P	RR3	S	P	EX	U	E
PUEBLO CR	6030	1.75	2.10	?	RR3	?	?	SS	?	?	RR3	?	?	EX	U	G
REAUX CR	6020	1.34	10.76	P	RR3	C	P	SS	D	P	RR3	D	P	EX	U	G
RED MT CR	6015	0.50	1.00	?	RR3	?	?	SS	?	?	RR3	?	?	RR3	?	?
RED MT CR	6015	2.00	2.00	?	RR3	?	?	SS	?	?	RR3	?	?	RR3	?	?
RED PT CR	6020	0.50	0.60	?	RR3	?	?	SS	?	?	RR3	?	?	EX	U	G
REYNOLDS CR	6020	1.25	1.50	?	RR3	?	?	SS	?	?	RR3	?	?	EX	U	G
*RIDDLE CR	6012	7.15	64.93	P	RR4	U	F	SS	D	P	RR4	U	F	EX	U	G
RINCON CR	6020	0.50	0.60	?	RR3	?	?	SS	?	?	RR3	?	?	EX	U	G
ROCK CABIN CR	6015	1.00	1.20	P	RR4	U	G	DF	D	P	DF	D	P	EX	U	G
ROCK CR	6001	0.25	0.52	P	EX	U	G	EX	U	G	EX	U	G	EX	U	G
ROCK CR	6001	3.75	4.30	P	SS	D	P	SS	D	P	SS	D	P	EX	U	G
ROUGH CR	6020	1.75	2.10	?	RR3	?	?	SS	?	?	RR3	?	?	EX	U	G
SCHOUVER CP	6019	2.50	3.00	?	PR1	?	?	RR1	?	?	RR1	?	?	EX	?	?
SESENA CR	6020	4.00	4.80	?	RR3	?	?	SS	?	?	RR3	?	?	EX	U	G
*SOUTH FORK BLITZEN R	6002	3.09	32.30	F	RR2	U	G	SS	D	P	RR2	U	G	EX	U	G
SOUTH FORK BLITZEN R	6002	1.78	6.09	C	IN	S	G	IN	S	G	IN	S	G	IN	S	G
SKULL CR	6002	0.21	1.71	P	W	U	F	SS	S	P	W	U	F	EX	U	G
SKULL CR	6002	1.50	9.20	F	SS	D	P	SS	D	P	SS	D	P	EX	U	G
SQUAW CR	6011	0.50	0.60	?	RR1	?	?	SS	?	?	RR1	?	?	RR1	?	?
STARR CR	6020	3.25	3.90	?	RR3	?	?	SS	?	?	RR3	?	?	EX	U	G
STILL CR	6020	1.00	1.20	?	RR3	?	?	SS	?	?	RR3	?	?	EX	U	G
STONEHOUSE CR	6011	1.09	1.39	?	DR	?	?	DR	?	?	DR	?	?	DR	?	?
STONEHOUSE CR	6012	2.25	6.30	?	RR1	?	?	SS	?	?	RR1	?	?	EX	?	?
STONEHOUSE CR	6020	4.00	4.80	?	RR3	?	?	SS	?	?	RR3	?	?	EX	U	G
STONEY CR	6015	1.50	1.50	?	RR3	?	?	SS	?	?	RR3	?	?	RR3	?	?
STONEY CR & SP	6015	0.50	0.60	?	FFR	?	?	FFR	?	?	FFR	?	?	FFR	?	?
*THREE M CR	6002	2.20	19.30	G	EX	U	E	FFR	S	G	FFR	S	G	EX	U	E
TOMBSTONE CR	6002	0.40	0.58	F	RR2	U	G	SS	S	F	RR2	U	G	SS	S	F
T38R33S31	6019	2.75	3.30	?	PR1	?	?	RR1	?	?	RR1	?	?	EX	?	?
TROUT CREEK TRIB	6015	1.00	4.84	P	RR4	U	G	DF	D	P	RR2	U	G	EX	U	E
VAN HORN CR	6020	0.52	3.72	F	RR3	S	F	SS	D	P	RR3	S	F	EX	U	G
VAN HORN CR	6020	1.80	8.07	G	RR3	S	G	SS	S	G	RR3	S	G	EX	S	G
WHISKEY CR	6015	1.00	7.00	P	SS	D	P	SS	D	P	SS	D	P	SS	D	P
*WILDHORSE CR	6013	0.15	0.64	P	RR2	U	F	RR2	D	P	RR2	D	P	EX	U	G
*WILDHORSE CR	6013	0.64	8.60	F	RR2	U	G	RR2	S	F	RR2	S	F	EX	U	G
*WILDHORSE CR	6013	0.65	2.76	P	RR2	U	F	RR2	S	P	RR2	S	P	EX	U	G
*WILDHORSE CR	6013	1.60	21.80	G	RR2	S	G	RR2	S	G	RR2	S	G	EX	S	G
*WILDHORSE CR	6015	2.80	14.80	P	RR2	U	F	RR2	D	P	RR2	D	P	EX	U	G
WILDHORSE CR	6019	0.60	0.70	P	SS	D	F	SS	D	P	SS	D	P	SS	D	F
WILLIAMS CR	6019	0.70	0.80	?	RR1	?	?	RR1	?	?	RR1	?	?	PR1	?	?
WILLIAMS CR	6020	1.00	1.20	?	RR3	?	?	SS	?	?	RR3	?	?	EX	U	G
WILLOW CR	6012	0.50	0.70	?	RR1	?	?	RR1	?	?	RR1	?	?	EX	?	?
WILLOW CR	6012	4.25	0.50	?	IN	?	?	IN	?	?	IN	?	?	IN	?	?
WILLOW CR	6020	5.50	6.60	?	RR3	D	?	SS	D	?	RR3	D	?	EX	U	G
TOTALS		299.74	1,914.43													

