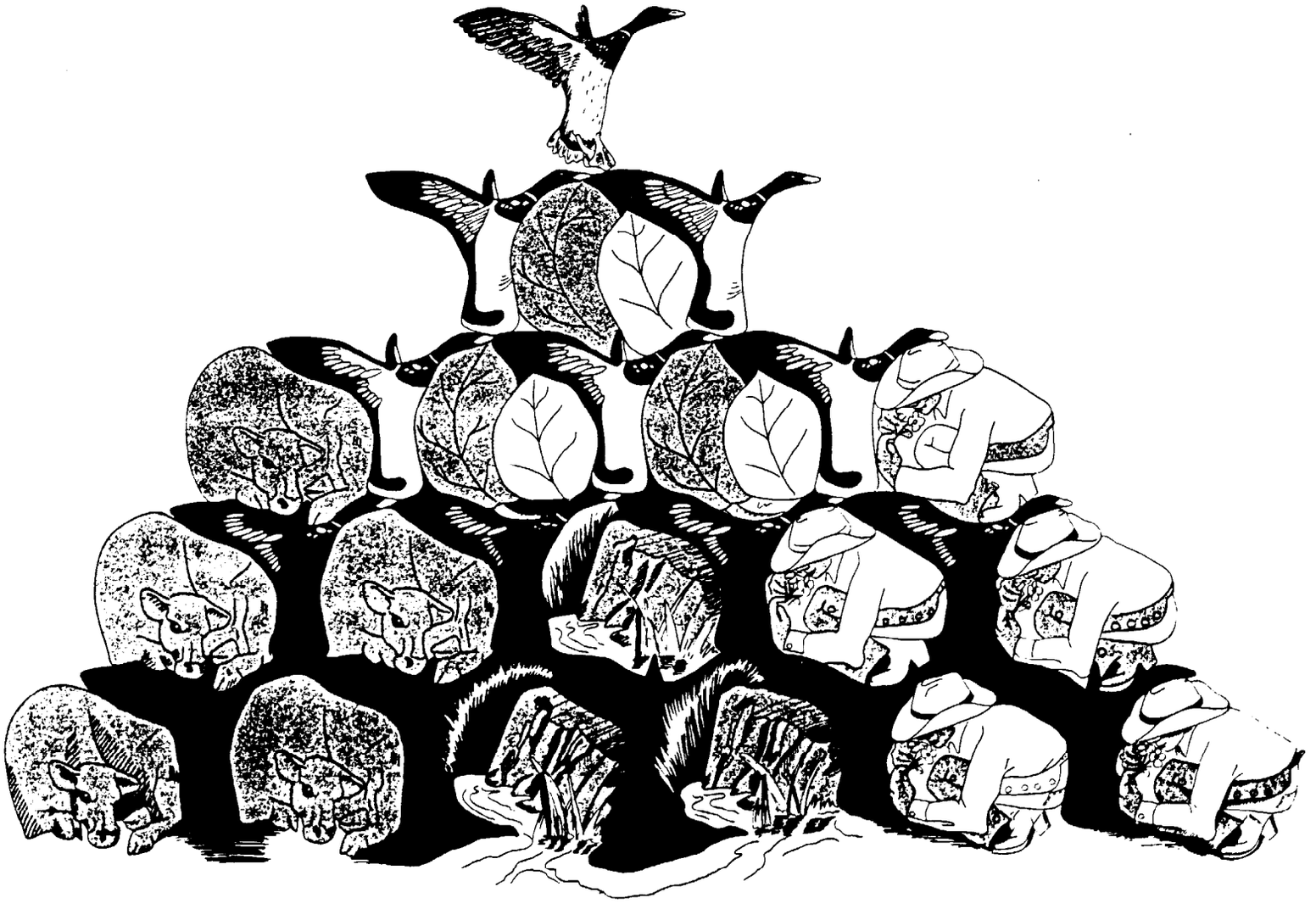
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

Draft

Prineville District Office
PO. Box 550
Prineville, Oregon 97754

Brothers Grazing Management Program

Environmental Impact Statement



IN REPLY REFER TO

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Prineville District Office
P.O. Box 550
Prineville, Oregon 97754

Enclosed for your review and comment is the Brothers Grazing Management Draft Environmental Impact Statement (EIS). The statement analyzes the-impacts which would result from the proposed livestock management program and four 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.

Comments concerning the adequacy of this statement will be considered in the preparation of the final environmental impact statement. The comment period will end June 30, 1982. Informal discussion sessions intended to assist you in reviewing and commenting on the draft EIS will be held at 7:00 p.m., May 251982, at St. Joseph's Parish Hall, 150 East First St., Prineville, Oregon and at 7:00 p.m., May 26, 1982, at the Bend Riverhouse Motor Inn, 3075 North Highway 97, Bend, Oregon.

Bureau of Land Management personnel will be available at both sessions 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:

Prineville District Manager
Bureau of Land Management
P.O. Box 550
Prineville, Oregon 97754

In using this analysis, readers should keep in mind that an EIS (draft or final) is not the decision document. Final decisions will be made after the close of the final EIS comment period. The two-step decision process (issuing a draft record of decision for comment, then the final) which has been used in the past will not be followed. We have concluded that the two-step decision process would unnecessarily prolong the decision. We believe that public comment on the draft and final Brothers EISs can provide adequate opportunity for the public to help us reach proper decisions.

Comments on both draft and final EISs will be used to reach a final decision. There will be no draft decision document issued for public comment. The final decision will be announced through release of a decision document to interested parties.

Gerald E. Magnuson,
District Manager

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

DRAFT

BROTHERS GRAZING MANAGEMENT PROGRAM

ENVIRONMENTAL IMPACT STATEMENT

Prepared By
PRINEVILLE DISTRICT
BUREAU OF LAND MANAGEMENT
U.S. DEPARTMENT OF THE INTERIOR
1982

State Director, Oregon State Office

BROTHERS 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: This EIS describes and analyzes the environmental impacts of implementing a grazing management program for 1 .1 million acres of public land in the Prineville District, Oregon. The Bureau of Land Management is responsible for managing rangeland for multiple use. Four alternatives, plus the proposed action are described and analyzed for environmental impacts. The proposed action, the result of Bureau multiple use planning using public input, is the preferred alternative. Other alternatives analyzed included: 1) Optimize livestock grazing; 2) Continue present management; 3) Optimize wildlife and watershed values; and 4) Eliminate grazing. Specific management components of the proposed action include forage allocation for livestock and wildlife, protection of all riparian areas, implementation of grazing systems and treatments, brush and juniper control, and seeding. Environmental impacts of the proposed action include wildlife habitat modification, increased allocation of forage, reduced soil erosion and stream sedimentation.

3. The draft statement is expected to be filed with EPA and made available to the public on May 1, 1982. The comment period will be 60 days following transmittal to EPA.

4. For further information contact:

Brian Cunninghame
EIS Teamleader
Bureau of Land Management
Prineville District
PO. Box 550
Prineville, Oregon 97754
Telephone: (503) 447-7003

SUMMARY

This draft Environmental Impact Statement (EIS) describes and analyzes the environmental, social, and economic impacts of implementing a livestock grazing management program in the Brothers area of central Oregon. The proposed action, developed through BLMs planning system using public input, is the preferred alternative. Four other alternatives also are described and analyzed.

The proposed action consists of forage allocation, implementation of grazing systems, and rangeland improvements on 177 grazing allotments covering 1,067,577 acres of public land. The objective of the proposed action is to maintain or improve ecological condition on all allotments. The proposal would occur in a 20 to 25 year period; up to 10 years for implementation and 10 to 15 additional years to achieve management objectives.

Existing forage production totals 89,104 AUMs. Under the proposed action, initial forage allocation would be 83,087 AUMs for livestock, 5,331 AUMs for wildlife, leaving 686 AUMs not allocated. The allocation to livestock constitutes an 11 percent increase from the 1981 active grazing preference of 74,769 AUMs.

Livestock grazing would be increased initially by 8,318 AUMs to reflect current forage production. Increases for individual allotments range from 6 AUMs to 1,095 AUMs. Implementation of grazing systems and rangeland improvements would result in future forage production of 177,357 AUMs. It is anticipated that this would be allocated to livestock (132,795 AUMs) and wildlife (7,427 AUMs). The remaining 37,135 AUMs of forage production would not be allocated.

Rest rotation grazing would be implemented on 400.942 acres, deferred rotation on 593,725 acres, rotation on 5,755 acres, short duration on 37.144 acres, winter grazing on 14,478 acres. Livestock grazing would be excluded on 2.003 acres. An additional 13,530 acres would remain in rest status.

Proposed rangeland improvements include 391 miles of fence, 13 springs, 7 wells, 467 miles of pipeline, 25 reservoirs, and 2 waterholes. Vegetation manipulation is proposed for 266,709 acres and would consist of brush control on 110,121 acres, jumper control on 97,733 acres, and preparation for seeding on 58,855 acres by spraying, cutting, burning, or plowing. In addition 80 wildlife guzzlers, 55 miles of stream rip-rap, 620 stream structures, 15 acres of stream debris removal, and 120 bird nesting sites would be constructed as interrelated rangeland improvement measures.

Four alternatives to the proposed action were analyzed and are summarized below.

Alternative 1. Optimize Livestock Grazing: In the long term, this alternative would provide 123,911 AUMs more than the existing situation from implementation of the following improvements: 124,550 acres of seeding, 289,500 acres brush control, 97,733 acres of juniper control, and 470 miles of pipeline. There would be no additional protective fencing in riparian areas. There would be 40 wildlife guzzlers, 14 miles of stream rip-rap, 155 stream structures, and 60 bird nesting sites constructed. The initial allocation of forage for livestock would be 9,004 AUMs greater than the existing allocation. The anticipated future available forage production of 214,015 AUMs would be allocated to livestock (201,777 AUMs) and wildlife (7,427) with 4,811 AUMs remaining nonallocated.

Changes in grazing systems would be similar to the proposed action.

Alternative 2. Continue Present Management: With this alternative, there would be no change from present management conditions. Forage production would be allocated at existing levels to livestock (74,769 AUMs) and wildlife (5,331 AUMs), with 9,004 AUMs remaining unallocated. Wildlife allocations are projected to increase to 7,427 AUMs and unallocated forage is projected to increase to 51 ,115 AUMs due to improving trend and productivity. No new range improvement projects or changes in grazing systems would be undertaken.

Alternative 3. Optimize Wildlife and Watershed Values: Initial livestock forage allocations would be 26,256 AUMs fewer under this alternative than the proposed action. This alternative is projected to provide 75,964 fewer AUMs for livestock than the proposed action by eliminating livestock from allotments within deer and antelope winter ranges as well as sage grouse nesting areas. In addition, no livestock grazing would be allowed on any riparian area or on any area with critical or severe soil erosion hazards. Rangeland improvements would include 349 miles of fence, 3 springs, 10 reservoirs, 5 waterholes. 58,204 acres of brush control, and 68,028 acres of juniper control. There would be 100 wildlife guzzlers, 69 miles of stream rip-rap, 775 stream structures, 15 acres of debris removal, and 150 bird nesting sites constructed under this alternative.

Rest rotation grazing would be implemented on 219,127 acres, deferred rotation on 242,883 acres. rotation on 98,987 acres, deferred grazing on 29,881 acres, early spring grazing on 56,740 acres, spring-summer grazing on 60,426 acres, spring-summer-fall grazing on 7,885 acres, spring-fall grazing on 9,246 acres, and winter grazing on 17,299 acres. There would be 293,919 acres where livestock grazing would be excluded and 18,586 acres in rest status

Alternative 4. Eliminate Livestock Grazing: This alternative would eliminate all livestock grazing from public lands (except during trailing). No range improvements would be constructed.

The major environmental consequences analyzed in this document are summarized below.

SOIL

The rate of soil erosion over the long term would decrease under all alternatives. Alternatives 3 and 4 would show the greatest reduction. Short-term erosion rates would increase under the proposed action and alternative 1 due to temporary reductions in residual ground cover.

WATER

Under all alternatives, there would not be a measurable effect on mean annual water yield. Water quality would improve under the proposed action, and alternatives 3 and 4. Water quality and channel stability would not change significantly under alternatives 1 and 2.

VEGETATION

The grazing systems and rangeland improvements under the proposed action and all alternatives would change ecological condition upward, and hence, increase available forage production. Through fencing and/or exclusion of livestock, riparian vegetation would show a significant upward change in ecological condition under alternatives 3 and 4; there would be some upward change under the proposed action. Upward change in ecological condition of riparian vegetation under alternatives 1 and 2 would be limited to areas presently fenced from livestock, except for changes resulting from improved grazing systems under alternative 1. Plant diversity would increase under the proposed action and alternatives 3 and 4, but would decrease under alternatives 1 and 2. Residual ground cover would increase under the proposed action, and alternatives 3 and 4. No change would occur with alternative 2. With alternative 1, residual ground cover would be slightly decreased.

The standard procedures and design elements of rangeland improvements would prevent impacts to plants of special concern during construction or implementation of these improvements.

WILDLIFE

Habitat diversity would have the largest increase in alternative 3 (17 percent). Alternative 4 and the proposed action would increase diversity 12 percent and 8 percent, respectively. Alternatives 1 and 2 would each decrease diversity 1 percent.

All alternatives would show some improvement and some decline in condition on crucial deer and antelope winter ranges. Alternative 3 has the largest improvement while alternatives 2 and 4 have the smallest improvement. The largest decline in crucial deer winter ranges would occur under alternatives 2 and 4. Alternatives 1 and 2 would result in the most acres declining in condition on antelope crucial winter range. Rangeland improvement projects under alternative 1 would have the largest negative impact on crucial winter ranges due to the reduction of juniper and sagebrush needed for forage and cover.

Wildlife habitat condition in all stream riparian areas would improve in alternatives 3 and 4. The proposed action and alternatives 2 and 1 would improve habitat by 55 percent, 33 percent, and 21 percent, respectively. All reservoir riparian areas would also improve under alternatives 3 and 4. The proposed action, and alternatives 1 and 2 would improve habitat by 7 percent.

Fisheries habitat would improve on all streams with alternatives 3 and 4. The proposed action would improve 50 miles of fish habitat, while 16 miles would improve under alternative 1. Alternative 2 would improve fish habitat on 25 miles and decrease fish habitat on an additional 20 miles of stream.

RECREATION

Implementation of the proposed action or any of the alternatives would not affect long-term visitor use levels more than ± 3 percent. Implementation of alternative 2 would have no effect on recreational activities. The proposed action and alternative 4 would result in visitor use increases in most activities. Alternative 3 would create increases in recreation use in all activities, while alternative 1 would result in decreases in all activities.

CULTURAL RESOURCES

Implementation of the proposed action and alternatives 1, 2 and 3 would have the potential for impacting unidentified cultural sites and the integrity of some known sites. Alternative 4 would have no impact.

VISUAL RESOURCES

Range improvements under the proposed action and alternatives 1 and 3 would create visual contrasts in the short term that would diminish over the long term. Under alternatives 2 and 4, visual quality would not change significantly from present condition.

SPECIAL MANAGEMENT AREAS

The Horse Ridge Research Natural Area would not be affected by the proposed action or any of the alternatives. There are no existing or proposed Areas of Critical Environmental Concern (ACEC) in the EIS area.

SOCIOECONOMICS

Increases in forage availability for BLM permittees would occur under the proposed action (11 percent) and alternative 1 (23 percent). A decrease in available forage for BLM permittees would result under alternatives 3 and 4. Under alternative 3 this would amount to a net loss of 2 percent. While forage losses under alternative 4 would be 100 percent of BLM-produced forage, there would be a decrease of 11 percent of overall forage needs for operators.

Ranch values would be increased by $3.4 million under the proposed action and by $6.5 million under alternative 1. Alternative 2 would have no impact on economic values.

Alternatives 3 and 4 would reduce ranch values overall by $.9 million and $2.9 million, respectively.

The increase in local personal income and employment would be the greatest under alternative 1 and the proposed action.

Decreases would occur under alternatives 3 and 4. Alternative 2 would have no impact on social conditions or economic values.

The major environmental consequences analyzed in this document are summarized below.

SOIL

The rate of soil erosion over the long term would decrease under all alternatives. Alternatives 3 and 4 would show the greatest reduction. Short-term erosion rates would increase under the proposed action and alternative 1 due to temporary reductions in residual ground cover.

WATER

Under all alternatives, there would not be a measurable effect on mean annual water yield. Water quality would improve under the proposed action, and alternatives 3 and 4. Water quality and channel stability would not change significantly under alternatives 1 and 2.

VEGETATION

The grazing systems and rangeland improvements under the proposed action and all alternatives would change ecological condition upward, and hence, increase available forage production. Through fencing and/or exclusion of livestock, riparian vegetation would show a significant upward change in ecological condition under alternatives 3 and 4; there would be some upward change under the proposed action. Upward change in ecological condition of riparian vegetation under alternatives 1 and 2 would be limited to areas presently fenced from livestock, except for changes resulting from improved grazing systems under alternative 1. Plant diversity would increase under the proposed action and alternatives 3 and 4, but would decrease under alternatives 1 and 2. Residual ground cover would increase under the proposed action, and alternatives 3 and 4. No change would occur with alternative 2. With alternative 1, residual ground cover would be slightly decreased.

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Fisheries habitat would improve on all streams with alternatives 3 and 4. The proposed action would improve 50 miles of fish habitat, while 16 miles would improve under alternative 1. Alternative 2 would improve fish habitat on 25 miles and decrease fish habitat on an additional 20 miles of stream.

RECREATION

Implementation of the proposed action or any of the alternatives would not affect long-term visitor use levels more than ± 3 percent. Implementation of alternative 2 would have no effect on recreational activities. The proposed action and alternative 4 would result in visitor use increases in most activities. Alternative 3 would create increases in recreation use in all activities, while alternative 1 would result in decreases in all activities.

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Implementation of the proposed action and alternatives 1, 2 and 3 would have the potential for impacting unidentified cultural sites and the integrity of some known sites. Alternative 4 would have no impact.

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Range improvements under the proposed action and alternatives 1 and 3 would create visual contrasts in the short term that would diminish over the long term. Under alternatives 2 and 4, visual quality would not change significantly from present condition.

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The Horse Ridge Research Natural Area would not be affected by the proposed action or any of the alternatives. There are no existing or proposed Areas of Critical Environmental Concern (ACEC) in the EIS area.

BROTHERS GRAZING MANAGEMENT EIS
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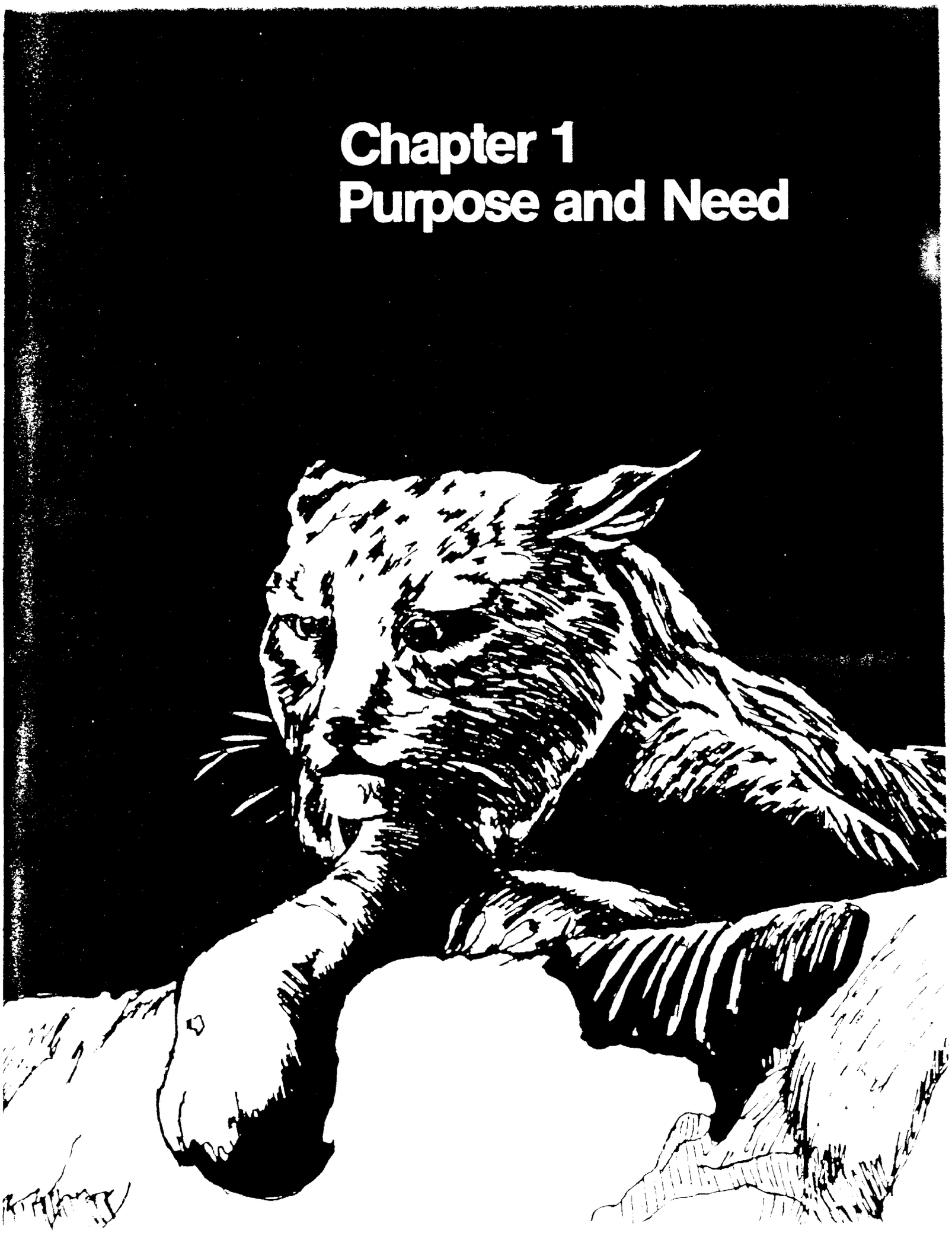
Chapter 1
Purpose and Need



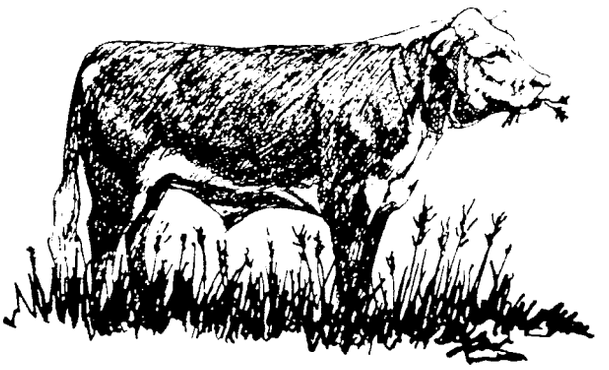
CHAPTER 1
PURPOSE AND NEED

PURPOSE OF AND NEED FOR ACTION

The Brothers Grazing Management Draft Environmental Impact Statement analyzes the environmental, social, and economic impacts of implementing a livestock grazing program on public land administered by the Bureau of Land Management (BLM) in the Prineville District in central Oregon. In this document the area is referred to as the Brothers Environmental Impact Statement or EIS area (Map 1).