Key

Grazing System
- SS - Spring/Summer
- EX - Exclusion
- DF - Deferred
- TR - Trail Use
- FFR - Fenced Federal Range
- TEX - Temporary Exclusion
- IN - Inaccessible to Livestock
- W - Winter
- Rest Rotation (RR)
- RR1 - 1 year SS/1 year DF 1 year rest
- RR2 - 1 year/SS 1 year rest
- RR3 - 2 years SS/1 year rest
- RR4 - 1 or 2 year SS/2 years rest

Trend
- U - Up
- D - Down
- S - Static
- ? - Unknown

Condition
- E - Excellent
- G - Good
- F - Fair
- P - Poor

* Riparian areas which would be managed in the proposed action to improve stream channel stability, water quality and fish habitat.

APPENDIX H

Estimates of Gross Sales, Personal Income, and Employment

These measures of the economic effects of changes in program-related activities were estimated by use of an interindustry computer model (IMPLAN) developed by the U.S. Forest Service, representing the economy of Harney County,

An interindustry (or input-output) model is a summary of all the trans-actions occurring in an area during a 1 -year period, showing for each industry or economic sector the amount of its purchases from every other industry (inputs) and the amount of its sales to every other industry (outputs). Purchases of goods to be sold by trade industries are treated as direct sales by the producing industry, and trade industry transactions are limited to their gross margin accounts or the part of their transactions over and above the cost of goods sold. This information represents the interindustry relationships in the area and permits the estimation of how a change in one industry would affect other industries and the economy as a whole.

When a specific change occurs in the economy, such as an increase in cattle sales due to increased forage availability, the cattle industry purchases more from its suppliers, ranch families spend more. and so on. Recipients of these purchases increase their purchases. The end result of this process is increased activity throughout the economy. The effects on the industry in which the initial change occurs (e.g.. the cattle industry) are termed the direct effects of the change. The direct effects plus the effects on other industries in the local economy make up the total local effects. Estimates of the effects per unit measure are shown in Table t-i-l for livestock production and range improvements, the two activities significantly affected by the potential program actions.