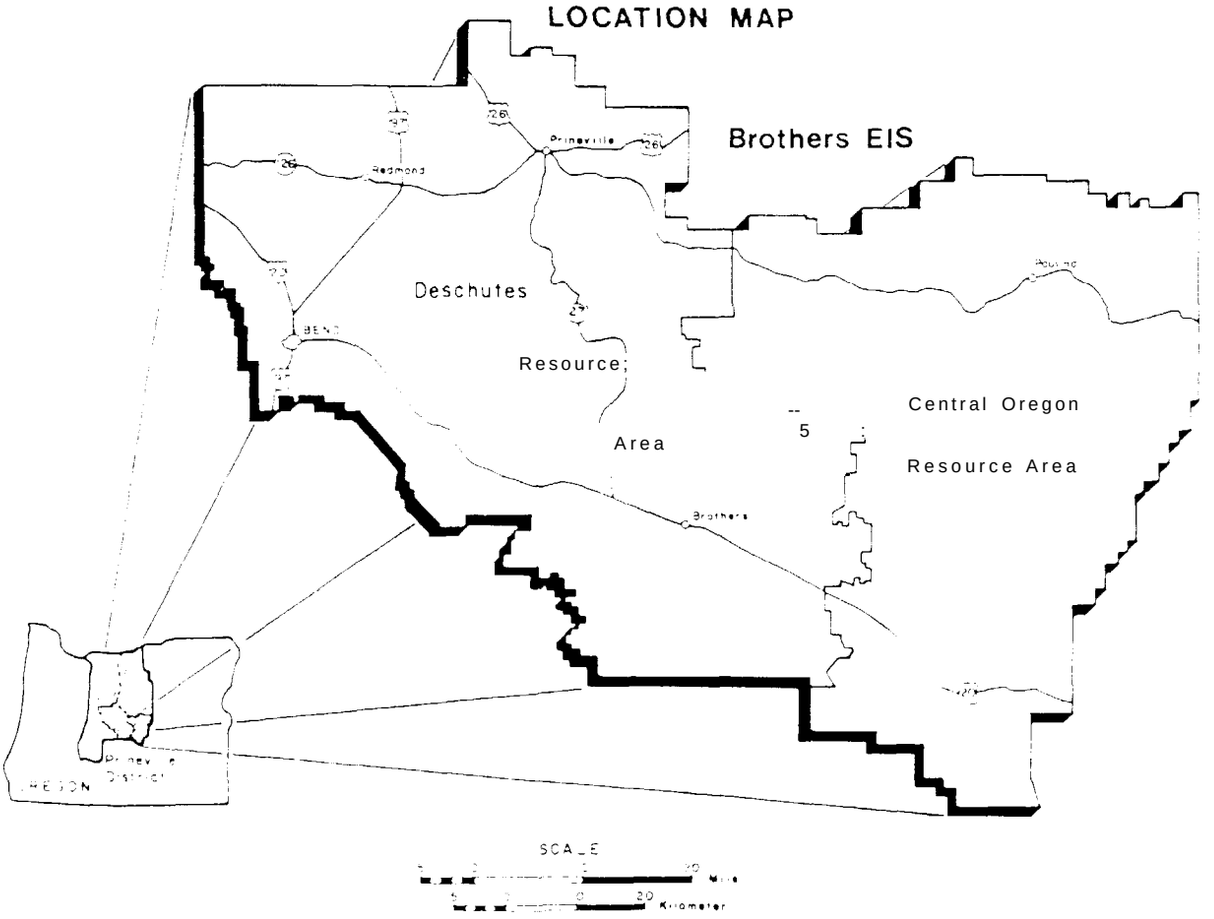
The Bureau of Land hlanagement is responsible for multiple use management of public lands The BLMs principal authority and direction is the Taylor Grazing Act of 1934 as amended, Federal Land Policy and Management Act of 1976, and the Public Rangelands Improvement Ac: of 1978. Lands, minerals, and timber resources on BLM-administered lands also are part of BLMs responsibility However they are not affected by the implementation of a livestock grazing program and are not considered in this document

The purpose of the proposed action is to implement planning decisions needed for management, protection, and enhancement of the rangeland resource The proposed action is a grazing managemen! program consisting of vegetation allocation, implementation of grazing systems and rangeland Improvement projects



MAP 1

LOCATION MAP



SETTING

The Brothers EIS area of central Oregon is high desert characterized by juniper and sagebrush. intermittent and perennial streams, and two major river systems. Population in the area is mainly concentrated in and near Bend. Redmond, and Prineville.

Total acreage in the EIS area is about 2.3 million acres, including 1.07 million acres of public land under BLM management (Table 1 and Map 2)

Table 1 Land Status

Land Status	Acres
BLM	1,067,577 [1]
Other Federal	5,940
State	**54,604**
County	15,000
Private	1,194,000
TOTAL	2,337,121

[1] BLM-administered:
Crook County - 511.978
Deschutes, Countv-465.210
Harney County - 1,080
Lake County - 89,309

The EIS area includes 177 allotments Involving 121 ranch operations (Map 3). Operations vary considerably in size and dependency on public land. In general, operations in the southern and eastern parts of the EIS area rely heavily on BLM grazing allotments. In contrast, there are many small or part-time operations in the Bend and Redmond areas 'where suburban growth has fragmented many ranches into smaller units and grazing on associated public land is no longer practical.

South of U.S. Highway 20. BLM-administered land is in nearly continuous blocks, while north of the Highway, it is Interspersed with state, private, and other Federal land (Map 2). The primary ownership pattern is of scattered tracts of BLM-administered land intermingled with other ownerships.

Public land in this area has been grazed by domestic livestock since the late 1800's. Prior to the Taylor Grazing Act of 1934, use of the public land was unregulated Heavy use by cattle, sheep, and in some cases. horses. depleted the rangeiand resource

Grazing use on virtually all allotments within the Brothers EIS area was adjusted in the late 1950's and early 1960's based on detatied range surveys Through this process called "adjudication. total number of AUMs allocated in the EIS area was reduced. As a result of this decrease. Improved grazing management, fencing. water facilities. and vegetation treatments. the overall ecological condition and trend of the rangeland Improved

MANAGEMENT GUIDANCE AND COORDINATION

MANAGEMENT GUIDANCE

The BLM planning system is a decision-making process which begins with Issue identification and resource Inventories. These resource inventories are documented in a Unit Resource Analysis (URA) With additional social and economic data. and public input. land use decisions are developed in a Management Framework Plan (MFP) for a planning area.

A proposed MFP for the Brothers Grazing EIS area has been developed. The MFP and URA are available for review in the Prineville District Office.

Meetings to obtain public comment on the development of the proposed MFP and the scope of this EIS were held September 21. 22. 23, 1981, in Portland. Prineville and Bend, respectively (Appendix A). Results of those meetings were presented to the Prineville District Advisory Council on September 24, 1981. Comments obtained from the public and the Council at that time are reflected in both the proposed action and the overall scope of this EIS.

The proposed action in this EIS is the preferred alternative.

COORDINATION

The Brothers Grazrng EIS area shares, in part common boundaries with the Deschutes and Ochoco National Forests (Map 2). Coordination between the BLM District Manager and respective Forest Supervisors is routrne. Specific project and program coordination takes place as needed at all management levels

In addition, the Soil Conservation Service initiates development of coordinated resource plans when requested by ranchers who utilize land managed by more than one government agency Participation by the rancher and agency representative in identifying management needs often results in conflict resolution and helps ensure that mutual goals are met.

The Intergovernmental Relations Division of the Executive Department of Oregon acts as a clearinghouse for various State agencies. State agency review of the BLM planning process is coordinated through that clearinghouse Planning is also coordinated with the county commissioners and county planning departments.

Under a memorandum of understanding. the BLM and Oregon Department of Environmental Quality (DEQ) agreed to provide the necessary coordination to meet the implementation requirements of the

Clean Water Act (PL 92-500. as amended). The Fish and Wildlife Coordination Act of 1958 requires wildlife conservation be given equal consideration and be coordinated with other features of water developments.

Under Oregon State Law (ORS 197). all counties and cities in Oregon are required to develop and adopt comprehenslve plans and land use controls consistent with statewide planning goals and guidelines developed by the Land Conservation and Development Commission (LCDC). Crook and Ceschutes Counties have adopted comprehenslve plans which have been acknowledged by LCDC. Comprehensive plans for Harney and Lake Counties have been submitted to LCDC The relationship Detween the proposed action and alternatives and LCCC goals is shown in Table 2. Counties will be asked to determine the consistency of grazing management alternatives with county comprehensive plans County responses will be published in the final EIS.

After completion of the EIS. allotment management plans (AMPs) will be prepared "in careful and considered consultation. cooperation and coordination" with the affected rancher. other interested parties. other landowners and the grazing advisory board in accordance with BLM policy and Federal grazing regulations (43 CFR 31001

THE DECISION

After release of the final EIS the District Manager will review public comments on **Doth** draft and final EISs and prepare a Record of Decision The decision may be to select one of the EIS alternatives or the proposed actlon. or to select features from several alternatives that fall within the range of actions analyzed in the EIS. Significant conflicts. alternatives. environmental preferences, social. economic (including benefit cost analyses), and technical considerations and the Bureau's statutory mission will be addressed in the Record of Decision The decision is expected by the summer of 1983.

Table 2 Relationship of the Proposed Action and Alternatives to LCDC Goals

LCDC Statewide Goal Number and Description [1]	Discussion
1. To insure citizen involvement in all phases of the planning process.	BLM's land use planning provides for public involvement at various stages. Public input was specifically requested in developing the proposed grazing management program and alternatives described in this EIS. Public input will continue to be utilized in the environmental process and final decision.
2. To establish a land use process and policy framework as a basis for all decisions and actions.	The proposed action and all alternatives have been developed in accord 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.	BLM's land use planning system considered natural and scenic resources in development of proposed action and alternatives. The proposed action and alternatives 1 and 3 would alter some scenic values as a result of fences and rangeland improvements. Alternatives 2 and 4 would not significantly affect scneic values.
6. To maintain and improve the quality of the air, water and land resources.	Water quality would be maintained or improved under the proposed action and all alternatives. Proposed burning for brush control in the proposed action and alternatives 1 and 3 would temporarily affect air quality on a local basis.
8. To satisfy the recreational needs of the citizens of the State and visitors.	Under the proposed action and all alternatives, recreation opportunities would be provided,
9. To diversify and improve the economy of the State.	Short and long term economic losses would occur under alternatrves 3 and 4 due to reductions in livestock use. Economic gains would occur in the long term due to increased forage production, resulting in improved local economy under the proposed action and alternative 1. Economic gains from increases in recreation use would occur under the proposed action and alternatives 3 and 4. Losses would result under alternative 1.
13 To conserve energy.	Conservation and efficient use of energy sources are objectives in all BLM activities. Because rangeland improvement construction is energy intensive, alternative 1 utilizes the most energy.

Goals 3 4 7 10 11 12 and 14 are not applicable to the proposed action or alternatives

Chapter 2
Proposed Action and Alternatives

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

BROTHERS GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

1982

SCALE

LEGEND

- Bureau of Land Management
- U. S. Forest Service
- State Land
- Private

Location Map

MAP 2
LAND STATUS

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

BROTHERS GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

1982

SCALE
0 5 10 MILES
0 5 10 15 20

LEGEND

- Bureau of Land Management
- U. S. Forest Service
- State Land
- Private

Location Map

MAP 2
LAND STATUS

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

BROTHERS GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

1982

ALLOTMENT LEGEND

Allotment Boundary

Allotment Numbers and Names

Deschutes Resource Area

0072 Miltenberger
5001 Witaker
5002 Broaddus & Carder
5003 Sanowski
5004 Lamb
5006 Emmrich
5007 Harsch
5010 Harrington
5018 Wierleske
5022 Airport
5024 Couch
5029 Claypool
5030 Keystone
5031 Mayfield-Harris
5032 Barrett
5050 Gray Butte
5051 Sherwood Canyon
5052 Smith Rocks
5061 McWeizz
5064 Williams
5065 Lower Bridge
5066 Pine Ridge
5067 Fisher
5068 Stevens-Freemont
5069 Squaw Creek
5070 LaFollette Butte
5071 Odin Falls
5072 Struss
5073 Cline Butte
5074 Fryrear Butte
5075 Desert Springs
5078 Home Ranch
5079 Whiskey Still
5080 Maston
5081 Paulus
5086 Lone Pine Canyon
5088 Burns-Montgomery
5089 Knoche
5090 Zemlicka
5092 Red Cloud
5093 Cronin
5094 Brown
5096 Foster
5097 Russell
5107 Cain Fields
5108 Zell Pond
5109 Hohnstein-Tatti
5110 Bruckert
5111 Cook
5112 Driveway
5113 Hacker-Hassing
5114 Weigand
5115 Allen
5116 Redmond Airport
5117 Pipeline
5118 Crenshaw
5119 Black Rock
5120 Hutton
5121 Oertle
5122 Howard
5124 Smead
5125 Mayfield Pond
5127 Powell Butte
5130 Pilot Butte
5131 McClellan
5133 Long Hollow
5134 Stearns
5135 Dry Creek
5136 Davis
5137 Prineville Dam
5138 Plateau
5139 Dunham
5140 Salt Creek-Alkali
5141 Sanford Creek
5142 Carey
5145 Eagle Rock-Bailey
5149 Beoletto
5176 McCabe
5177 Reynolds
5178 Grizzly Mountain
5179 Lytle Creek
5180 Golden Horseshoe
5182 Floyd Jones
5183 Rail Hollow
5198 Laier-Gove
5201 Alfalfa Market Road
5204 Sinclair
5206 Arnold Canal
5207 Michaels
5208 Barlow Cave
5209 Lava Beds
5210 Horse Ridge
5211 Pine Mountain
5212 Millican
5213 Rambo
5214 Williamson Creek
5215 Coats
5216 Grieve
5229 Klootchman
5231 West Butte
5232 Nye
5233 Scott
5234 Haughton
5235 Moffitt
5236 Bear Creek
5237 Brothers
5238 ZX
5239 Grassy Butte
5240 Fehrenbacher
5241 Rickman-McCormack
5242 Spring Creek
5243 Bright
5244 Imperial
5245 Ram Lake
5246 Hatfield
5247 Lizard Creek
5248 Pothook
5249 McCormack Home Ranch
5250 Coffeh Ranch
5251 96 Ranch
5252 Meisner
5254 Barbwire

Central Oregon Resource Area

1 Alaska Pacific
3 Hampton
4 Miners Flat
6 Post
7 River
9 Cold Springs
12 Windmill
13 Sheep Mtn Community
14 Sheep Mtn Individual
16 Indian Creek
17 Bonnieview
18 Juniper Springs
19 Ibex Butte
20 Lower 12 Mile Table
21 Middle Fork 12 Mile Creek
22 Laughlin
23 Angell
24 Upper Buck Creek
25 Buck Creek Flat
26 Humphrey
27 Upper Pocket Community
28 Ferian
29 Jimmy McCuen
33 Congleton
34 Lower Pocket Community
35 Bulger Creek
36 Delore
37 Foster
38 Cave
39 Paulina
41 Layton
42 Owens Water Community
43 Barney Buck Creek
44 G I
45 East Maury
47 Lister
48 Durgin
49 McCullough
50 Rabbit Valley
51 Paulina Creek
52 Miller
53 North Fork
54 Beaver Creek
56 Dagis Lake
58 Coyote Springs
59 Dry Lake
60 Flat Top Butte
62 Bennett Field
64 Camp Creek Community
66 Butler
70 Clover Creek
71 Coffee Butte
75 Weigand
76 West Pine Creek

SCALE
0 5 10 MILE
0 5 10 15 20 KM

Location Map

LIVESTOCK EXCLUSION LEGEND

LIVESTOCK EXCLUSION AREA

Livestock Exclusion Area
Bureau of Land Management
U. S. Forest Service
State Lands
Private Lands

MAP 3
ALLOTMENT BOUNDARIES and LIVESTOCK EXCLUSION AREAS

CHAPTER 2

PROPOSED ACTION AND ALTERNATIVES

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The proposed action and four alternatives would affect 177 grazing allotments on 1.07 million acres of public land.

There are 11,700 unallotted acres where no grazing occurs. No forage allocation, grazing systems (other than rest), or rangeland improvements are proposed for those unallotted acres. Further environmental analysis and documentation would be required prior to authorizing grazing on these lands.

In addition to the proposed action, which is designed to maintain or improve ecological condition on all allotments, alternatives analyzed are:

Alternative 1. Optimize livestock grazing (optimize livestock);
Alternative 2. Continue present management (no action);
Alternative 3. Optimize wildlife habitat and watershed values (optimize wildlife and watershed); and
Alternative 4. Eliminate livestock grazing (eliminate grazing).

For convenience, further reference to these alternatives will be by alternative number and abbreviation. Alternatives were developed as a result of public involvement and scoping (Appendix A).

These alternatives differ in vegetation allocation, type of grazing system, and the kind or amount of rangeland improvements proposed. (Tables 3, 4. and 5 summarize the proposed action and alternatives.)

Projections of future long-term ecological condition, and hence, available forage production, were made based on the expected response of the vegetation to grazing management and rangeland improvements.

Habitat for threatened or endangered animal species and plant species of special concern would receive priority consideration in all cases where resource conflicts would occur.

The alternatives are described in both the short and long term. The implementation of grazing systems or rangeland Improvements is assumed to take place in the short term (during the next ten years). All responses to the rangeland program are assumed to take place in the long term, ten to fifteen years after implementation of an action.

PROPOSED ACTION

A rangeland management program is proposed which would maintain or improve ecological condition on all grazing allotments in the area. Wildlife habitat would be managed to provide an ecological condition of mid-seral to the lower end of late-seral (see glossary). This would be accomplished by the amount of forage allocated for livestock grazing, the grazing management system utilized, and the rangeland treatments or improvements that would be implemented (Tables 3, 4, and 5).

Riparian areas would be protected and managed to provide full vegetative potential, where multiple use benefits warrant fence construction and maintenance. On those areas where fencing is not feasible, livestock use would be managed to achieve 60 percent of vegetative potential (see glossary).

Initial forage allocation for livestock grazing would be increased by 11 percent from current levels to 83,087 AUMs. This increase reflects allocation of existing forage. Long-term livestock forage projections would be 132,795 AUMs. (Appendix B lists forage production and allocation by allotment.)

Short-term allocations of available forage for deer, elk, and antelope would be 5,331 AUMs, increasing to 7,427 AUMs over the long term. Long-term forage allocations would meet the management objective numbers of the Oregon Department of Fish and Wildlife (ODFW) for deer, elk, and antelope.

Grazing systems which encourage upward change in ecological condition would be applied to more than 99 percent of the EIS area, with the remainder managed under a system which would maintain existing conditions. Of the total EIS area 2,003 acres would be excluded from livestock grazing, 132 acres more than the existing situation. (Appendix C lists proposed grazing systems by allotment.)

Proposed rangeland improvements are expected to Increase available forage for livestock. (Appendix D lists proposed improvements by allotment.) An increase of 78 percent from current allocations is expected by the year 2000, providing rangeland improvements and recommended grazing management systems are implemented, and ecological conditions improve as predicted.

ALTERNATIVE 1. OPTIMIZE LIVESTOCK GRAZING

The objective of this alternative is increased forage production and allocation for livestock use **as** a result of an intensive rangeland management program. (Tables 3, 4, and 5 summarize forage allocation, grazing systems, and rangeland improvements.)

Habitat for deer, elk, and antelope would not receive special consideration. However, forage needs for deer, elk, and antelope in the long term, as recommended by ODFW, would be met. Riparian areas would be managed to achieve or maintain a good or excellent channel stability rating.

Initial available forage allocation for livestock would be increased by 12 percent from current levels to 83,773 AUMs. The projected long-term livestock forage allocation would be 201,777 AUMs. (Appendix B lists forage production and allocation by allotment.)