Table H-1 Economic Effects per Unit Measure

Item	Livestock Production	Range Improvements
Unit of Measure	AUM	$100.
Initial gross sales [1]	$23.76	$100.
Direct effects: [2]		
Personal income	$ 3.743	$45.050
Employment	.000157	.002323
Total local effects: [3]		
Gross sales	$ 49.69	$160.420
Personal income	$ 13.97	$79.610
Employment	.000563	.004312

[1] Total sales (or expenditures) per unit. Livestock sales per AUM derived from ranch budget survey for BLM permittees in Harney County (Gee 1982). [2] Effects within the livestock industry, or within the construction industry, respectively.
[3] Total effects in Harney County including direct, indirect and induced effects.

GLOSSARY

Acre-foot - The volume of water that will cover 1 acre to a depth of 1 foot.

Active Preference - That portion of the total grazing preference for which grazing use may be authorized.

Active Use - The total number of AUMs authorized for grazing by livestock. Also called paid use.

Actual Use - See active use.

Allotment - An area of land where one or more operators graze their livestock. Generally consists of public land but may include parcels of private or state lands. The number of livestock and season of use are stipulated for each allotment. An allotment may consist of one or several pastures.

Allotment Management Plan (AMP) - An intensive livestock grazing management plan dealing with a specific unit of rangeland, based on multiple use resource management objectives. The AMP considers livestock grazing in relation to the renewable resources -- watershed, vegetation and wildlife. An AMP establishes the season of use, the number of livestock to be permitted on the range and the range improvements needed.

Alluvial - Pertaining to material that is transported and deposited by running water.

Animal Unit Month (AUM) - The amount of forage required to sustain the equivalent of one cow with one calf, or their equivalent for one month.

Annual Vegetative Growth - The amount of forage or herbage produced during one growing season.

Archeologic Resources - All physical evidence of past human activity, other than historical documents, which can be used to reconstruct lifeways and cultural history of past peoples. These include sites, artifacts, environmental data and all other relevant information.

Area of Critical Environmental Concern (ACEC) - An area within the public lands where special management attention is required (when such areas are developed or used, or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards (FLPMA Sec. 103(a)).

Browse - That part of leaf and twig growth of shrubs, woody vines and trees available for animal consumption.

Carrying Capacity - The maximum number of animals an area can sustain without inducing damage to vegetation or related resourses, such as watershed.

Characteristic Landscape - The visual characteristics of existing landscape features (including man-made) within a physiographic province. The term does not necessarily mean naturalistic character but rather could refer to landscapes which exhibit both physiographic and land use similarities.

Concentration Area - An area where factors such as terrain, water, vegetation, fences or management practices result in livestock congregation. Generally, these areas are grazed more heavily than surrounding areas.

Contrast Rating - A method of determining the extent of visual impact for an existing or proposed activity that will modify any landscape feature.

Critical Growing Period - The portion of a plant's growing season, generally between flowering and seed dissemination, when carbohydrate reserves are being stored and seeds produced. Grazing after the start of this date is detrimental due to inadequate moisture for supporting further plant growth later in the season.

Crucial Habitat - A relatively small part of an animal's range or habitat which is essential for the animal's existence because it contains special qualities or features (e.g., water holes, winter food and cover, nesting trees, strutting ground, upland meadow).

Cultural Resources - A term that includes resources of paleontologic, archeologic or historic significance which are fragile, limited, and non-renewable portions of the human environment.

Direct Income - Earnings from production of workers in a specified industry. See Indirect Income.

Dissolved Oxygen Saturation - The amount of gaseous oxygen (O) dissolved in a liquid - usually water.

Distance Zones - The area that can be seen as foreground, middleground, background or seldom seen.

Erosion - Detachment and movement of soil or rock fragments by water, wind, ice or gravity.

Exclosure - An area fenced to exclude livestock and wild horses.

Fecal Coliform - A group of bacteria used as an indicator of sanitary quality in water.

Forage Condition - As it is used in this document, forage condition defines the composition of desirable, intermediate and undesirable plant species.