Grazing systems differ only slightly from the proposed action in that no new areas of livestock exclusion are proposed. (Grazing systems by allotment are listed in Appendix C.)

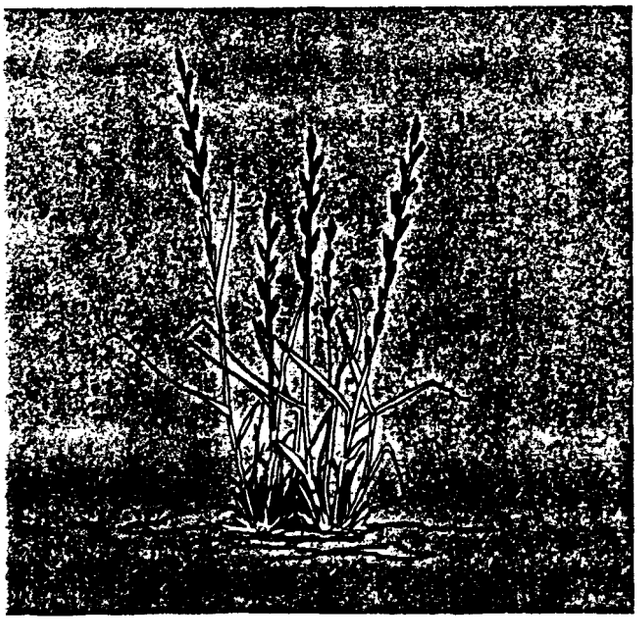
This alternative differs from the proposed action by allowing 68,982 AUMs more for livestock initially and 201,777 AUMs more in the long-term.

Proposed rangeland improvements are listed by allotment in Appendix E.

ALTERNATIVE 2. CONTINUE PRESENT MANAGEMENT

This alternative would maintain the current rangeland management program at 1981 levels (Tables 3, 4, and 5). Allocation of 74,769 AUMs for livestock use would continue. AUMs allocated for wildlife use would increase to 7,427 in the long term, which would meet ODFW wildlife management objective numbers. Existing grazing systems would be continued. (Appendix C lists grazing systems by allotment.)

Approximately 67 percent of the EIS area would be managed under systems which would encourage



upward change of ecological condition, 13 percent would encourage a downward change, and 20 percent would maintain existing ecological condition. No new areas are proposed for livestock exclusion. Six hundred and eighty-eight acres of riparian vegetation would continue to be grazed by livestock.

No new riparian exclusion areas are proposed. No new reservoirs, fences, pipelines, or other developments would be constructed. No vegetation manipulation would occur. Existing developments would be maintained at current levels and replaced on an as-needed basis.

This alternative differs from the proposed action by allowing 8,318 AUMs less forage for livestock in the short term and 58,026 AUM's less in the long term. Existing management, including grazing in riparian areas, would be continued.

ALTERNATIVE 3. OPTIMIZE WILDLIFE HABITAT AND WATERSHED VALUES

The objectives of this alternative are to emphasize wildlife habitat and the soil and vegetative resources of the watersheds.

Livestock use would be eliminated from allotments within deer and antelope winter ranges as well as sage grouse nesting areas. In addition, livestock grazing would not be allowed on any riparian area or in those portions of mapping units 1, 7, and 9 which are highly susceptible to erosion. This livestock exclusion would be accomplished through additional fencing or complete elimination of livestock from a pasture or allotment. (Appendix B lists allocations for alternative 3.)

Initial allocation of forage for livestock grazing would be 56,831 AUMs (Table 3, 4, and 5). To achieve this, livestock grazing would be eliminated on early-seral (see glossary) condition rangeland. The future livestock forage allocation would remain at 56.831 AUMs (Appendix B). Long-term allocation of 7,427 AUMs for big game species would meet ODFW management objective numbers. The remaining forage would be nonallocated.

Existing grazing systems would continue on all land not excluded from livestock grazing, encouraging an upward change in ecological condition on 77 percent of the EIS area, a downward change on 7 percent, and maintenance of existing conditions on 16 percent. In addition, 291,916 acres would be excluded from livestock grazing as compared to the proposed action.

Proposed grazing systems are listed by allotment in Appendix C. Proposed rangeland improvements are listed by allotment in Appendix F.

This alternative differs from the proposed action by allowing 26,256 AUMs less to livestock in the short term and 75,964 AUMs less over the long term. In addition it would protect all riparian habitats to achieve 100 percent of their vegetative potential,

ALTERNATIVE 4. ELIMINATE LIVESTOCK GRAZING

No livestock would be permitted to graze on public lands with this alternative (Tables 3, 4, and 5). Livestock owners would be responsible for preventing livestock use on BLM-administered lands.

All forage would be available for wildlife, watershed, riparian, or other uses. No rangeland improvements that solely benefit livestock would be constructed or maintained.

This alternative differs from the proposed action by reducing the allocation of forage to livestock by 83,087 AUMs in the short term and 132,795 AUMs in the long term. In addition it would allow no livestock grazing in BLM-managed riparian habitat.

Table 3 Available Forage Production and Allocations (AUMs), Proposed Action and Alternatives

Allocation	Proposed Action	Alt. 1 (Optimize Livestock)	Alt. 2[1] (No Action)	Alt. 3 (Optimize Wildlife & Watershed)	Alt. 4 (Eliminate Livestock)
Initial					
Livestock allocation	83,087	83,773	74,769	56,831	0
Wildlife allocation[2]	5,331	5,331	5,331	5,331	5,331
Nonallocated [3]	686	0	9,004	26,942	83,773
TOTAL	89,104	89,104	89,104	89,104	89,104
Projected					
Livestock allocation	132,795	201,777	74,769	56,831	0
Wildlife allocation[2]	7,427	7,427	7,427	7,427	7,427
Nonallocated[3]	37,135	4,811	51,115	75,021	135,779
TOTAL	177,357	214,015	133,311	139,279	143,206

[1] Existing conditions.

[2] Allocation for deer, elk, and antelope.

[3] Nonallocated is available forage not specifically allocated to wildlife or livestock.

Table 4 Summary of Acres by Grazing Systems, Proposed Action and Alternatives

Grazing System	Proposed Action	Alt. 1 (Optimize Livestock)	Alt. 2 (No Action)	Alt. 3 (Optimize Wildlife & Watershed)	Alt. 4 (Eliminate Livestock)
TOTAL ACRES					
rest rotation	400,942	401,019	291,089	219,127	0
deferred rotation	593,725	593,778	341,698	242,883	0
rotation	5,755	5,755	121,164	98,987	0
deferred	0	0	35,329	29,881	0
early (spring)	0	0	85,191	56,740	0
spring/summer	0	0	116,393	60,426	0
spring/summer/fall	0	0	12,907	7,885	0
spring/fall	0	0	9,511	9,246	0
short duration	37,144	37,144	0	0	0
winter	14,478	14,478	17,299	17,299	0
exclusion	2,003	1,871	1,871	293,919	1,067,577
rest	13,530	13,532	18,586	18,586	0
fenced Federal range	0	0	16,539	12,598	0
Total[1]	1,067,577	1,067,577	1,067,577	1,067,577	1,067,577
STREAM RIPARIAN HABITAT					
rest rotation	66	145	92	0	0
deferred rotation	119	175	88	0	0
rotation	0	0	26	0	0
deferred	0	0	53	0	0
early (spring)	0	0	64	0	0
spring/summer	0	0	26	0	0
spring/summer/fall	0	0	9	0	0
spring/fall	0	0	0	0	0
short duration	41	41	0	0	0
winter	0	0	0	0	0
exclusion	169	32	32	407	407
rest	12	14	14	0	0
fenced Federal range	0	0	3	0	0
RESERVOIR RIPARIAN HABITAT					
rest rotation	283	283	282	0	0
deferred rotation	3	0 30	30	0	0
rotation	0	0	0	0	0
deferred	0	0	0	0	0
early (spring)	0	0	0	0	0
spring/summer	0	0	1	0	0
spring/summer/fall	0	0	0	0	0
spring/fall	0	0	0	0	0
short duration	0	0	0	0	0
winter	0	0	0	0	0
exclusion	23	23	23	336	336
rest	0	0	0	0	0
fenced Federal range	0	0	0	0	0

[1] Total includes riparian areas.

Table 5 Rangeland Improvements, Proposed Action and Alternatives

Rangeland Improvements	Proposed Action	Alt. 1 (Optimize Livestock)	Alt. 2 (No Action)	Alt. 3 (Optimize Wildlife & Watershed)	Alt. 4 (Eliminate Livestock)
fences (miles)	391	315	.O	349	0
springs (#)	13	13	0	3	0
wells (#)	7		0	0	0
pipelines (miles)	467	47;	0	0	0
guzzlers (#)[1]	80'	40	0	100	0
reservoirs (#)	25	25	0	10	0
waterholes (#)	2	2	0	5	0
stream rip-rap (miles)'	55	14	0	69	0
stream structures (#)[1]	620	155	0	775	0
debris removal (acres)[1]	1	5 1 5	0	15	0
bird nesting site (#)	120	60	0	150	0
spraying w/seeding(ac)	3,200	6,250	0	0	0
burning w/seeding (ac)	42,330	93,050	0	0	0
plowing w/seeding (ac)	8,625	17,650	0	0	0
brush control by spraying (acres)	57,635	143,400	0	0	0
brush control by burning (acres)	47,486	135,100	0	58,204	0
brush control by chaining (acres)	5,000	11,100	0		0
juniper control (ac)	97,733	153,012	0	68.0280	0
juniper control with seeding (acres)	4,700	7,600	0	0	0

[1] Interrelated rangeland improvement measures. listed here for impact assessment.

FEATURES OF THE PROPOSED ACTION AND ALTERNATIVES

AVAILABLE FORAGE ALLOCATION

Each alternative has a different allocation of available forage to wildlife, livestock, and nonconsumptive uses.

See Chapter 3. Vegetation and Figure 3 for a discussion of available forage production and Appendix G for available forage computation methodology

For the purpose of this analysis, initial allocations under the proposed action and all alternatives are based on range surveys completed in the 1960's.

These surveys were updated using information based on actual livestock use and information gained for condition, trend, and utilization studies conducted in recent years. Additional production information gathered through a BLM Soil Vegetation Inventory Method (SVIM) survey, conducted between 1978 and 1979, will be incorporated into allotment management plans (AMPs) as data becomes available.

Proposed forage allocations assume different levels of average utilization for each grazing system (Table 6).

GRAZING SYSTEMS

Grazing systems are implemented to alleviate specific resource problems and to achieve management objectives identified in the Management Framework Plan. Figure 1 diagrammatically portrays the

Figure 1 Examples of Typical Grazing Systems

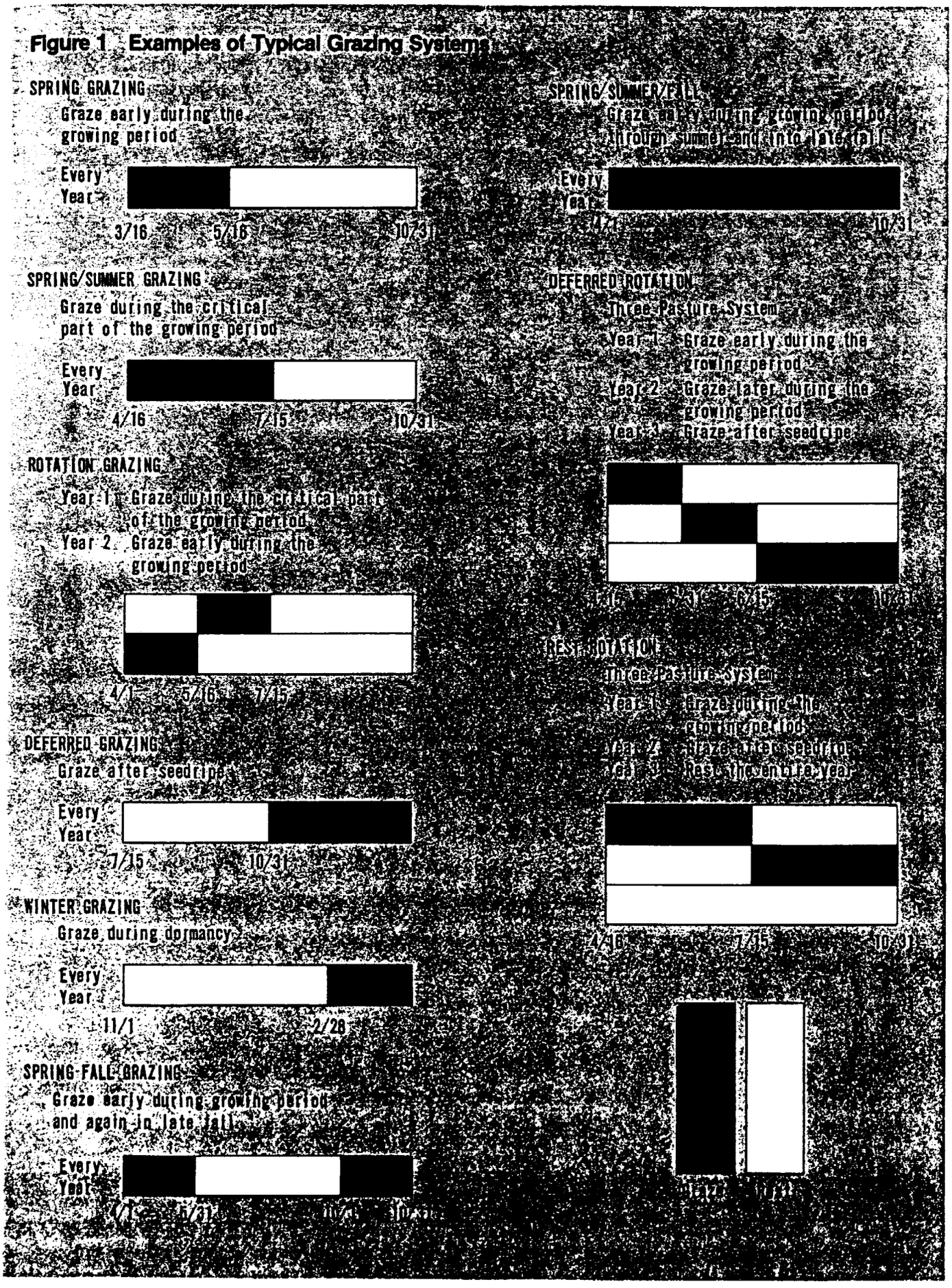


Table 6 Summary for Proposed Grazing Systems

Grazing System	General Comments of Systems	Avemge Utilization (percent)
Rest rotation	Provides total annual rest for each pasture on a regular basis and promotes plant vigor, seed production, seedling establishment, root production and litter accumulation. Woody riparian vegetation is not improved with this system.	60
Deferred rotation	Provides total growing period rest for each pasture on a regular basis and promotes plant vigor, seed production, seedling establishment and root production. Woody riparian vegetation is not improved with this system.	55
Rotation	Provides rest for a portion of the growing period for each pasture and promotes plant vigor. Seed and/or root production are not necessarily enhanced. This system benefits riparian vegetation by allowing regrowth each year and by minimizing livestock use of woody plants.	50
Deferred	Provides total growing period rest for each pasture every year and promotes seed and root production as well as seedling establishment. This system is detrimental to riparian vegetation because of increased use on woody plants.	55
Early	Provides rest during much of the growing period since use occurs before May 15, depending on the location, and thereby promotes seed and root production in most years. Riparian vegetation benefits since regrowth always occurs and use on woody plants is kept to a minimum.	40
Spring/summer	Does not provide rest during the growing period for plant vigor or reproduction. Use occurs from early spring into July or August and results in heavy use of woody riparian species.	40
Spring/summer/fall	Similar to spring/summer except grazing extends into plant dormancy. Rest is never provided and hence the plants do not replace food reserves in roots; seed may or may not be produced. Concentration of livestock in riparian areas results in heavy use of woody riparian species.	40
Spring/fall	Rest is not usually provided since grazing occurs in the spring and again in the fall, after seed ripe. Some rest is allowed depending on when livestock are removed in the spring, but this system does not enhance plant vigor, seed or root production, or litter accumulation. The system is detrimental to riparian vegetation due to heavy use of woody riparian species in the fall.	40

Table 6 Summary for Proposed Grazing Systems (continued)

Grazing System	General Comments of Systems	Average Utilization (percent)
Winter	Provides total growing period rest every year since grazing occurs only between complete plan? dormancy and the beginning of spring growth. Promotes plant vigor, seed and root production, and seedling establishment. Dormant woody riparian species would be utilized to some degree, and therefore live twig growth would be removed. However, winter use would benefit riparian vegetation since use of riparian areas is low due to an abundance of livestock water elsewhere. The colder drainages also discourage livestock use of riparian zones.	60
Short duration	Provides substantial rest during the growing period since grazing is allowed during any one 2-3 week period except between May 16 and June 30, depending on the location. Promotes plant vigor, seed and root production, and litter accumulation, depending on the exact time of use. Riparian vegetation benefits since regrowth always occurs and use on woody plants is kept to a minimum.	50
Exclusion, rest	Provides total annual rest since no grazing is authorized. Promotes plant vigor, seed production, replenishment of root reserves, and litter accumulation. Benefits riparian vegetation. Exclusion refers to areas where livestock use is excluded to protect resource values. Rest occurs because lack of water, or other factors which prohibit livestock use. All unallotted acreage in the EIS area is considered to be in rest.	0
Fenced Federal range	Grazing use is not monitored on these smaller, somewhat isolated parcels of public land which are used in conjunction with private lands. Utilization is not measured.	

systems proposed. Table 6 shows each system. components of each system. and average total forage utilization levels that would be allowed.

Utilization reflects the amount of available forage used or consumed by livestock. It is expressed as a percentage of the total forage available and is measured by the average use of the entire pasture or representative area (see glossary) If topography or other factors result in heavy utilization in part of the pasture while other parts receive lighter use, representative areas are monitored. When average utilization reaches maximum acceptable limits, livestock would be removed.

Determination of the utilization level depends on ecological condition, period of use, use patterns, grazing system, and current climatic situation, and is made by BLM range conservationists and area managers.

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

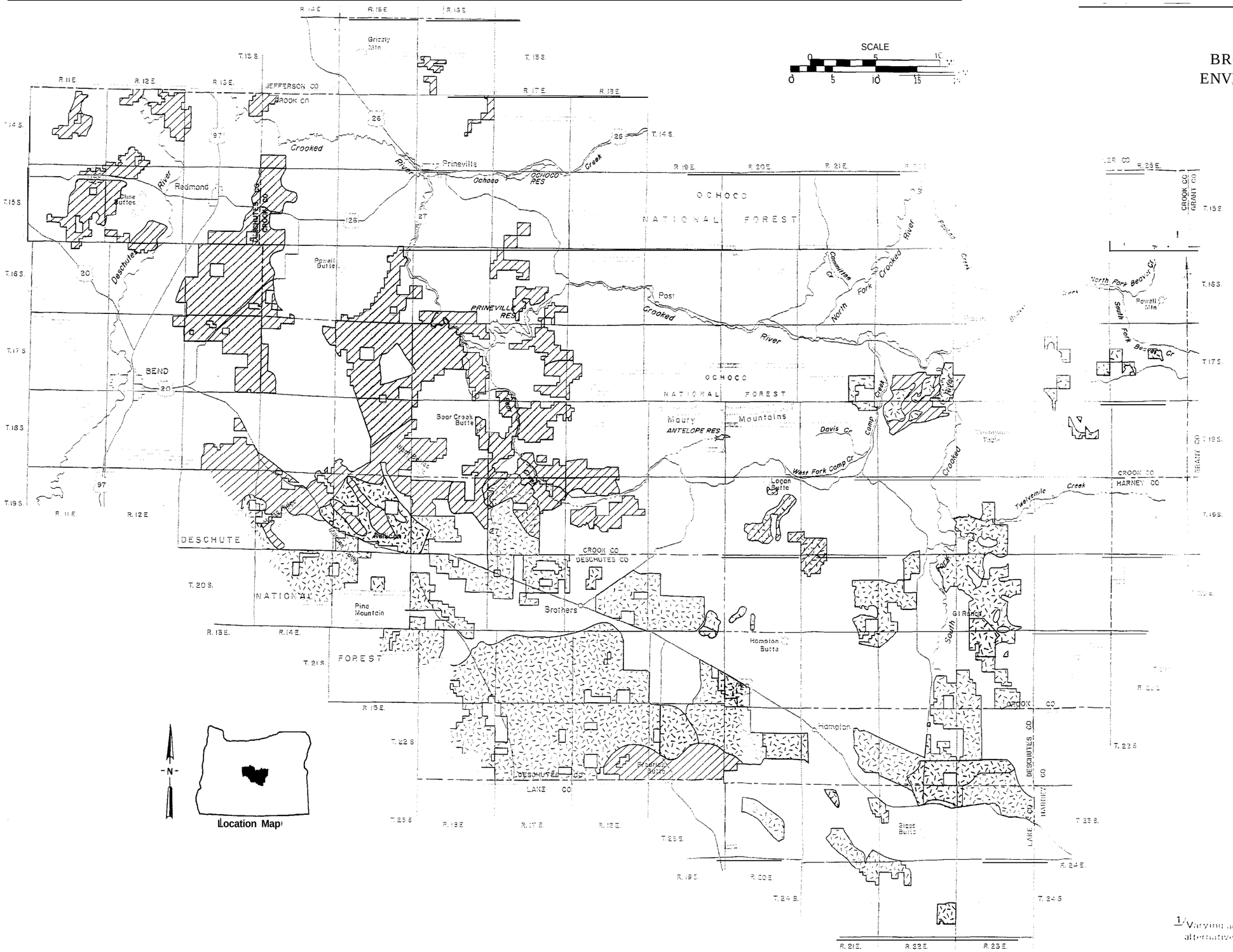
BROTHERS GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

1982

SCALE
0 5 10 15

LEGEND

- Potential Juniper Control Area
- Potential Brush Control Area
- Potential Seeding Area



MAP 4

POTENTIAL RANGELAND TREATMENT AREAS 1/

1/ Varying acreages would be treated under the proposed action or alternatives 1 and 3. No alternative would treat all identified acres.

RANGELAND IMPROVEMENTS

Rangeland improvements are used to support or aid implementation of grazing systems and achieve multiple use objectives. Watering facilities are proposed to improve distribution of livestock. Fences are proposed to control or exclude livestock and provide better distribution. Table 5 lists proposed rangeland improvements along with interrelated wildlife improvements. (Appendices D, E, and F list proposed rangeland improvements by alternative by allotment.) Areas proposed for rangeland improvements are displayed on Map 4.

Burning, mechanical, or chemical treatment of vegetation is proposed to change the ecological condition class of early-, mid-, and late-seral vegetation if they are not expected to change under intensive management alone.

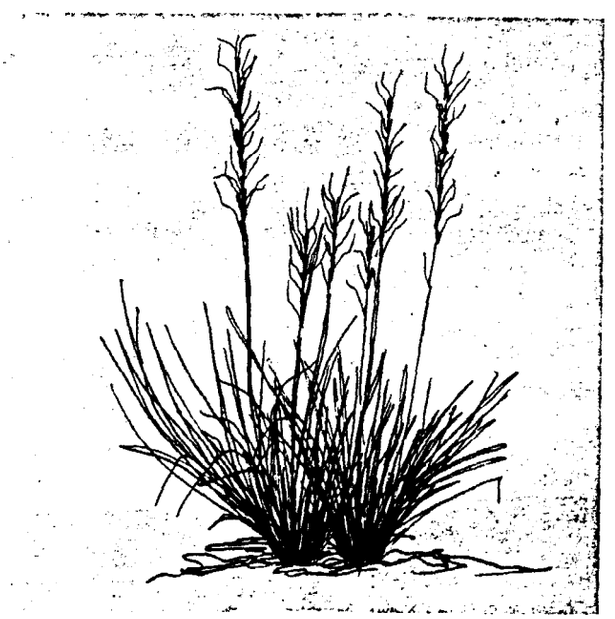
Standard Procedures and Design Elements for Range improvements

Standard Procedures

All projects will be designed in accordance with BLM specifications (BLM Manual Sections 1737 and 7400) and incorporated into specific AMPs.

Site-specific environmental analysis and documentation prior to implementation of rangeland improvements is required. Proposed rangeland improvements may be modified or abandoned if this assessment indicates significant adverse environmental Impacts cannot be mitigated or avoided.

Visual resource contrast ratings will be completed as part of this site-specific assessment. If appropriate, mitigating measures will be developed on a case-by-case basis (BLM Manual Section 8400).



The BLM will 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.

Before beginning rangeland improvements, BLM will complete a survey for threatened, endangered, or sensitive plants and animals. If a project will adversely affect a listed species or its critical habitat and adverse impacts cannot be avoided, the project will be modified, relocated, or abandoned. The U.S. Fish and Wildlife Service will be consulted (50 CFR 402; Endangered Species Act of 1973, as amended). In addition, a raptor inventory will be conducted to identify active nests.

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 insure they meet guidelines. individuals and organizations who have indicated an interest in WSAs will be notified before construction of rangeland improvements.

Design Elements

Proposed fences will be constructed in accordance with BLM Manual Section 1737. Gates or cattle guards will be built where needed.

AUMs of forage required to satisfy ODFW recommended management objective numbers for big game will be allocated in all allotments. If the analysis of SVIM data reveals that the proposed allocations for big game exceed the anticipated production on any allotment then the amount of livestock will be reduced.

Brush control, seeding, and juniper control projects will be designed using irregular patterns and untreated patches to provide edge effect and cover for wildlife. Crucial wildlife habitat will be excluded from these projects unless the treatment would enhance wildlife habitat,

For areas designated for chemical treatment, 2.4-D (low volatile formulation) with a water carrier at a rate of two pounds active ingredient per acre would be applied. All applications of 2,4-D would be in accordance with state regulations and BLM Manual Section 9200.

The existing road and trail system will provide access to most project sites. Roads will be constructed to minimum standards, following environmental assessment and documentation.

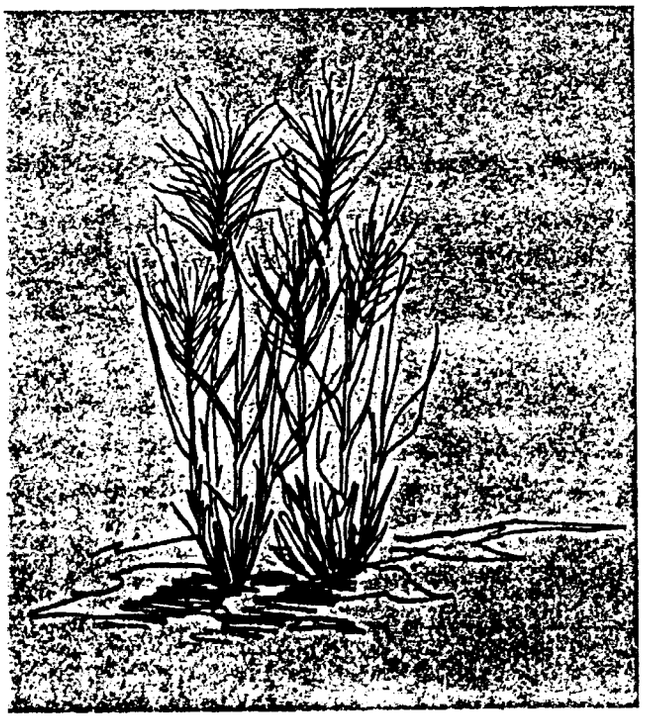
Broadcast or drill seeding will usually follow brush or juniper control. The majority of the area will be seeded with crested wheatgrass; other grass or forb species will be included where appropriate. All seeding will be in accordance with the current BLM Oregon rangeland seeding policy.

All State of Oregon well water drilling regulations will be foilowed. Ramps, rocks, or float boards will be provided in all water troughs for small birds and mammals to gain access to water or provide a means of escape.

MONITORING AND MANAGEMENT ADJUSTMENTS

An integral part of this rangeland management plan is a system of monitoring and evaluation to see if objectives are being met. Monitoring the grazing management program will determine accuracy of livestock vegetation allocation and the effectiveness of the grazing system, vegetative treatments, and other rangeland improvements.

Typical monitoring activities include regular visits with the ranch operator and other interested parties to observe the management program and to make needed changes. These visits involve checking average vegetation utilization levels of each pasture, or representative area, collecting actual use information, and annually conducting other studies specified in the AMP



Studies of wildlife use, degree of forage utilization, and rangeland ecological condition and trend will be designed in accordance with BLM Manual 4420 and will be used to modify AMPs as appropriate.

Riparian studies will be established to determine changes in habitat condition and fish and wildlife populations. Such monitoring will comply with Executive Orders 11514 and 11990 and BLM Manual Sections 6602 and 6700. Wildlife habitat will be monitored by using utilization transects, photo-points, and sightings to determine effectiveness of vegetation manipulation design and grazing systems.

Grazing management will be revised if monitoring studies determine objectives are not being achieved. Revisions may include reductions in the amount of livestock use, or changes in the period of use, or a combination. Where objectives are being met and a monitoring study supports an increase in livestock grazing use, additional use will first be granted on a temporary basis. A permanent increase would be granted when an evaluation of forage production confirms the continued availability of additional livestock forage. Any change in use would be implemented in accordance with Federal grazing regulations.

Water quality monitoring will be initiated in accordance with Executive Orders 11991 and 12088, BLM Manual Section 7200, and Sections 208 and 313 of the Clean Water Act (P.L. 95217, P.L. 92-500, as amended).

Each operator will be issued term permits which specify allotment, period of use, and numbers and kind of livestock. Grazing allotments will be supervised in accordance with BLM policy. If unauthorized use occurs, action will be taken by BLM in accordance with regulations in 43 CFR 4150.

Table 7 Summary, Long-Term Environmental Consequences, Proposed Action and Alternatives

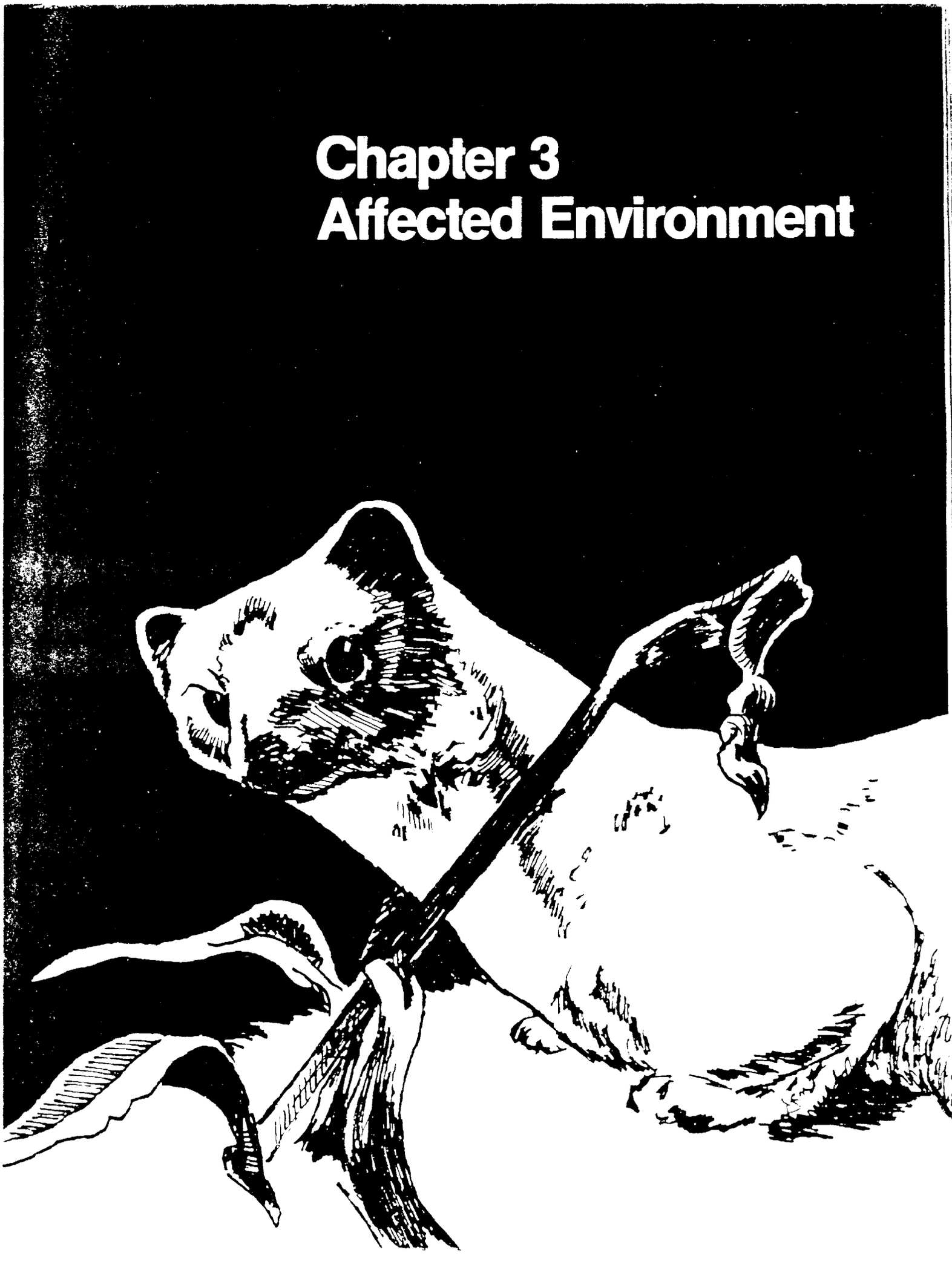
Resource	Existing Situation	Proposed Action	Alt. 1 (Optimize Livestock)	Alt. 2 (No Action)	Alt. 3 (Optimize Wildlife and Watershed)	Alt. 4 (Eliminate Livestock)
Vegetation						
Upland Vegetation						
Ecological Condition (acres)						
Climax (excellent)	24,010	41,007	83,639	12,922	14.023	15,037
Late-seral (good)	234,657	603.976	574,635	421,442	467.504	554,439
Mid-seral (fair)	565,928	260,615	221,667	378,369	467,669	345.258
Early-seral (poor)	185,499	45,641	5.603	197,361	60,898	95,360
Other	57,483	116,338	182.033	57.483	57,483	57,483
Riparian Vegetation, Streams						
Ecological Condition (acres)						
Climax (excellent)	20	148	91	93	321	321
Late-seral (good)	97	134	56	56	86	86
Mid-serai (fair)	204	118	175	145	0	0
Early-seral (poor)	86	7	85	113	0	0
Riparian Vegetation, Reservoirs						
Ecological Condition (acres)						
Climax (excellent)	11	11	11	11	40	40
Late-seral (good)	12	12	12	12	296	296
Mid-seral (fair)	28	29	29	29	0	0
Early-seral (poor)	285	284	284	284	0	0
Endangered or Threatened Species	--		--		--	--
Sensitive Species		N C	NC[1]	N C	NC[1]	NC[1]
Available Forage Production AUMs						
Livestock allocation	--	132.795	201,777	74,769	56,831	0
Wildlife allocation	--	7.427	7,427	7,427	7.427	7,427
Nonailocated		37.135	4,811	51,115	75.021	135,779
TOTAL AVAILABLE FORAGE PRODUCTION	89.104	177.357	214,015	133,311	139,279	143,206
Wildlife Habitat Conditions						
Upland Habitat Diversity						
Changes in Habitat Diversity (percent)		+8	-1	-1	+17	+12
Fish (miles)						
Excellent	0	27	11	10	69	69
Good	18	38	20	20	25	25
Fair	40	29	45	39	2	2
Poor	38	2	20	27	0	0
Wildlife habitat						
Deer	--	+M[1]	+L	+L	+M	+L
Antelope	--	+M	+L	+L	+L	+L
Elk	--	+M	+L	+L	+M	+M
Upland Birds	--	+M	-M	NC	+H	+M
Waterfowl	--	+L	-H	NC	+H	+M
Endangered or Threatened Animals		NC	NC	NC	NC	NC
Soils						
Erosion Rate	--	+M	+M	NC	+M	+L
Water						
Quality		+L	NC	NC	+H	+H
Quantity (runoff)	--	+L	+L	NC	+H	+M
Channel stability	--	+L	NC	NC	+H	+H

Resource	Existing Situation	Proposed Action	Alt. 1 (Optimize Livestock)	Alt. 2 (No Action)	Alt. 3 (Optimize Wildlife and Watershed)	Alt. 4 (Eliminate Livestock)
Cultural and Paleontological		-L	-M	-L	-L	+L
Recreation						
Recreation activities						
Visitor use (visitor days)	235,000	+2,900	-7,500	0	+9,400	+5,600
Recreation opportunities		+L	-L	NC	+M	NC
visual						
Visual contrast		-L	-M	NC	-L	NC
Wilderness						
Wilderness Characteristics		-L	-H	NC	+L	+M
***Socioecomonic Values*[2]**						
Operators losing more than 10% of annual forage needs		1			10	63
Average change in forage as percent of annual need	—	+11	+23	0	-2	-11
Livestock forage ($000)	$11,300	+$1,508	+$3,074	0	-$207	-$1,307
Recreation ($000)	$ 2,291	+$ 24	-$ 50	0	+$ 72	+$ 12
Employment (jobs)	1,890	+219	+434	0	-21	-186

'NC = No Change
+ = Beneficial
- = Adverse
L = Low
M = Medium
H = High

[2] Socioeconomic effects are shown as changes from the existing situation (actual grazing use).

Chapter 3
Affected Environment



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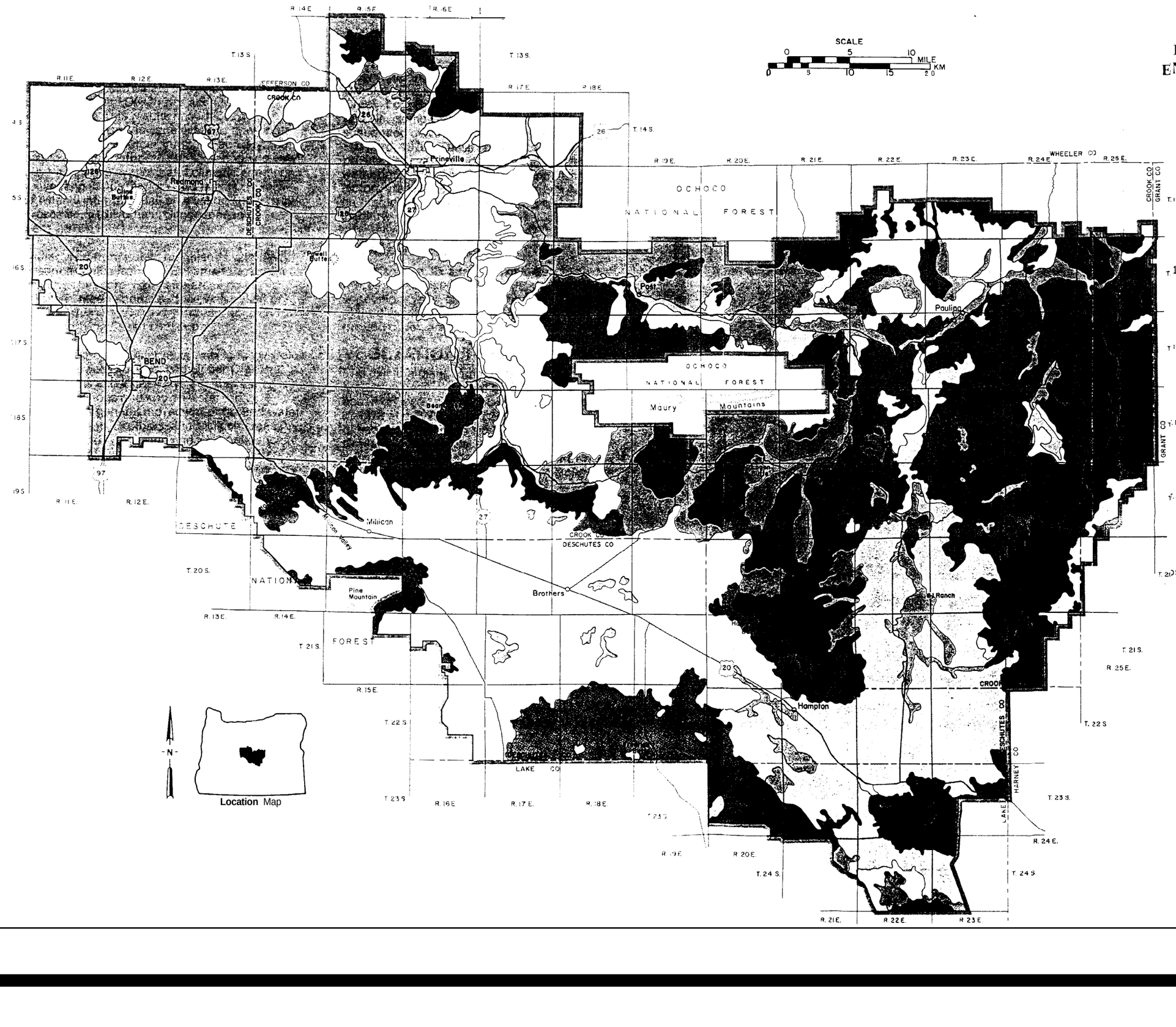
BROTHERS GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

1982



LEGEND

GROUP I

1 — Willowdale-Swaier-Borow association

3 — Ratto-Blayden-Embal association

GROUP II

2 — Canest-Madeline-Choptie association

8 — Westbutte-Menbo-Madeline association

GROUP III

4 — Statz-Houstake-Deschutes association

5 — Dester-Stooky-Gardone association

GROUP IV

6 — Varco-Anawalt-Bieber association

7 — Simas-Madeline-Day association

9 — Stukel-Lorella-Redcliff association

MAP 5
GENERAL SOILS

CHAPTER 3
AFFECTED ENVIRONMENT

Generally, this chapter addresses the environment as it existed in 1978 within the Brothers EIS area (exceptions have been noted). Since grazing use has been ongoing within the area, the environment described is seldom pristine but exhibits effects of human use.

Chapter 3 provides a basis on which impacts of the proposed action and alternatives may be assessed. Emphasis has been placed on those areas most likely to be impacted by the proposed action or alternatives. Data and analysis are consistent with the importance of the impact, with material summarized, consolidated or referenced. Chapter 3 contains a description of those resources that would be affected by the proposed action or alternatives described in Chapter 2. Impacts on these resources are discussed in Chapter 4.

In preparation of this chapter, the primary data sources were BLM planning documents developed by the Prineville District. Unit Resource Analyses and proposed Management Framework Plan are available for review at the Prineville District Office. Additional references have been cited by author and date of publication. A full listing is located in References Cited section.

CLIMATE

The Brothers EIS grazing area has a semiarid continental climate with long, cool, moist winters and springs, and short, warm, dry summers. The area annually receives 9 to 14 inches of precipitation. Generally, there are two periods of maximum precipitation: snow in November through February and rain in April through June.

Soil temperatures become warm enough to stimulate plant growth about March 1 at Prineville and April 1 at Brothers. Lack of available soil moisture generally ends the growing season, usually by mid-July.