Forage Production - The amount of forage that is produced within a designated period of time on a given area (expressed in AUMs or pounds per acre). This is the proportion of total annual vegetation production which is consumable by livestock on a sustainable basis.

Forb - Any non grasslike herbaceous plant.

Grazing Preference - See Total Preference.

Groundwater - Subsurface water that is in the zone of saturation.

Gully - A channel, usually with steep sides, through which water commonly flows during and immediately after rains or snow melt.

Habitat Diversity - The relative degree or abundance of plant species, communities, habitats or habitat features (e.g. topography, canopy layers) per unit of area.

Headcutting - An erosional process characterized by the progression up-slope of an initial furrow or rill, leading to the formation of a gully.

Herb - A seed-producing plant that does not develop persistent woody tissue.

Herbage - Herbaceous plant growth, especially fleshy, edible plants.

Herbaceous Plants - Plants having little or no woody tissue.

Indirect Income - Earnings or personal income to workers outside a specified industry generated by production in that industry. For example, personal income to those outside the livestock industry generated by the business and personal expenditures of the livestock industry as well as successive rounds of expenditures which may result in the community. Indirect income as defined here includes induced income.

Infiltration - The gradual downward flow of water from the surface through soil to groundwater.

Intermittent Stream - A stream or portion of a stream that flows only in direct response to precipitation. It receives little or no water from springs and no long-continued supply from melting snow or other sources. It is dry for a large part of the year, ordinarily more than 3 months.

Key Species - A plant that is a relatively or potentially abundant species. It should be able to endure moderately close grazing and serve as an indicator of changes occurring in the vegetational complex. The key species is an important vegetative component that, if overused, will have a significant effect on watershed conditions, grazing capacity, or other resource values. More than one key species may be selected on an allotment. For example, a species may be important for watershed protection and a different species may be important for livestock forage or wildlife forage, etc.

Limiting Factor - A component of the environment which regulates animal populations (e.g., food, water, cover).

Litter - A surface layer of loose, organic debris, consisting of freshly fallen or slightly decomposed organic materials.

Livestock Forage Production - see Forage Production.

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.

National Natural Landmark - Areas designated by the Secretary of Interior which contain representative examples of the nation's natural history, including terrestrial communities, aquatic communities, landforms, geological features or habitats of native plant and animal species, possessing national significance in illustrating or interpreting the nation's natural heritage.

National Register of Historic Places - Established by the Historic Preservation Act of 1966, the Register is a listing maintained by the National Park Service of architectural, historical, archeologic and cultural sites of local, state or national significance.

Paleontology - A science dealing with the life of past geological periods as known from fossil remains.

Pasture - A fenced subdivision of a grazing allotment capable of being grazed by livestock independently from the rest of the allotment.

Perennial Stream - A stream or portion of a stream that flows year long. It receives water from precipitation, springs, melting snow and/or groundwater.

Permits/Leases - Under Section 3 of the Taylor Grazing Act, a permit is a document authorizing use of the public lands within grazing districts for the purpose of grazing livestock. Under Section 15 of the Taylor and Grazing Act, a lease is a document authorizing livestock grazing use of public lands outside grazing districts.

pH - The negative logarithm of the hydrogen ion concentration. A low pH indicates an acid, and a high pH indicates an alkaline substance. A pH of 7.0 is considered neutral.

Planning Area Analysis (PAA) - A planning document which analyzes the relationship of social and economic data to the physical and biological data presented in a Unit Resource Analysis (URA).

Plant Composition - The proportions of various plant species annual production in relation to the total annual production of all plants on a given area.

Plant Maturity - That point in the growing season when an individual plant species has set seed, stored food reserves and gone into the dormant stage. This time is different for various species.

Plant Vigor - See Vigor

Playa - A shallow lake in an arid or semi-arid region in which water evaporates during the drier months to leave a dry lake bed.

Preference - **See** Total Reference arid Active Preference.

Proprietor - **One** who owns and operates their own business; one engaged in economic activity on their own account and not as an employee. Farm or ranch proprietor need not own the land used.