This area has large variations in both daily and seasonal temperatures. The Redmond area mean annual temperature is 47.2” F and at Brothers it is 43.2° F. Generally the frost-free period for the area is between 50 and 90 days.

SOILS

Soils data is available in the General Soil Map, Deschutes County (USDA, 1973), Prineville Soil Survey (USDA. 1966). and the unpublished order III BLM soil survey. This data includes soil series descriptions, mapping unit descriptions, interpretations, and detailed soil maps which are on file at the Prineville District Office.

The complex and diverse soil patterns have been divided info four main groups comprising nine mapping units (Map 5). A summary interpretative table is in Appendix H.

Group 1 consists of two mapping units comprising about 15 percent of the EIS area: Willowdale-Swaler-Borow association (5 percent), and Ratto-Blayden-Embal association (10 percent). They are on nearly level to gently sloping topography: elevation ranges from 2,500 to 4,800 feet. The alluvial soils of mapping unit 1 are susceptible to erosion when found along stream channels. The alluvial and lacustrine soils of mapping unit 1 are moderately susceptible to wind erosion.

Group 2 consists of two mapping units comprising about 17 percent of the EIS area: Canest-Madeline-Choptie association (4 percent) and Westbutte-Menbo-Madeline association (13 percent). These soils occur on nearly level to steep tablelands, lava benches, terraces, and volcanic domes. Elevation ranges from 3,400 to 6,500 feet. These upland stony soils are moderately susceptible to water erosion.

Group 3 consists of two mapping units comprising about 34 percent of the EIS area: Statz-Houstake-Deschutes association (20 percent) and Dester-Stookey-Gardone association (14 percent). These soils occur on nearly level to gently rolling basalt plains, plateaus, terraces. and basins. Elevation ranges from 2,500 to 5,000 feet. The dense sagebrush-covered soils of mapping unit 5 are moderately susceptible to wind erosion. Water erosion and runoff from units 5 and juniper-covered unit 4 is slight.

Group 4 consists of three mapping units comprising about 34 percent of the EIS area: Varco-Anawalt-Bieber association (15 percent); Simas-Madeline-Day association (8 percent); and Stukel-Lorella-Redcliff association (11 percent). They occur on rolling to steep uplands, escarpments, canyons, buttes, basalt plateaus, and volcanic domes. Elevation ranges from 2,700 to 6,500 feet. The sensitive soils of mapping units 7 and 9 are highly susceptible to erosion. Unit 6 is moderately susceptible to erosion.

WATER

The water resources of the EIS area lie almost entirely within three major subbasins or watersheds of the Deschutes River Basin: the Middle Deschutes Lower Crooked. and Upper Crooked Rivers. An area south of Brothers and Hampton consisting of small, scattered basins and intermittent lakebeds. is in the Goose and Summer Lakes Basin (Oregon State Water Resources Board, 1961).

WATER QUANTITY

perennial streams in the predominantly rangeland watersheds have headwaters in the higher-elevation, forested areas of the Deschutes and Ochoco National Forests. This results in surface runoff coming in two phases: lower elevations contribute primarily during November through February and higher elevations contribute during spring snowmelt. Because of lower elevations and climatic conditions on public rangelands, major flood events usually occur when winter rains fall on existing snow pack and frozen soils (Silvernale, Simonson, and Harward, 1976).

The water yield from public rangelands is limited. Mean annual yields from the EIS area range from 0 to 7.4 inches per acre. Extensive areas do not contribute to mean annual surface water yield or stream flow due to excessively drained soils and porous underlying basalt (Appendix I).

The extent of ground water resources in the Middle Deschutes, Lower Crooked, and Upper Crooked River subbasins and Goose and Summer Lakes is unknown. Well logs and known water tables indicate there is general movement of ground water from the Hampton, Brothers, and Millican areas northwest towards Redmond and the confluence of the Crooked and Deschutes Rivers (State Water Resources Board, 1961). Ground water depths vary considerably, but generally the average depth of the regional water table is 200 to 600 feet below the surface. Perched water tables, as well as major differences in water-bearing geologic rock stratum, and subsurface flows in alluvial soils cause maior interruptions in ground water flow and quality (State Water Resources Board, 1961; CH_2M Hill, 1970).

In the Lower Crooked River subbasin, near Prineville, there is heavy utilization of ground water. The Upper Crooked River subbasin has minor ground water utilization, limited to tapping alluvial deposits along major drainages (State Water Resources Board, 1961).

WATER QUALITY

Generally, water quality meets standards established by the Oregon Department of Environmental Quality (ODEQ, 1980) and is sufficient for consumptive use by terrestrial wildlife and livestock (Appendix J). Untreated surface water is not considered suitable for human consumption in the EIS area, due to a high potential of pathogenic organisms from wildlife, livestock, or human use.

Specific water quality problems are high water temperatures, sediment deposition, and lack of sufficient late summer flows (Appendix K). A contributing factor is lack of sufficient riparian vegetation to shade the stream and stabilize the stream channels. These problems influence fishery habitat.

Flows entering Prineville Reservoir from Upper Crooked River, Camp Creek, Bear Creek, Eagle Creek, Lost Creek, Klootchman Creek, Cow Creek and Newsome Creek contain a high amount of suspended clays (Silvernale, Simonson, and Harward, 1976). These sediments come from both private and public lands and contribute to lower water quality for downstream users. Contributing factors are lack of sufficient upland protective cover on highly erosive soils and poor stream channel stability.

VEGETATION

In this section six attributes of vegetation are discussed as related to the existing situation: vegetation types, ecological condition and trend, plant diversity, available forage production, residual ground cover, and plants of special concern.

VEGETATION TYPES

The existing plant communities in the Brothers EIS area have been classified into 17 vegetation types based on a soil and vegetation inventory conducted in 1978 and 1979. Figure 2 displays the relationship of vegetation types to elevation. Because of similarities in response to management actions, these 17 types were further grouped into 7 major groupings (Table 8 and Map 6).

ECOLOGICAL CONDITION AND TREND

Ecological condition, based upon the relationship between existing plant composition on a given site compared to the composition of that site in a pristine state, is shown in Table 9. Appendix L shows ecological condition by allotment.

SVIM was used to determine ecological condition (BLM Manual 4400). Under this classification system, existing vegetation is defined as climax, late-seral, mid-seral, or early-seral condition (see glossary). These classes relate directly to excellent, good, fair, and poor condition, respectively.

Riparian vegetation, due to its importance to other resources, was intensively inventoried (Map 7). Riparian ecological condition is shown in Table 9, for both streams and reservoirs. All vegetation not riparian is considered to be upland vegetation.

For the purpose of this analysis, ecological trend refers to the direction of change of ecological condition. For example, upward trend refers to ecological condition moving toward climax while downward trend refers to ecological condition moving away from climax. Ecological condition not changing would have static trend.

No data is available concerning ecological trend. However, predictions for alternative 2. the no action alternative. are based on the existing situation, and are considered to Indicate present trend in the EIS area (see Chapter 4. Table 22 for ecological trend),

Figure 2 Vegetation Types in Relation to Elevation

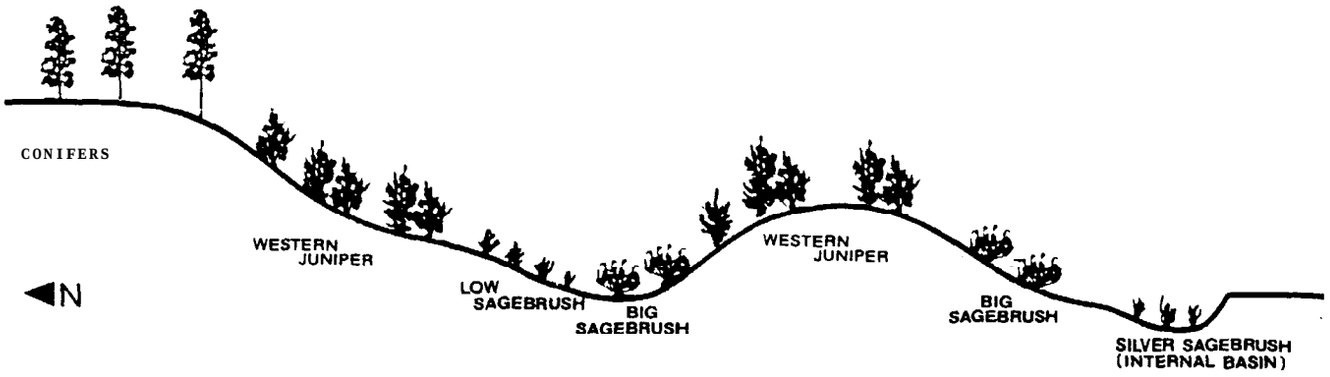


Table 8 Vegetation Types

Vegetation Type	Acres	Percent of EIS Area	Primary Associated Plant Species[2]
WESTERN JUNIPER			
Juniper-big sagebrush[1]	**393,580**	37	At least 10 percent juniper with Wyoming big sagebrush, basin big sagebrush, mountain big sagebrush, bluebunch wheatgrass, needle and thread grass, Thurber's needlegrass, Idaho fescue, squirreltail, junegrass, Kentucky bluegrass, basin wild ryegrass, Sandberg bluegrass, cheatgrass, phlox, aster.
Juniper-low sagebrush[1]	48,525	5	At least 10 percent juniper with low sagebrush, stiff sagebrush, and grasses and forbs.
Juniper-bitterbrush[1]	5,839	< 1	At least 10 percent juniper with Idaho fescue, mountain sagebrush, Thurber's needlegrass, squirrel-tail, mountain brome. Resembles other brush in species composition.
Juniper bunchgrass[1]	**1,795**	< 1	Mature juniper, bluebunch wheatgrass, Idaho fescue, needle grasses, bluegrasses.
BIG SAGEBRUSH[1]	**398,778**	37	Similar to juniper-big sagebrush without juniper.
LOW SAGEBRUSH			
Low sagebrush bunchgrass[1]	131,205	12	Stiff sagebrush, low sagebrush, early low sagebrush, cleft leaf sagebrush, Sandberg bluegrass, bluebunch wheatgrass, Idaho fescue, Thurber's needlegrass, biscuitroot, buckwheat, cheatgrass.
Intermittent lake beds[1]	4,484	< 1	Silver sagebrush, alkali muhly, wire rush, squirreltail.

[1] Corresponds lo wildlife habitats, Table 11

[2] See species list, Appendix O

Table 8 Vegetation Types (continued)

Vegetation Type	Acres	Percent of EIS Area	Primary Associated Plant Species[2]
OTHER BRUSH DOMINANT[1]	17,924	2	Antelope bitterbrush, rabbitbrush, Idaho fescue, sagebrush, Sandberg bluegrass, cheatgrass, bluebunch wheatgrass, giant wildrye, salt grass, erigeron.
CONIFER/MTN. SHRUB			
Ponderosa pine[1]	11,766	1	Ponderosa pine, snowberry, juniper, sagebrush, bitterbrush, bluebunch wheatarass. Idaho fescue; sedge, pinegrass, mountain brome, Sandberg bluegrass.
Mixed conifer[1]	920	<1	Douglas fir, white fir, ponderosa pine, mountain brome, bluegrass, pinegrass, bracken fern, elk sedge, snowberry, forbs.
Mahogany dominant[1]	354	<1	Curt leaf mountain mahogany, sage-brush, bluegrass, fescue, bluebunch wheatgrass, forbs.
GREASEWOOD BUNCHGRASS[1]	1,137	<1	Black greasewood, giant wildrye, salt grass, muhlenbergia, forbs, thickspike wheatgrass.
GRASS/OTHER			
Wet meadow[1]	100	<1	Willows, Kentucky bluegrass, rabbitsfoot grass, sedges, rushes muhlenbergia, forbs.
Aspen[1]	45	<1	Aspen, cottonwood, snowberry, service berry, gooseberry, Oregon grape, chokecherry, big sagebrush, horsetail, sedges, bluegrass, junegrass, bluebunch wheatgrass, Idaho fescue, giant wildrype, lupine, wax currant, sagebrush lily, paintbrush, green rabbitbrush.
Crested wheatgrass[1]	40,821	4	Crested wheatgrass, nomad alfalfa, intermediate wheatgrass, sage-brush, rabbitbrush, juniper, bunchgrass, forbs.
Bunchgrass[1]	9,581	1	Wheatgrass, needlegrass, fescue, ryegrass, forbs, sagebrush, rabbitbrush, bitterbrush, juniper.
Riparian [1]	743	<1	Perennial grasses, sedges, rushes, cattails, shrubs, deciduous trees, emergent water plants.

Table 9 Present Ecological Condition

Ecological Condition Class	Acres	Percent of EIS Area
ALL VEGETATION TYPES		
Climax (excellent)	24,010	2
Late-seral (good)	234.657	22
Mid-seral (fair)	565,928	53
Early-seral (poor)	185,499	18
Other'	57,483	5
TOTAL[2]	1,067,577	100
STREAM RIPARIAN		
Climax (excellent)	20	5
Late-seral (good)	97	24
Mid-seral (fair)	204	50
Early-seral (poor)	85	21
TOTAL	407	100
RESERVOIR RIPARIAN		
Climax (excellent)		
Late-seral (good)		
Mid-seral (fair)		
Early-seral (poor)		
TOTAL		

[1] Other: Vegetation no longer in "natural" condition. For example abandoned farmland or seedings. Rockland and sand dunes also included.

[2] Total includes riparian areas.

PLANT DIVERSITY

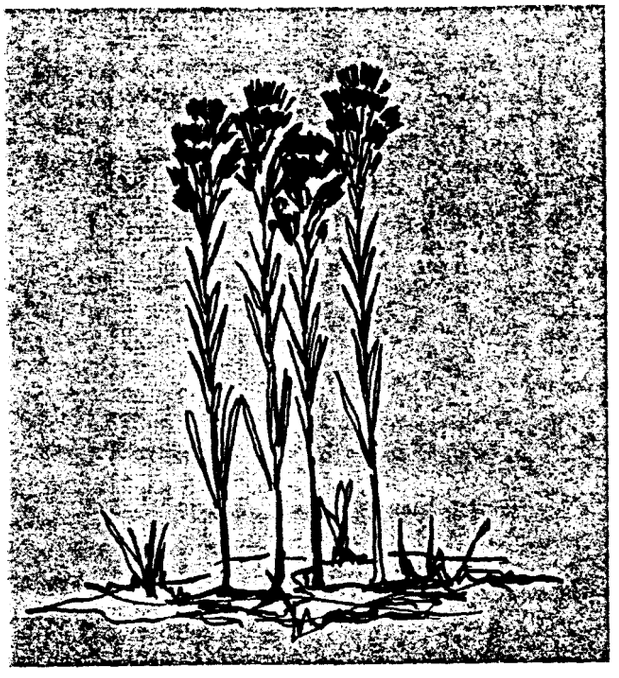
Plant diversity is expressed as the number of different plant species found within a vegetation type. for each of the 17 vegetation types, plant diversity varies in relation to ecological condition. For example, greater species diversity exists in a juniper-big sagebrush vegetation type when in late-seral ecological condition than in either early-seral or climax conditions. Plants in late-seral to climax condition may not be present in early-seral condition and plants commonly found in early-seral sites may not be evident in climax condition. This is because both early-seral and climax vegetation tends to be more homogeneous and thus has fewer plant species.

The greatest diversity of plant species is found in the lower half of late-seral and the upper half of mid-seral condition vegetation. Based on present ecological condition, plant diversity is high on 400,293 acres. Exceptions occur in riparian, wet meadow, greasewood, and aspen vegetation types where the greatest diversity is found in late-seral and climax condition classes. These types compose only 0.2 percent or 2,025 acres of the public land in the EIS area.

AVAILABLE FORAGE PRODUCTION

Of the total vegetation produced on a given site, a significant amount is not consumed by herbivorous animals. This portion of the total vegetation will vary in amount depending on vegetation type and ecological condition and is important for wildlife cover as well as watershed protection (see Figure 3). The remainder of the vegetation which is readily consumed by herbivorous animals is called total forage.

Of the total forage produced, a portion is not palatable to livestock, but provides important forage for wildlife (some forbs and shrubs). The remainder of total forage, generally grasses and some forbs, is palatable to, and could be consumed by, livestock. Deer and antelope also utilize grasses as part of their diet during certain times of the year. Total use on the grass-forb part of the forage must be regulated so that enough plant material remains for plant maintenance and soil protection. The remainder of the plant is available for grazing use, and is referred to as available forage. It is the available forage which is allocated to livestock and wildlife. Wildlife have use of not only a portion of the available forage but also that portion of grasses and forbs left for plant maintenance which can be used for habitat, Forage not palatable to livestock, and the woody part of the total vegetation is also available to wildlife.



Total available forage production for the EIS area is 89,104 AUMs, as shown in Table 3. Appendix B shows existing available forage production by allotment.

RESIDUAL GROUND COVER

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 from wind and water and replaces soil nutrients.

The existing amount of residual ground cover in the EIS area is unknown, but assumptions about changes in residual ground cover can be made based on the effects of proposed management activities in the EIS area (see Chapter 4, Vegetation).

PLANTS OF SPECIAL CONCERN

There are no plants within the EIS area which are listed as threatened or endangered under the Endangered Species Act of 1973. However, long-bearded Mariposa lily, green-tinged Indian paintbrush, Peck's penstemon, and Columbia cress are under review by the U.S. Fish and Wildlife Service for possible listing. These plants have been found within the EIS area during surveys made in 1977 and 1979 or it is probable they occur within the area. In addition, four plants not currently under review for federal listing, but of Importance to the

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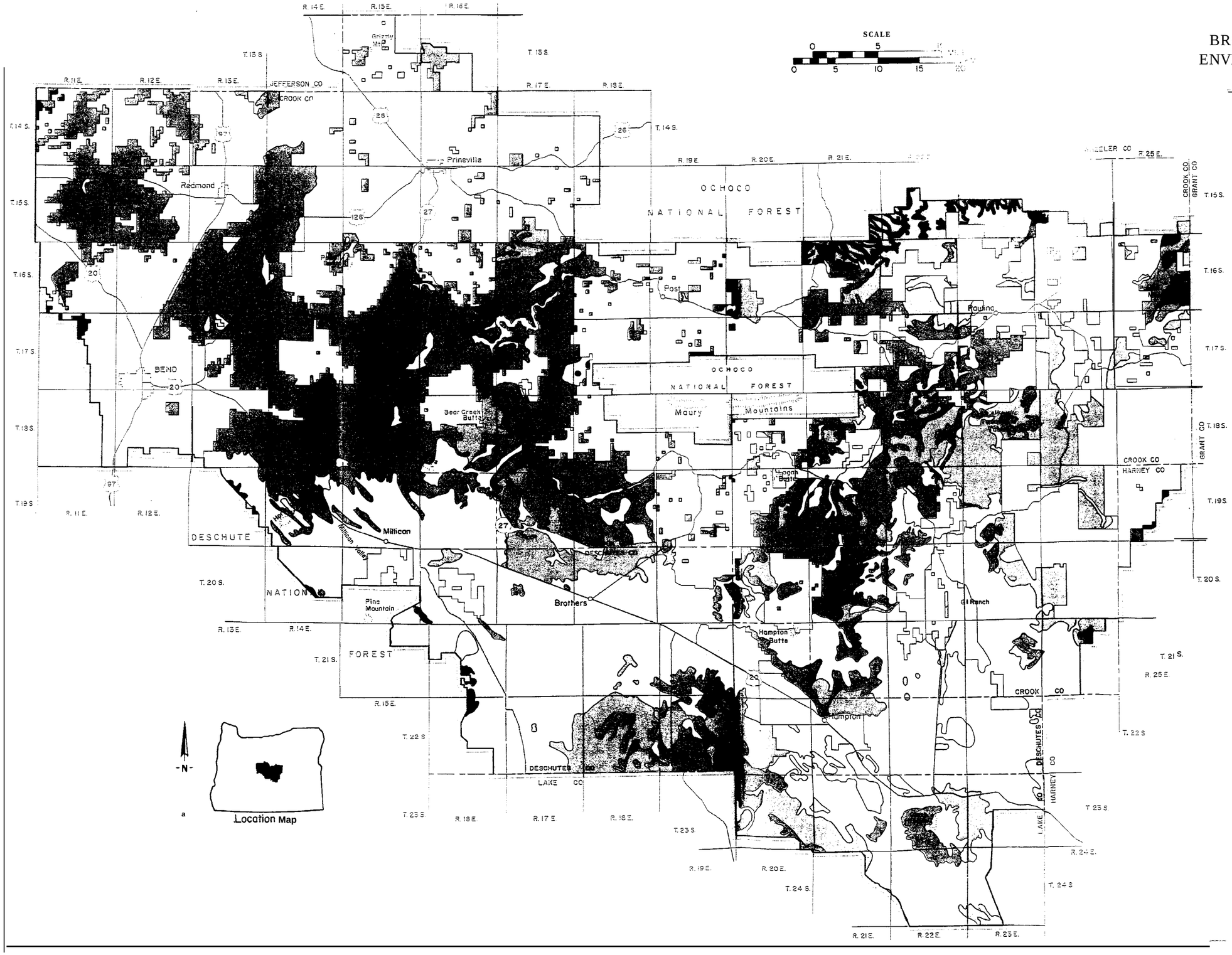
BROTHERS GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

1982



LEGEND

SHRUBS

- Big Sagebrush, Bunchgrass
- Low Sagebrush, Stiff Sagebrush, Bunchgrass, Silver Sagebrush
- Other Brush Dominant
- Greasewood, Bunchgrass

TREES

- Western Juniper, Grass and Shrub Understory
- Conifer, Mountain Shrub

GRASS/OTHER

- Bunchgrass, Wet Meadow, Crested Wheatgrass

MAP
VEGETATION

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

BROTHERS GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

1982

SCALE
0 5 10 MILE
0 5 10 15 20 KM

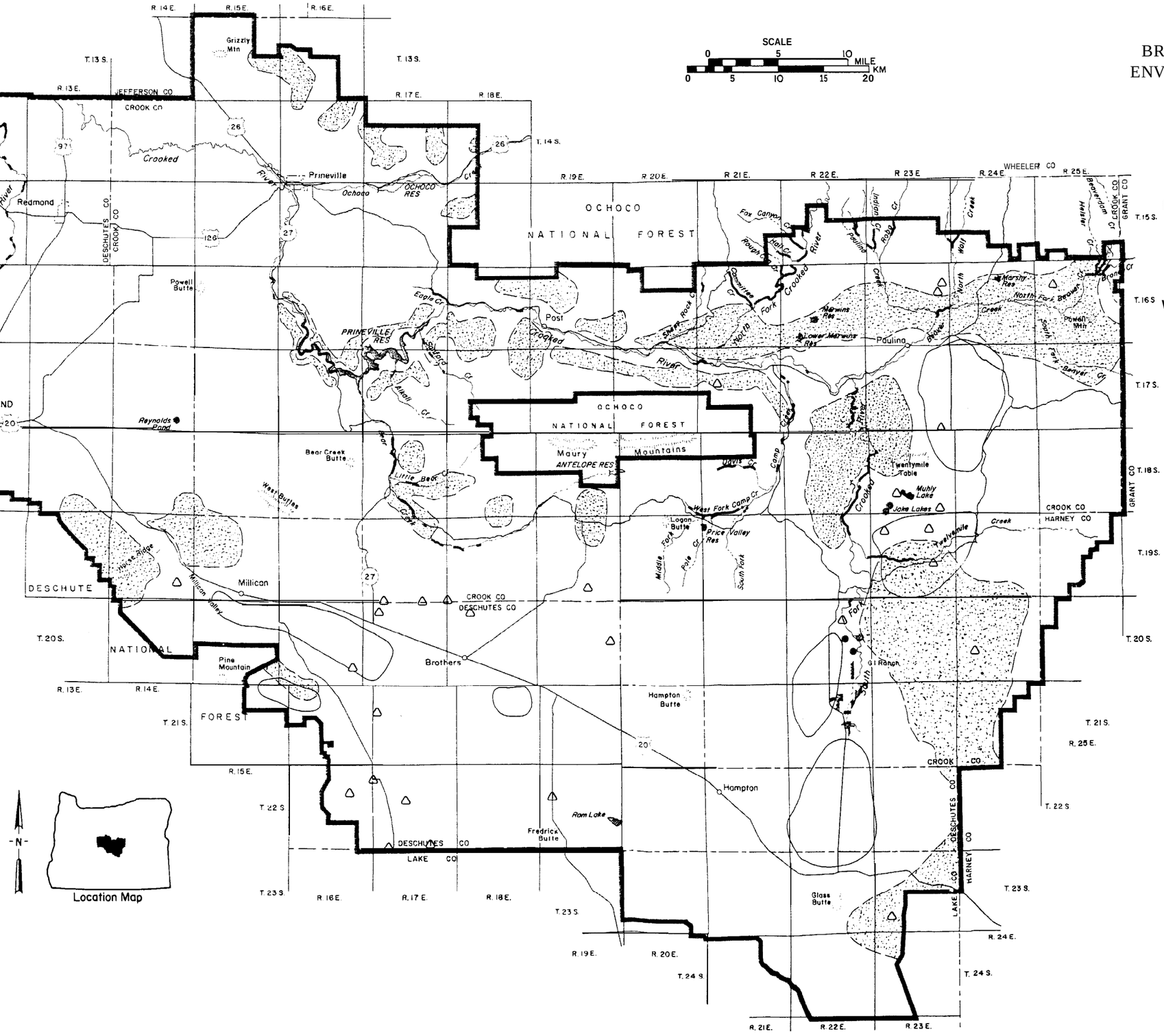
LEGEND

RIPARIAN and WETLAND AREAS

- Wetland at Lake, Reservoir or Meadow
- Riparian Area along stream or drainage

WILDLIFE HABITAT

- Crucial Deer Winter Range
- Crucial Antelope Winter Range
- Sage Grouse Strutting Grounds



MAP 7

RIPARIAN, WETLAND AREAS and WILDLIFE HABITAT

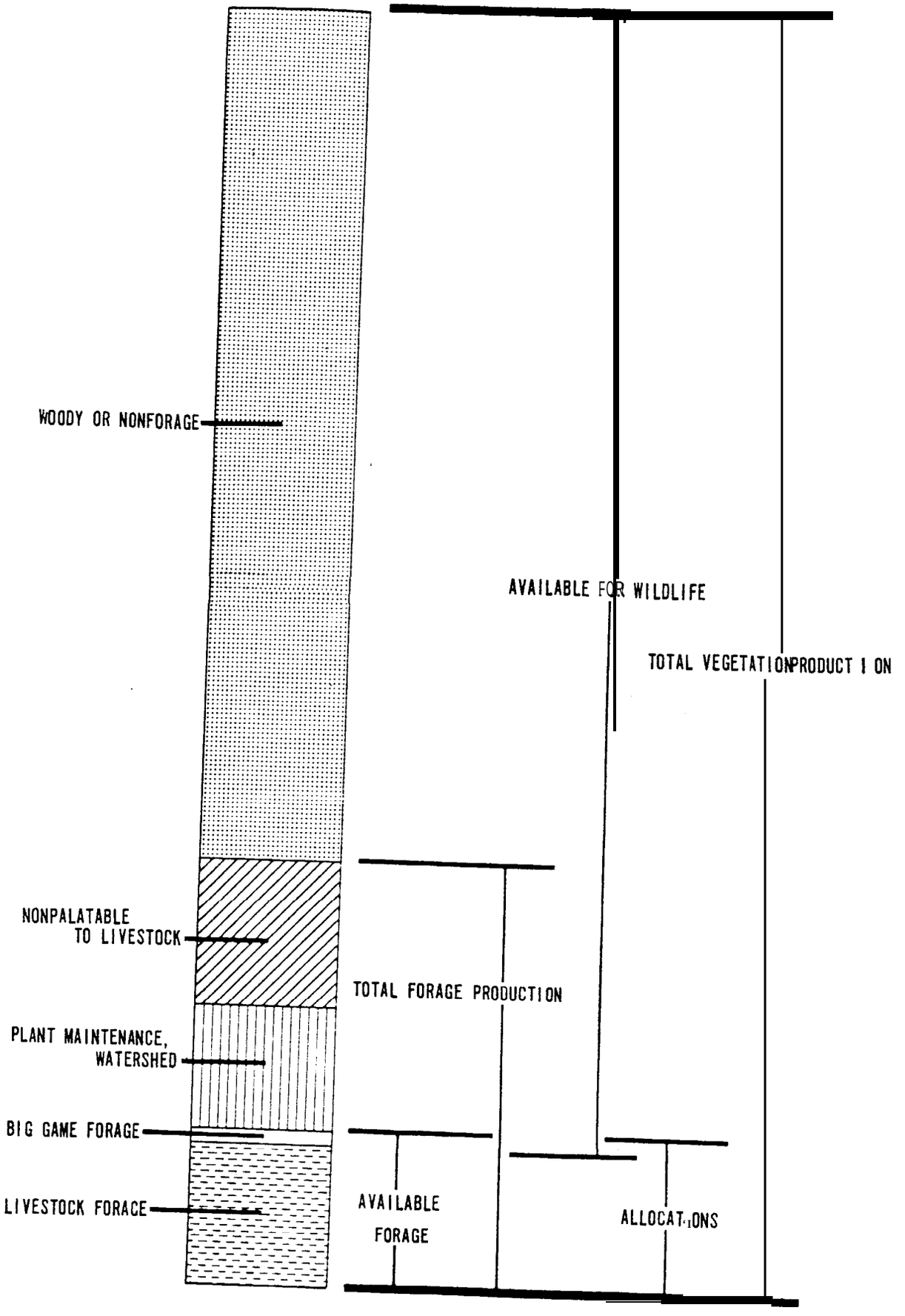


Figure 3 Relationship Available Forage to Total Vegetation

Oregon Natural Heritage Program, occur within the EIS area. Table 10 lists potential threatened or endangered and plants of concern and their occurrence.

AIR QUALITY

Under the Clean Air Act, as amended, the Central Air Quality Control Region at Bend (ODEQ) enforces class II air quality standards for the entire EIS area. Class II designation allows moderate dearadation within air quality standards.

Bend exceeded the standards for Total Suspended Particulates (TSP) (see glossary) for 5 days in 1979. This was principally from windblown dust from roads and fields (ODEQ, 1979).

The following sources of air pollution have been identified as principal contributors to the airshed: lumber mills in Prineville, Bend, and Redmond; occassional burns in sanitary landfills: slash burning; field and ditch burning in the Redmond-Madras area: wood burning stoves in Bend and Prineville when inversions predominate; Willamette valley field burning: and windblown dust from roads and fields.

Table 10 Plants of Special Concern

Name	Category[1]	Habitat	Occurrence
Palmer's onion **Allium bisceptrum**	3	Open slopes east of Cascade Mtns.	none known
Douglas' wormweed **Artemisia ludoviciana** ssp. **nova**	3	Along Deschutes River, Deschutes Co.	Cline Falls area
Peck's milkvetch **Astragalus peckii**	3	Sandy or pumice soil, western Crook Co. Deschutes County	none known
long-bearded mariposa lily **Calcochortus longebarbatus** var. **peckii**	2	Meadows wet in spring and drying by summer, Ochoco Mtns. and associated drainages, Crook County	Allots. 26, 27
green-tinged Indian paintbrush **Castilleja chlorotica**	1	Dry gravelly slopes and summits, Tumalo Creek area, Deschutes Co.	none known
Peck's penstemon **Penstemon peckii**	1	Dry soils of ponderosa pine forest on east side of Cascade Mtns., Black Butte, Deschutes Co.	none known
American pillwort **Pilularia americana**	3	Shallow vernal pools	none known
Columbia cress **Rorjppa calcyna** var. **columbiae**	2	Moist, sandy soil, Crook Co.	none known

[1] Category 1: Sufficient biological justification exists for listing as threatened or endangered (Federal Register Vol. 45, No. 242, Dec. 15, 1980)
Category 2: Further study is needed to determine if biological justification for listing exists (Federal Register Vol. 45, No. 242, Dec. 15, 1980)
Category 3: Plant is considered important by the Oregon Natural Heritage Program

WILDLIFE

UPLAND HABITAT DIVERSITY

In general, the greatest numbers and kinds of wildlife are found in areas with the highest habitat diversity. Habitat diversity is the amount of mixture or variety of land forms, vegetation, vegetation types, and water in any given habitat type. For example, sagebrush adjacent to seeded grass increases habitat diversity around the perimeter of the seedino (edge effect). A variety of plant species also increases habitat diversity. Structure, or the physical aspects of vegetation, increases habitat diversity. Specific examples are clumps of high grass in a grazed meadow, several age classes of aspen along a stream, and snags or dead trees in a stand of timber.

Habitat diversity can be correlated with ecological condition described in the vegetation section. Mid- or late-seral ecological condition has greater habitat diversity than early-seral or climax condition. Seedings have low habitat diversity.

For the purpose of this EIS, wildlife habitat was considered as the prime determinant of wildlife welfare. Since wildlife usually respond to vegetative structure rather than composition (Thomas 1979), structurally similar plant communities were grouped into distinct and important habitat types as described in the vegetation section (Table 8).

The large number of wildlife species present in this area makes it difficult to evaluate the effects of management practices on the total population of each species. However, the life form concept, the grouping of animals based on specific requirements for feeding and reproduction, (Thomas, 1979) allows a grouping of the 337 wildlife species found in the EIS area into 16 life form groups. (Appendix M lists wildlife species occurrance by habitat type, species preference, and life form.)

Big game, threatened or endangered species, upland birds, and waterfowl are discussed in detail because of their economic importance, legal status, or sensitive position in the planning area. Table 11 lists the numbers of wildlife species dependent on each habitat type. Table 12 shows acres of wildlife habitat and estimated populations for deer, elk, and antelope in the EIS area.

Table 11 Wildlife Habitat and Species Use

		Number of Wildlife Species Using Habitats[1]			
		Primary Use[2]		Secondary Use[3]	
Habitat Type	Public Acres	Reproduction	Feeding	Reproduction	Feeding
Juniper-big sagebrush	393,580	73	86	31	57
Juniper-low sagebrush	48,525	9	10	52	87
Juniper-bitterbrush	5,839	40	45	51	69
Juniper-bunchgrass	1,795	36	44	27	48
Big sagebrush-bunchgrass	398,778	72	84	18	35
Low sagebrush-bunchgrass	131,205	19	23	18	50
Intermittent lake beds	4,464	30	39	15	53
Other brush dominant	17,924	41	45	29	65
Ponderosa pine	11,766	71	81	35	61
Mixed conifer	920	86	87	36	41
Mahogany dominant	354	3	4	17	47
Greasewood-bunchgrass	1,137	20	52	20	69
Wet meadow	100	46	92	16	62
Aspen	45	85	100	14	42
Crested wheatgrass	40,821	0	2	11	40
Bunchgrass	9,581	42	59	22	57
Riparian[4]	743	213	265	14	28

[1] Species may use more than one habitat.
[2] Habitat used 40 percent of time or more.
[3] Habitat used less than 40 percent of time.
[4] Includes reservoir and stream riparian areas.

Table 12 Wildlife Habitat and Populations

Species	Habitat (public acres)	Present Population
MULE DEER		
Crucial winter range	142,914	12,000
Summer range	1,067,577	9,700
ANTELOPE		
Crucial winter range	64,312	1,460
Summer range	739,968	1,490
ELK		
Winter range	38.9'12	55
Summer range	35,200	35
WATER ASSOCIATED BIRDS		
(includes surface water acres)	1,218	Moderate to abundant'
UPLAND GAME BIRDS		
Stream riparian habitat	407	Low to moderate'
Upland habitat	317,322	
NONGAME SPECIES		
Yearlong range	1,067,577	Moderate to abundant[1]

[1] Based on historical populations.

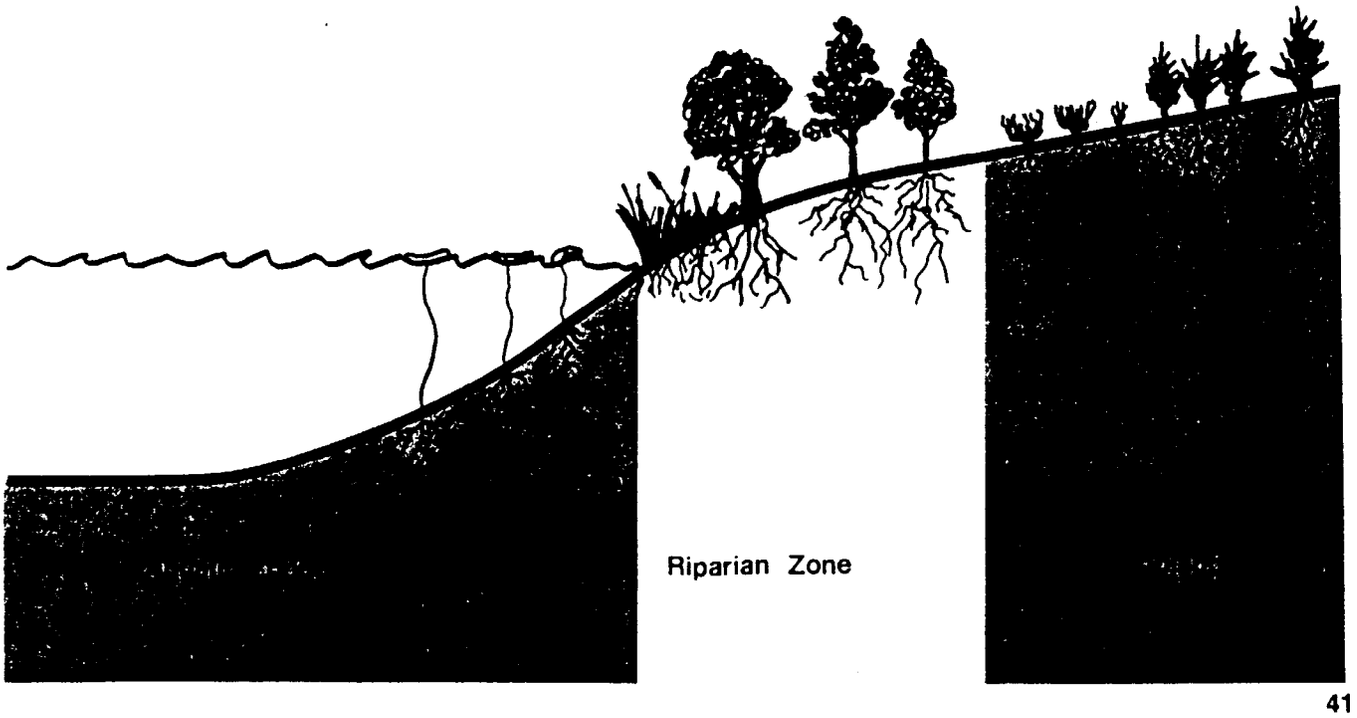
RIPARIAN HABITAT

Riparian areas make up less than one percent of the public land in the EIS area, yet are often the most heavily utilized (Figure 4). Recreation, roads, livestock, irrigation, and wildlife all contribute to the total use of this fragile area.(Table 9 shows present ecological condition of riparian habitat.)

Stream riparian areas are used during all seasons of the year by more than 85 percent of the wildlife species in the area (Appendix M). These areas provide shade and escape cover for all species. Shrubs provide winter forage: grasses provide season-long green forage. When riparian areas are in the higher ecological condition classes, plant diversity is high allowing increased wildlife diversity. All reservoir habitats are primarily characterized by a dominance of rushes and sedges with occassional cattails, emergent water plants, and clumps of willows. Table 11 lists numbers of species that use riparian habitat for feeding and reproduction.

Stream riparian zones frequently become travel lanes for migrating big game animals. Song birds utilize trees and shrubs for spring nesting and for cover during winter periods. Other wildlife use includes brown headed cowbird, Brewers blackbird, redwinged blackbird, northern pacific rattlesnake, wandering garter snake, western skink, waterfowl, upland birds and several species of shorebirds. Appendix M lists species found in each of the 17 habitat types found in the EIS area.

Figure 4 Riparian Vegetation



FISHERIES

There are about 96 miles of stream on public lands that have fish or the potential to support fish. Eighty-eight miles presently contain fish populations. Habitat condition and fish species by miles of stream on public lands are listed in Appendix K.

There were 18 miles of fish habltat rated in good condition, 40 miles in fair condition, and 38 miles in poor condition. None of the streams were rated in excellent condition.

DEER, ANTELOPE, AND ELK

Mule Deer

Mule deer are commonly found throughout the EIS area. Present populations are below the ODFW management objective numbers in all game units. All of the public lands in the EIS area provide summer habitat; 142,914 acres are considered crucial winter habitat.

Table 12 shows the estimated present population and acres of habitat in the EIS area.

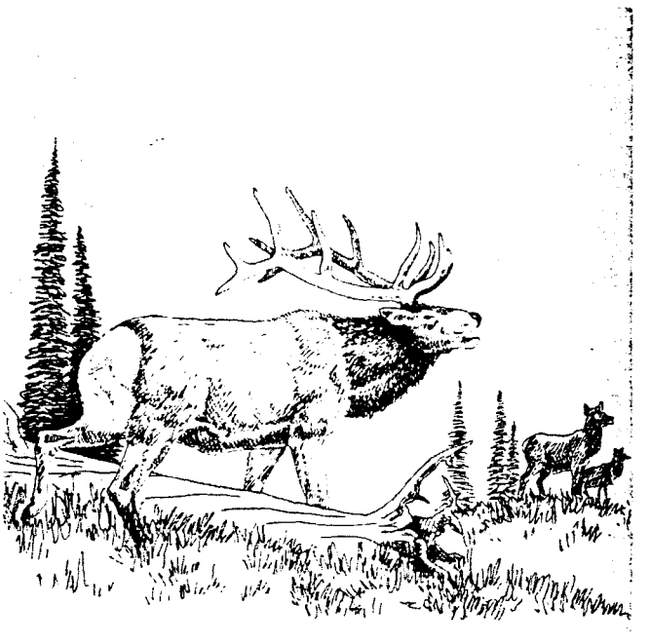
Predation, housing developments, and livestock grazing continue to conflict with deer management. Coyote predatron on mule deer fawns is felt to be a major population influence factor (Trainer, 1977; Scott. pers. comm., 1981). Housing developments near Bend and Prineville have encroached on winter ranges. Spring competition for early grasses and forbs occurs whenever livestock use deer winter ranges prior to mid-April. However some seedings, water developments, juniper chainings, and grazing systems have improved deer habitat.

Antelope

Antelope, like mule deer, are found in a wide variety of habitats in the EIS area. They are found not only in the traditional low sagebrush-grass habitats, but also are found in the juniper-low and big-sagebrush habitats (Kindschy. et al.. 1979). There are approximately 739.968 acres of summer habltat and 64.312 acres of crucial winter habltat in EIS area. Population figures are listed in Table 12.