Public hand - Formal name for lands administered by the Bureau of Land Management.

Range **Improvement** - A structure, action or practice that increases forage production, improves watershed at-d range condition or facilitates management of the range or the livestock grazing on it.

Range **Trend** - A measure of the direction of change in range condition.

Research Natural Areas - Areas established and maintained for research and education, The general public may be excluded or restricted where necessary to protect studies or preserve research natural areas. Lands may have: (1) Typical or unusual faunistic or fioristic types. associations. or other biotic phenomena. or (2) Characteristic or outstanding geologic, pedologic or aquatic; features or processes

Residual Ground Cover - That portion of the total vegetative ground coyer that remains after the livestock grazing season.

Rest - As used in this statement, refers to deferment of grazing on a range area (pasture) to allow plants to replenish their food reserves.

Riparian - Related **to** wet areas associated with streams and springs.

Runoff - That portion of the precipitation on a drainage area that is discharged from the area in stream channels, including both surface and subsurface flow.

Sediment Yield - The quantity of sediment transported through a stream cross-section in a given time.

State Historic Preservation Office (SHPO) - The official within each State. authorized by the State at the request of the Secretary of the Interior, to act as a liaison for purposes of implementing the National Historic Preservation Act of 1966.

Thermal Cover - Vegetation or topography that prevents radiational heat loss. reduces wind chill during cold weather, and intercepts solar radiation during warm weather.

Total Preference - The total number of animal unit months of livestock grazing on public lands. apportioned and attached to base property owned or controlled by a permittee or lessee. The active preference and suspended preference are combined to make up the total grazing preference.

Unallotted Lands - Public lands which currently have no authorized livestock grazing.

Unit Resource Analysis - A BLM planning document which contains a comprehensive inventory and analysis of the physical resources and an analysis of their potential for development. within a specified geographic area.

Upland - All rangelands other than riparian areas or wetlands.

Upland meadow - A flat area characterized by dense herbaceous vegetation due to a high water table.

Utilization - The proportion of the current year's forage production that is consumed or destroyed by grazing animals. This may refer either to a single species or to the whole vegetative complex. Utilization is expressed as a percent by weight. height or numbers within reach of the grazing animals. Four levels of utilization are used in this document: light (21-40 percent). moderate (41-60 percent). heavy (61-80 percent). and severe (81-100 percent).

Vegetation Allocation - In reference to forage. the distribution of the available livestock forage production to the various resource needs sush as wildlife, livestock, wild horses and nonconsumptive use.

Vegetation Manipulation - **As** used in this statement. refers to seeding and brush control range improvements.

Vegetation Type - A grouping of plant communities which have simiiar dominant plant species.

Vegetative Ground Cover - The percent of the land surface covered by ail living and undecomposed remnants of vegetation within 20 feet of the ground

Vigor - The relative well-being and health of a plant as reflected by its ability to manufacture sufficient food for growth. maintenance and reproduction.

Visual Contrast - The effect of a striking difference in the form. line, color or texture of the landscape features in the area being viewed.

Visual Resource - The land, water, vegetation, animals and other features that are visible on ail public lands.

Visitor-Day - Twelve visitor-hours, which may be aggregated continuously, intermittently or simultaneously by one or more persons. Visitor-days may occur either as recreation visitor-days or as non-recreation visitor-days.

Visual Resource Management (VRM) Classes - The degree of alteration that is acceptable within the characteristic landscape. It is based upon the physical and sociological characteristics of any given homogenous area.

Water Gap - Small areas which allow livestock access to streams.

Water Yield - The amount of water discharged in streams.

Wetland - Wet areas associated with lakes, reservoirs, marshes and playas.

Wilderness Study Area - A roadless area or island that has been inventoried and found to have wilderness characteristics as described in Section 603 of the Federal Land Policy and Management Act of 1976 and Section 2(c) of the Wilderness Act of 1964.

Work Year - One person working the full-time equivalent of one year.

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