Elk

Elk populations on public lands are located around the Maury Mountains and along the southern boundary of the Ochoco National Forest. The estimated population on public lands is 55 (Table 12). There are approximately 35.200 acres of summer habltat. The ODFW has not identified any crucial elk winter range: however. approximately 38,912 acres of winter habitat are contained in the EIS area (Table 12)

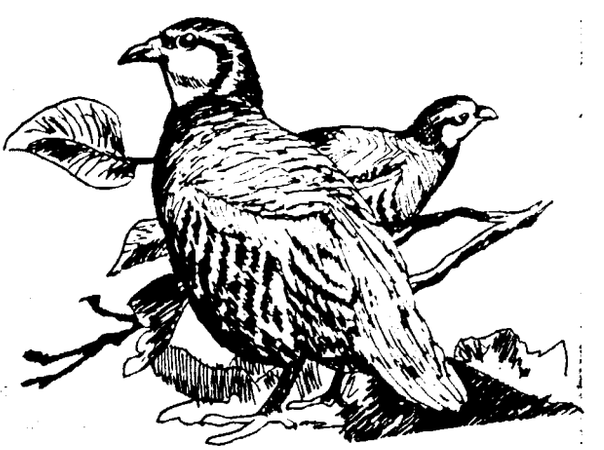


OTHER WILDLIFE

Upland Birds

Upland birds are found throughout the EIS area and include sage grouse. California valley quail, chukar partridge, pheasant. mountain quail, blue grouse, and ruffed grouse.

Sage grouse are scattered throughout the southern portion of the EIS area but are found primarily in the low sagebrush-bunchgrass habitat type. Present populations are low, reflecting a downward trend over the last 20 years. This decline has Increased ODFW management emphasis and inventory of strutting and nesting areas. Twenty-three strutting grounds and associated nesting areas have been located within the EIS area. Strutting grounds and nesting areas are considered crucial habitat.

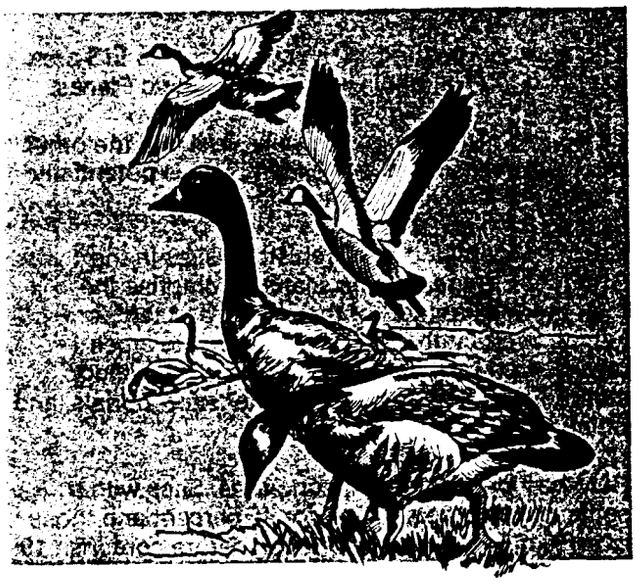


Small populations of chukar partridge are found in a few steep rocky areas near perennial water. California valley quail are closely associated with riparian areas. Blue grouse, ruffed grouse, and mountain quail are found in the conifer-vegetation types adjacent to the Maury and Ochoco Mountains. pheasants are found primarily on private lands around agricultural areas.

Waterfowl

Five species of geese and 23 species of ducks use the EIS area during migration or for nesting. These include mallard, pintail, Canada goose, scaup, redhead, and teal. Most of the associated habitat for waterfowl is on state, private, or Bureau of Reclamation lands.

Reservoirs that are important include Marshy and Muhly reservoirs, Ram Lake, and a portion of Merwin's Reservoir. Nesting habitat around unfenced reservoirs is often poor because concentrated livestock use removes most of the ground cover.



ENDANGERED OR THREATENED SPECIES

There are only two species listed by the Secretary of the Interior on the "endangered species" list (44 FR 12:3544, 1979) known to occur in the EIS area.

The bald eagle is classified as threatened in Oregon and is a winter migrant to the area. Areas of high use include the upper Crooked River Valley near Paulina and the lower Crooked River Valley below Prineville Dam. Lesser use areas include Ochoco. Prineville, and Barnes Butte Reservoirs, and the Powell Butte area. Birds arrive as early as September, but numbers generally peak in March. The highest number recorded during a winter survey was 49 in 1980. There are no known breeding pairs of bald eagles in the Brothers EIS area.

Peregrine falcons are classified as endangered. Two sightings of adult birds were made by BLM and ODFW personnel in 1978 near the G. I. Ranch. Both observations were made during the nesting season. Investigations failed to locate nest sites.

RECREATION

The Brothers EIS public lands receive nearly 1 million recreation visits annually, or about 235,000 visitor days (Table 13).

The only developed recreation site on public land is the Chimney Rock Recreation Site adjacent to the Crooked River, downstream from Bowman Dam (Prineville Reservoir). This site, and the 12-mile segment of the canyon in which it is located, is the most intensively used recreation area on public land in the EIS area. Annually it receives more than 60,000 visitor days of use.

Hunting, driving for pleasure, target shooting and photography are dispersed throughout the area. Rockhounding for obsidian, petrified wood, and agate-type material is concentrated around Glass Butte, Congleton Hollow, Liggett Table, Hampton Butte, and near Prineville Reservoir. The Crooked River, its tributaries, and portions of the Deschutes River accommodate nearly all fishing and watersports in the EIS area. Off-road vehicle use is concentrated in the Millican Valley ORV area, around Prineville Reservoir, and on public lands near Bend, Redmond, and Prineville. Hiking and camping on public lands is centered in the seven identified wilderness study areas and along the Crooked River.

Two river segments identified in the nationwide rivers inventory cross public land within the EIS area (Table 14).

Table 13 Summary of 1981 Recreation Use on Public Lands

Activity	Visits[1]	Visitor Days[2]
Driving for pleasure	735,000	105,000
Fishing	74,000	31,000
Rockhounding	36,000	30,000
Off-road vehicle driving	42,000	23,000
Hunting	10,000	18,000
Hiking or camping	6,000	9,000
Other[3]	48,000	19,000
TOTAL	951,000	235,000

[1] A recreation visit is one person visiting a given area to participate in a recreation activity.

[2] A visitor day is the aggregation of 12 hours of recreation use.

[3] Includes watersports, target shooting, and photography.

Table 14 Rivers Identified in the Nationwide Rivers Inventory

River Segment	Approximate Shoreline Mileage	
	Total Length	Total BLM
Deschutes River (Bend-Billy Chinook Reservoir)	26	3
Crooked River (North Fork-Lake Billy Chinook)	107	16

SOURCE: Heritage Conservation and Recreation Service, 1980.

The State of Oregon has identified the segment of the Crooked River between Bowman Dam and the slack water of Lake Billy Chinook for possible inclusion in the State Scenic Waterways System.

Trends in outdoor recreation use in the EIS area have fluctuated widely in the past due to fuel availability, weather, inflation, and changes in user preference. A 4.5 percent decrease in overall traffic in the EIS area was experienced between 1979 and 1980. From 1980 to 1981 an increase of 1.6 percent to approximately 235.000 visitor days was experienced. Projections indicate hunting and fishing will remain relatively stable through the year 2000. Other recreational activities are expected to increase by 30 percent to 300,000 visitor days by the year 2000 (Pacific Northwest River Basin Commission, 1975).

VISUAL RESOURCES

Scenic quality, the visual sensitivity the public has for the landscape, and visual distance are used to determine the visual resource management objectives for an area (Map 8).

In the Brothers EIS area 600 acres of public land (Horse Ridge Research Natural Area) are managed to allow only natural ecological changes on the landscape (VRM Class I). An additional 284,200 acres of public land are managed to allow surface disturbing activities to occur only if those projects are not evident on the characteristic landscape (VRM Class II). Another 483,400 acres are managed so surface disturbing projects do not dominate or change the character of the landscape (VRM Class III). Approximately 300,000 acres of public land are managed to allow surface disturbing activities to be dominant features on the landscape; however, they should fit into the characteristic landscape as much as possible (VRM Class IV).

Methodology for scenic resource evaluation under the visual resource program is available at the Prineville BLM Office.

CULTURAL RESOURCES

The cultural environment of the Brothers EIS area includes prehistoric and historic remnants of human activity durrng the last 12,000 to 13,000 years. Historic sites are locales used by Euro-Amencans from the 1820's to the 1930's. Prehistoric sites are locations used by native peoples prior to the 1850's.

A complete field survey to identify cultural resources eligible for inclusion in the National Register of Historic Places was not feasible, due to the size of the EIS area. However, a review and compilation of known cultural resource data (Class I inventory) was completed (Toepel and Beckham, 1978). A sampling field inventory (Class II) was completed in the Glass Butte area (Mack, 1975); 106 sites were identified durina the survey that covered 7.500 acres. This. plus the detailed surveys I (Class III) conducted prior to authorizing various activities resulted in an intensive survey on 21,905 acres of public land in the EIS area. This resulted in identification of site density ranging from 6 sites per 40 acres to one site per 640 acres.

There are no cultural sites in the Brothers EIS area listed on the National Register of Historic Places. However, Meek's Immigrant Road and two archeological districts, one near Post and the other on Twelvemile Table, were identified as potentially eligible for the National Register.

BLM has identified 238 prehistoric sites in the Brothers EIS area. Lithic scatters comprise the majority (77 percent) of these sites and temporary camps account for 7 percent. Other site types represented include quarry/workshops milling stations, rock art sites, rockshelter sites, burials, and other sites.

BLM has identified 62 historic sites. Sites with a settlement theme account for 45 percent and those of an exploration/transportation nature comprise 19 percent. Other themes Include townsite/public buildings, grave/cemetery. military, agriculture, industry, and others.

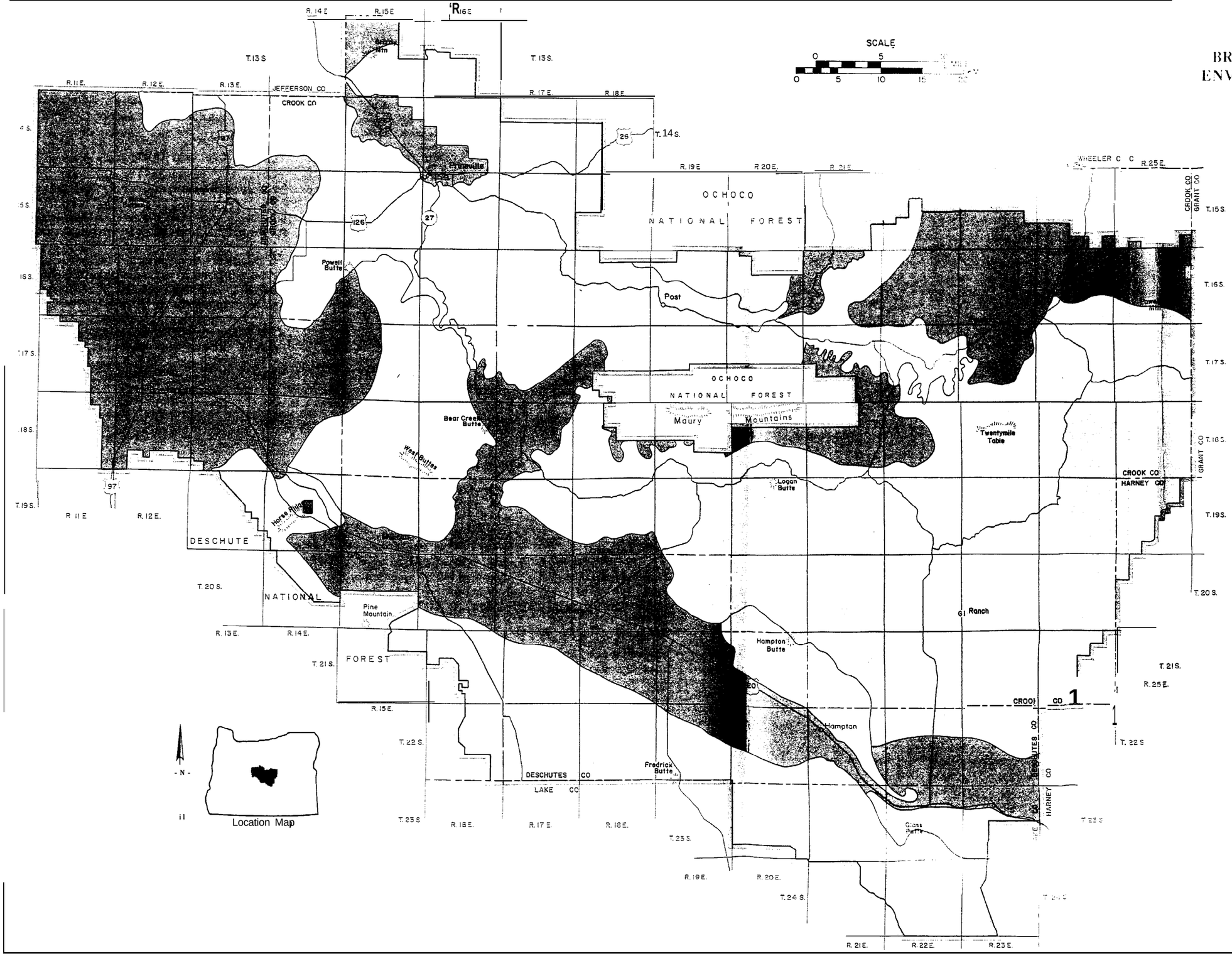
Based on the above information and a letter dated January 29, 1982, from the State Historic Preservation Officer (Appendix N), it is estimated there may be as many as 10.700 cultural resource sites on public lands within the EIS area.

PALEONTOLOGY

Relatively little is known about the overall extent or density of paleontological resources within the EIS area. A total of 42 paleontological sites have been located on or near public lands in the EIS area.

There are approximately 380,000 acres of geological formations (or 16 percent) in the EIS area which may contain fossils (paleontological sites).

BROTHERS GRAZING MANAGEMENT
ENVIRONMENTAL IMPACT STATEMENT



MAP 8

VISUAL RESOURCE
MANAGEMENT CLASSES

WILDERNESS

A wilderness inventory of the EIS area has been completed as required by Section 603 of the, Federal Land Policy and Management Act (1976). Seven wilderness study areas (see glossary) were identified (Table 15). Each meets the requirements that qualify them for further study.

Each of these areas will be evaluated in a Wilderness Environmental Impact Statement to be prepared in 1983 and 1984. Until that process is completed and a final decision regarding wilderness designation is made, all seven areas will be managed under the Interim Management Policy and Guidelines for Lands under Wilderness Review (December, 1979). The policy states that grazing use authorized during the 1976 grazing fee year is "grandfathered" and may continue. Range developments in existence as of October 21, 1976 can be used and maintained. New range improvements or changes in grazing levels or seasons of use will be allowed if the action is nonimpairing to wilderness suitability.

Data relating to the wilderness inventory are available for review in the Prineville District Office.

Table 15 Wilderness Study Areas

Name and WSA Number	Acres of Public Land	Allotments
Badlands OR-05-21	32,053	5108, 5204, 5207, 5209, 5 2 1 3
North Fork OR-05-31	10.745	0050, 0053
South Fork OR-05-33	19,631	0009, 0047, 0056, 0064
Sand Hollow OR-0534	8.791	0009, 0056
Gerry Mountain OR-05-35	20,700	0009, 0070
Hampton Butte OR-05-42	10,600	0003.0044
Cougar Well OR-05-43	17.315	0044
TOTAL	119.635	

SPECIAL MANAGEMENT AREAS

RESEARCH NATURAL AREAS

The Horse Ridge Research Natural Area (also known as Western Juniper National Natural Landmark) is a nearly pristine community of western juniper-big sagebrush-threadleaf sedge (Franklin, Hall, Dryness, and Maser, 1972). The 600-acre area has been fenced and is managed for scientific and educational purposes.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN

There are no areas of critical environmental concern (ACEC) proposed or designated in the Brothers EIS area.

Seven areas were nominated and studied as potential areas of critical environmental concern in BLMs planning process. However, none of the areas met the criteria for designation.

SOCIOECONOMIC CONDITIONS

For socioeconomic purposes, the EIS area is defined to include Crook and Deschutes Counties, even though a small portion of the area extends into Lake and Harney Counties.

POPULATION AND INCOME

The population of these two counties was 75,223 in 1980. Population growth during the 1960 s was moderate, averaging 2.2 percent per year; between 1970 and 1980 the population grew at an average rate of 7.4 percent per year. Most of this growth was in Deschutes County.

The portion of income attributable to labor and proprietor's income amounted to $418.8 million. Of this, $6.9 million was farm income and $411.9 million was nonfarm income. Personal income in the EIS area in 1979 was $566.7 million. Income per capita was $8,334; the state-wide average was $8.887.

Total farm proprietor income has wide annual variations. In the last eight years in this two county area it has ranged from $4.3 million in 1974 to -$1.3 million in 1977 and averaged S1.2 million.

ECONOMIC ACTIVITY

The total labor force (people working or looking for work) averaged 36,610 in 1980. Unemployment was about 12.5 percent.

Approximately 26,000 workers were employed in nonagricultural wage and salary positions in 1980. This included lumber and wood products, manufacturing, construction, trade, and government employment (Oregon Department of Human Resources, 1981). During 1979 there were approximately 950 farm or ranch proprietors and an average of 500 farm wage and salary workers employed in the two county area (U.S. Department of Commerce, 1981). (1980 data unavailable.)

The value of agricultural products sold in 1980 in Deschutes and Crook Counties was $32.7 million. This included 13.6 million in crops, $14.8 million in cattle, and $4.3 in other livestock products (Oregon Extension Service, 1981).

ECONOMIC SIGNIFICANCE OF PUBLIC LAND

The following sections describe several measures of the value of grazing on public land.. The amount of local income and employment generated by livestock use and recreation on the pulic lands is estimated.

DEPENDENCE OF LIVESTOCK OPERATORS ON PUBLIC FORAGE

During 1981. 119 operators grazed 48,711 cattle on public lands within the EIS area. There were 74.670 AUMs of forage available for sale; however-65.169 AUMs were actually sold. This was 11.2 percent of the total forage requirements of those operators.

Dependence on BLM-produced forage vanes monthly. Table 16 indicates dependency on public land forage is the greatest during the spring and summer, and the least during the winter months.

BLM GRAZING LICENSES AND RANCH PROPERTY VALUES

Effects on ranch property values may occur as a result of BLM grazing permits even though permits are not vested property rights. Based on appraisal studies related to ranch sales, the asset value of public forage licenses is estrmated to be about $40-$45 per AUM.

FINANCIAL VIABILITY OF RANCH ENTERPRISES

Return above cash cost has been designed to be used as a measure of the effect of changes in ranch enterprises. Return above cash cost can be used to apply to other costs such as depreciation, interest on investments or land, and family labor.

Table 16. Operator Dependency on BLM-Produced Forage by Month

Month	Percent Dependency Range	Herd Size: 0 - 99	100 - 399	400 - 999	1,000 or more
		Number of Operators			
March	0 - 19	44	36	25	9
	20 - 39	0	1	0	0
	40 - 59	0	1	0	0
	60 - 79	0	0	0	0
	80 - 100	0	1	0	0
April	0 - 19	32	25	18	6
	20 - 39	3	7	4	1
	40 - 59	5	3	3	2
	60 - 79	3	4	0	0
	80 - 100	2	0	0	0
May	0 - 19	18	15	13	4
	20 - 39	7	10	6	2
	40 - 59	3	8	5	3
	60 - 79	9	2	1	0
	80 - 100	7	4	0	0
June	0 - 19	21	Ia	14	4
	20 - 39	6	9	5	2
	40 - 59	5	5	2	2
	60 - 79	6	4	3	1
	80 - 100	6	3	1	0
July	0 - 19	27	18	14	4
	20 - 39	4	10	3	2
	40 - 59	6	4	4	1
	60 - 79	3	4	2	2
	80 - 100	4	3	1	0

INCOME AND EMPLOYMENT FROM RECREATIONAL ACTIVITY

In 1981, hunting, fishing, camping and day-use on public lands generated 180 local jobs (see Chapter 3, Recreation and Appendix Q).

SOCIAL CONDITIONS

The user group which would be the most significantly affected by implementation of the proposed action or any of the alternatives is that portion of the ranching community totalling approximately 670 people who are dependent upon BLM-produced forage. This group maintains a close connection between the ranching occupation and their personal, rural lifestyle. The ranch business often involves the entire family and plays a substantial role in developing personal and family ties.

Other effects on social conditions are primarily related to recreation users and their opportunity to pursue a variety of outdoor activities on public land (see Chapter 4, Recreation).

Chapter 4
Environmental Consequences

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

This Chapter identifies, summarizes, and compares the environmental impacts which are projected to occur to the environment as described in chapter 3 **as a** result of implementing the proposed action or one of the alternatives. Impacts are discussed in relation to two time frames: short term, those which are expected during project implementation, and long term, those which would result 15 years after Implementation.

The three features of the livestock grazing program analyzed under the proposed action and alternatives which would cause impacts are forage allocation, grazing systems, and rangeland improvements. Each resource is analyzed in terms of effect of these three actions.

Climate and special management areas were not analyzed since it was determined that they would not be affected by the proposed action or any of the alternatives. No impacts would occur to endangered or threatened species. They are dropped from further discussion.

The energy investment necessary for implementation of the proposed action would be 53.4 billion Btu's (less than .0001 percent of the total energy consumed in Oregon in 1981). Alternative 1 would require 88.2 billion Btu's and alternative 3 would consume 13.4 billion Btu's. No energy would be consumed under alternatives 2 and 4.

These criteria were used to determine the nature and extent of impacts:

Beneficial impact: conditions would improve relative to existing situation:
Adverse impact: conditions would deteriorate relative to the existing situation:
No impact: conditions would remain the same as the existrng situation.

The following assumptions have been made in this chapter:

1. BLM would have the funding and staff to fully implement the proposed action or selected alternative and interrelated elements as described in Chapter 2.
2. Standard procedures and design would be followed as specified in Chapter 2 for all rangeland Improvements.
3. All grazing systems and utilization levels would be followed.
4. The principal component directly affected is vegetation. Any change in vegetation would affect other resources.
5. Monitoring studies would be done and adjustments made as discussed in Chapter 2.
6. Sufficient forage to meet ODFW management objectives will be allocated as it becomes available.

SOILS

The proposed action and each of the alternatives would have an effect on soils in the EIS area by causing changes in erosion rates and soil productivity. Increased erosion would reduce soil productivity which, in turn, would reduce the sustained production of plants and animals, Erosion would be caused by soil disturbance and/or a change in residual ground cover caused by livestock grazing and rangeland improvements.

Soil surface disturbances reduce the protective ground cover (vegetation, litter, and surface rock) and allows an increase in wind and water erosion. This, in turn, reduces soil productivity due to changes in infiltration rate, soil moisture, organic matter, surface soil structure, permeability, nutrient recycling, and compaction (Silvernale, Simonson, and Harward, 1976.)

Generally, as residual ground cover decreases, erosion would increase, and as residual ground cover increases, erosion would decrease.

Erosion caused by changes in forage allocation, grazing systems, and rangeland improvements are based on changes to residual ground cover, reflected in changes in ecological trend displayed in Table 22. Erosion would increase with continuous spring grazing under spring/summer, spring/summer/fall, spring/fall, and early grazing systems. This would result from livestock trampling on wet soil and reduced residual ground cover on early-seral rangelands (Smeins, 1975: Silvernale, Simonson, and Harward, 1976: Bedell and Ganskopp, 1980).

No significant erosion due to soil compaction is expected where utilization is less than 60 percent (Gifford, 1975; Holechek, 1980) under proposed action, alternatives 1, 2. and 3.

Construction of rangeland facilities and implementation of vegetative treatments would cause short term increases in erosion due to soil disturbances (Table 18) and reductions in residual ground cover. However, this erosion would decrease over the long-term as vegetation became re-established. Juniper control would reduce erosion in critical watersheds in the long-term (Dealy, Geist, and Driscoll, 1977; Martin. 1977; Winegar and Elmore, 1977).

Erosion would not increase in the short or long term on areas where sagebrush would be controlled by spraying as residual ground cover would remain on-site and soil surface disturbances would be

Table 18 Acres of Potential Soil Disturbance [1]

Rangeland Improvements	Proposed Action Short Term	Proposed Action Long Term	Alternative 1 (Optimize Livestock) Short Term	Alternative 1 (Optimize Livestock) Long Term	Alternative 3 (Optimize Wildlife & Watershed) Short Term	Alternative 3 (Optimize Wildlife & Watershed) Long Term
Fences	70	0	57	0	64	0
Springs	1	1			1	1
Wells	2	1	2		6	0
Pipelines	933	467	939	470	0	0
Reservoirs	75	25	75	25	30	10
Waterholes	2		2		5	3
Guzzlers	8	8	4	4	10	
Rip-rap	164	0	41	0	206	10 0
Stream structu	62	0	16	0	78	0
Debris removal	15	0	15	0	15	0
Nest site const.	0	0	0	0	0	0
Spray/seed	3,200	0	6,250	0	0	0
Burn/seed	42,330	0	93.050	0	0	0
Plow/seed	8,625	0	17,650	0	0	0
Spray only	57.635	0	143.400	0	58.204	0
Burn-only	47,486	0	135.100	0	0	0
Chain only	5,000	0	11,000	0	0	0
Juniper control only	97.733	0	153.012	0	68.028	0
Juniper control/seed	4,700	0	7,600	0	0	0
TOTAL	268,041	503	568,214	502	126,647	24

[1] No projects are proposed for alternatives 2 or 4

negligible. Sagebrush control by burning would cause short term reductions in residual ground cover and increase the potential for wind erosion on susceptible soils in mapping units 1, 3, 4, and 5.

Plowing, chaining, and seeding associated with brush control would cause short term soil surface disturbance. This would cause increases in compaction. surface soil structure breakdown, decreases in soil-water infiltration rates, and reduction of protective ground cover. This would result in potential increases of wind erosion from mapping units 1, 3. and 5 (Gifford, 1975; Hessary and Gifford, 1979). Wind erosion potential is high for portions of mapping units 1 and 5: sagebrush removal from these soils would result in some seedling failure due to soil droughtiness and seedling burial (Gifford. 1975).

CONCLUSION

The rate of erosion over the long term would decrease under the proposed action and all alternatives. The proposed action and alternative 3 would show the greatest reduction. Under alternative 3 erosion would be reduced due to juniper control in critical watersheds and the elimination of livestock grazing in those areas.

Impacts due to range improvements would result in a short-term increase in soil erosion: however, an overall decrease in soil erosion would result as vegetative cover becomes established.

WATER

WATER QUANTITY

In general, surface runoff decreases with an increase in residual ground cover and improved ecological condition. Table 19 was used to predict acres affected by changes in surface runoff, due to expected long-term changes in residual ground cover. These changes are due to changes in ecological condition resulting from rangeland improvements, forage allocation, and grazing systems.

Forage allocation and grazing systems would have no significant effect on surface runoff except where changes in residual ground cover would occur (See Vegetation).

Surface runoff would decrease most under alternative 3 (Table 19). With alternative 1, surface runoff would Increase due to decreases in residual ground cover. Juniper control would decrease surface runoff due to an increase in residual ground cover: the greatest benefit from jumper control in critical watersheds would be in alternative 3. proposed action and alternative 1, respectively.

Brush control (other than spraying and seeding) would cause a short term increase in surface runoff due to loss of residual ground cover and increased soil disturbances.

Table 19 Long-Term Trend, Acres Contributing to Surface Runoff'

Surface Runoff	Proposed' Action	Alt. 1 (Optimize Livestock)	Alt. 2 (No Action)	Alt. 3 (Optimize Watershed & Wildlife)	Alt. 4 (Eliminate Livestock Grazing)
Upward	383,320	265,509	264,753	386,209	400,663
Downward	120,655	279,964	112,057	49,361	9,314
Static	563,602	522,104	690,767	632,007	657,600

' Acres contributing to surface runoff as a result of forage allocation and grazing systems

CONCLUSION

Changes in surface runoff would not have a measurable effect on mean annual water yield. However, it would change the magnitude and frequency of runoff events. The greatest decrease in surface runoff would be under the proposed action and alternatives 3 and 4.

WATER QUALITY

Water temperature. sediment, and late summer flows are affected by livestock forage allocation and grazing systems that allow the removal of riparian vegetation. This vegetation provides stream shade, channel stability. and water retention for higher late summer flows. The stability of stream channels is a major Indicator of water quality constituents (Table 20).

Fencing of riparian areas to exclude livestock would significantly improve riparian ecological condition, therefore Improving channel stability and water quality.

Application of herbicides under the proposed action and alternative 1 would not affect water quality (Chapter 2, Standard Design).

CONCLUSION

Overall water quality would improve under the proposed action and alternatives 3 and 4. Overall water quality would remain static under alternatives 1 and 2 (Table 20).

Spraying and other range improvements are not expected to have a significant effect on surface runoff.

Construction of reservoirs would impound approximately 25 acre-feet of water per year under the proposed action and alternative 1, and 10 acre-feet under aiternative 3. This would have an insignificant effect on mean annual water yield. Ground water withdrawal under the proposed action

Table 20 Channel Stability, Estimated Condition and Trend, BLM Stream Miles

Alternative	Condition: Excellent	Good	Fair	Poor
Existing situation	16	32	35	13
Proposed action	35	32	27	2
Alternative 1 (Optimize livestock)	21	13	41	20
Alternative 2 (No action)	22	13	34	27
Alternative 3 (Optimize wildlife and watershed)	76	20	0	0
Alternative 4 (Eliminate livestock)	76	20	0	0

Alternative	Trend: Up	Static	Down
Proposed action	53	43	0
Alternative 1 (Optimize livestock)	20	76	0
Alternative 2 (No action)	33	43	20
Alternative 3 (Optimize wildlife and watershed)	96	0	0
Alternative 4 (Eliminate livestock)	96	0	0

and alternative 1 IS estimated to be 45 acre-feet per year. This would have an insignificant effect on ground water.

VEGETATION

In this section the effects of forage allocation, grazing systems, and rangeland improvements on the six attributes of vegetation discussed in Chapter 3 (vegetation types, ecological condition and trend, plant diversity, available forage production, residual ground cover, plants of special concern) will be anaylzed. The situation as described in Chapter 3 is !he baseline from which all changes are projected.

VEGETATION TYPES

Forage allocation and grazing systems as proposed in this document would not have a significant effect on vegetation types. Any changes would be long-term changes in ecological condition, as discussed below.

Rangeland treatments would affect vegetation types through removal of sagebrush and juniper, converting big sagebrush vegetation type to native grassland-bunchgrass or crested wheatgrass. Table 21 shows changes in vegetation types resulting from brush and juniper control projects and seeding.

For the purpose of this analysis, ecological trend refers to direction of change of ecological condition. For example, upward trend refers to ecological condition moving toward climax, while downward trend refers to ecological condition moving away from climax. Ecological condition not changing would have static trend.

CONCLUSION

The greatest change in vegetation types would result from alternative 1, followed by the proposed action, and alternatives 2, 3. and 4.

ECOLOGICAL CONDITION AND TREND

FORAGE ALLOCATION

Initial forage allocation in the proposed action and alternatives is not projected to have a significant effect on ecological condition or trend. As discussed in Chapter 1, past problems of overgrazing largely have been alleviated in the EIS area.

GRAZING SYSTEMS

Plants draw on stored food in roots to initiate growth in the spring. Once sufficient vegetative material has been produced food is again stored in the roots to carry the plant through winter dormancy and provide for the next year's spring growth. The amount of grazing which would allow plants to complete this cycle has been called the proper stocking rate: the amount of use is proper use. However, the assumption that all plants in a pasture can be grazed to a proper level through regulation of the stocking rate is unrealistic because of the selective grazing habits of livestock. Livestock graze some plants heavier than others, regardless of the stocking rate and many plants are heavily utilized year after year. The key to improving the vegetation is not adjusting stocking rates, but managing grazing use in such a manner that these highly-utilized plants would be cared for (Hormay, 1970).

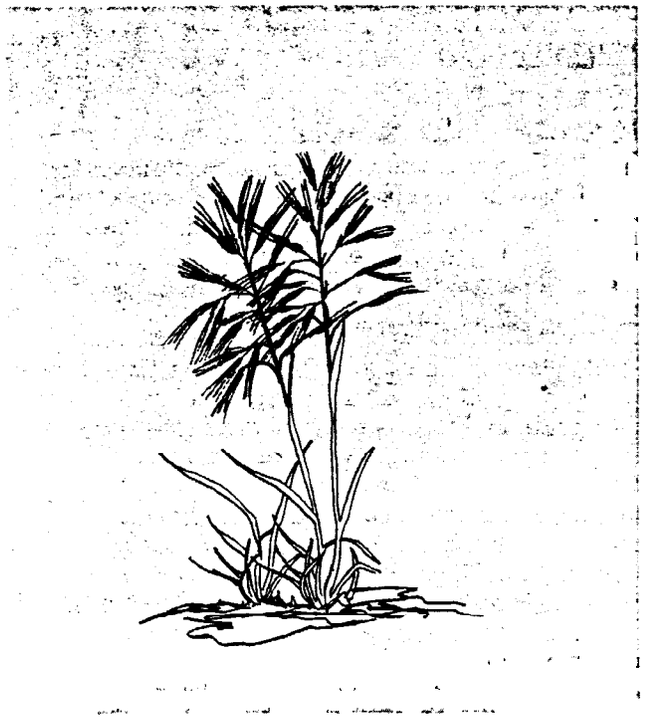
In order to improve plant vigor, reproduction, and hence, ecological condition, the grazed plants regularly must be allowed to complete a growth cycle. A growing season's rest, following a season of grazing, would allow grazed plants to make and store food, thereby increasing vigor. Further rest, beyond plant dormancy, would promote seedling establishment and allow litter accumulation between plants (Hormay, 1970). Extended rest would usually improve ecological condition (Hickey, 1969).

Grazing systems which allow complete or nearly complete growing season rest at regular intervals include rest rotation, deferred rotation, deferred, short duration, and winter grazing. An upward change in long term ecological condition would be expected with these grazing systems.

Table 21 Acres of Vegetation Types Resulting from Rangeland Improvements

Vegetation Type [1]	Proposed Action	Alt. 1 (Optimize Livestock)	Alt. 2 (No Action)	Alt. 3 (Optimize Watershed & Wildlife)	Alt. 4 (Eliminate Livestock)
Juniper-big sagebrush	291,147	232,968	393,580	325,552	393,580
Big sagebrush-bunchgrass	260,848	33,528	398,778	354,202	398,778
Low sagebrush-bunchgrass	128,005	118,705	131,205	131,205	131,205
Bunchgrass	194,289	423,393	9,581	122,185	9,581
Crested wheatgrass	99,676	165,371	40,821	40,821	40,821
All other types	93,612	93,612	93,612	93,612	93,612

[1] Existing conditions are same as listed for alternative 2.



Rotation and early grazing do not allow for extended growing season rest. While some improvement may result, for the purpose of analysis, it was assumed that ecological conditions would remain static with these systems.

Exclusion and rest result in extended rest of plants from livestock grazing.. For the purpose of analysis it was assumed that plant vigor and reproduction and hence, ecological condition class would improve with those treatments.

Grazing which does not allow plants to produce and store food reserves in the roots is especially detrtmental (Stoddart, 1955), and will cause the plant to weaken and lose vigor. Yearly grazing in this manner will eventually cause plants to die, resulting in a change in species composition and a downward change in ecological condition (Hormay, 1970). Grazing systems falling into this category include spring/summer, spring/summer/fall. and spring/fall.

Period of use under fenced federal range, where small Isolated parcels of BLM land are used in conjunction with private land, is not known, since it is at the discretion of the operator. It was assumed ecological condition would remain static.

Vegetation in the low end of the early-seral condition may not respond to grazing treatment or rest. Observations in the EIS area show that long-term rest of some pastures in extremely low early-seral condition has failed to produce even a small Increase in grass species composition due to the low occurrence of grass species. Similar results were observed by Tueller (1960). For this reason it was assumed that 50 percent of the present early-seral condition would not respond to management either through grazing or rest.

Vegetation in late-seral ecological condition will not go to climax through management alone (Sneva. 1980). Fire control, coupled with past management practices, has allowed sagebrush and juniper to increase in composition over much of the EIS area. Once these species become a part of the plant community, they can only be removed by fire or artificial means. Their contribution to the total plant composition is enough to keep vegetation from achieving a climax condition, except over a very long time frame. In addition, plant communities in the low end of climax condition have enough sagebrush or juniper in their composition so that condition will change to late-seral over the long term. For the purposes of analysis, it was assumed that 40 percent of vegetation presently in climax would change to late-seral in the long term.

The only ecological condition classes which would improve through grazing management are the upper end of early-seral and mid-seral. Based on observation and professional judgement of BLM personnel, it is assumed for this analysis that long-term upward or downward changes in ecological condition resulting from grazing management would be limited to one condition class, i.e.. mid-seral would progress to late-seral.

The effect of grazing systems on riparian ecological condition is different than on other vegetation due to the presence of year-round water. Year-round water allows extended growth but also attracts livestock when surrounding upland vegetation is dry.

Increased vegetative cover gained during the rest year of rest rotation systems is often lost with livestock use during the following years. Depending on their potential and location in pastures, some riparian areas may improve; however, most would remain in their present condition (Crouse, pers. comm., 1981). This is also true for deferred rotation grazing.

Early, short duration, and rotation grazing systems would result in less livestock concentrating along streams early in spring because of abundant green growth in the uplands and low air temperatures along streams. Sufficient regrowth would occur each year to establish an upward trend. Consequently, ecological condition would improve one condition class (Myers, 1981).

Spring/summer, spring/summer/fall, spring/fall, and deferred grazing would concentrate livestock in riparian areas during all or most of the summer and fall; therefore, a slow downward trend would be expected. Ecological condition would drop one condition class (Duff, 1977; Crouse, pers. comm., 1981; Platt, 1981).

Livestock exclusion and rest allow all riparian plants to complete their annual growth cycle and to increase in vigor and reproduction. Woody plants would accumulate woody tissue and therefore

increase in maturity and size. Within the EIS area, livestock exclusion has improved willow growth along Committee Creek (Allotment 0053). Through livestock exclusion and rest the ecological condition of riparian vegetation would improve by two classes in the long term (Duff, 1977; Bowers et al., 1979; Platt, 1981).

Fenced Federal range would be used in the same manner as adjoining private lands.

RANGELAND IMPROVEMENTS

Vegetation treatments have been proposed for some. plant communities to reduce or remove sagebrush or juniper to achieve a change of at least one ecological condition class.

The method of brush control determines vegetation composition following treatment. The expected results of burning are:

- Temporary elimination of sagebrush or juniper in treated areas;
- An increase in sprouting species such as rabbitbrush, if present in the treated area;
- An increase in perennial grass and forb species. This varies with timing and intensity of the burn. Under some circumstances perennial grasses may be damaged and could suffer a short term reduction in vigor.

Spraying is non-selective and would not only kill sagebrush but some other broad-leaved plants depending on stage of development during spraying. The expected results of spraying are:

. A reduction in sagebrush for the area treated;
- An increase in perennial grasses and annual forbs and grasses;
- A decrease in perennial forbs.

Chaining, while damaging some other plants, has a primary effect on brittle sagebrush plants. The expected results of chaining are:

A reduction in sagebrush within the treated area and
An increase in perennial and annual grasses and forbs.

Juniper control through cutting results in an immediate reduction of juniper in the treated area and is species-specific. Cutting removes only the juniper and leaves other plants intact. Juniper has been shown to use soil moisture at cooler soil temperatures than other species and as a result, much of the soil moisture has been depleted in juniper vegetation types before grasses can begin growth (Jeppeson, 1977). Therefore, the expected results of juniper control are:

A reduction in juniper within the treated area

An increase in perennial and annual grasses and forbs resulting from increased availability of soil moisture.

Since the smallest juniper trees would not be cut, juniper would once again dominate in 15 to 20 years, although the composition would not be enough to cause a change in ecological condition. Future control would be by burning.

Where reduction in woody species would not result in an increased composition of grass species due to a negligible natural seed source, seeding is proposed. Since most seedings include a high proportion of crested wheatgrass, the native plant community would be irreversibly altered and cannot be evaluated on an ecological seral stage basis. Therefore, for the purposes of analysis, all seeded vegetation is classified as “other.”

Rangeland improvements such as water facilities and fences allow control over livestock distribution and hence, utilization of forage. Water developments in particular also result in heavy use around the development itself. However, overall forage utilization becomes more uniform. These improvements per se would not cause significant changes in ecological condition, but would support implementation of grazing systems.

CONCLUSION

Ecological conditions would change under the proposed action and all alternatives. The greatest amount of change would occur with alternative 1, followed by the proposed action and alternatives 3, 4, and 2 (Table 22). The amount of vegetation in climax condition is greatest under alternative 1; the least amount of climax vegetation would be under alternative 2.

Streamside riparian vegetation would show improvement under all alternatives, most notably under alternatives 3 and 4. Reservoir riparian vegetation would show improvement only under alternatives 3 and 4. Table 22 shows ecological condition and trend of riparian vegetation for all alternatives.

PLANT DIVERSITY

As discussed in Chapter 3, plant diversity is greatest when vegetative communities are in mid- to late-seral ecological condition. Table 22 shows acres of high diversity resulting from the proposed action and alternatives.

Forage allocation as proposed in this document would have no significant effect on plant diversity.

Grazing systems would affect plant diversity as related to changes in ecological condition discussed previously.

Table 22 Long-Term Vegetation Impacts

Ecological Condition or Trend	Existing Situation		Proposed Action		Alt. 1 (Optimize Livestock)		Alt. 2 (No Action)		Alt. 3 Optimize Wildlife& Watershed)		Alt. 4 (Eliminate Livestock)	
	acres	percent	acres	percent	acres	percent	acres	percent	acres	percent	acres	percent
Ecological Condition												
ALL VEGETATION TYPES												
Climax (excellent)	24,010	2	41,007	4	83.639	8	12.922	1	14.023	1	15,037	
Late-seral (good)	234,657	22	603.976	57	574,635	54	421.442	40	467.504	44	554.439	5:
Mid-seral (fair)	565,928	53	260.615	24	221.667	20	378,369	35	467.669	44	345.258	33
Early-serai (poor)	185,499	18	45.641	4	5,603	1	197.361	19	60.898	6	95.360	9
Other	57.483	5	116.338	11	182,033	17	57.483	5	57,483	5	57,483	5
RIPARIAN VEGETATION												
Stream												
Climax (excellent)	20	5	148	36	91	22	93	23	321	79	321	79
Late-seral (good)	97	24	134	33	56	14	56	14	86	21	86	21
Mid-seral (fair)	204	50	118	29	175	43	145	35	0		0	
Early-seral (poor)	86	21	7	2	85	21	113	28	0		0	
Reservoir												
Climax (excellent)	11	3	11	3	11	3	11	3	40	12	40	12
Late-seral (good)	12	4	12	4	12	4	12	4	296	88	296	88
Mid-seral (fair)	28	a	29	9	29	9	29	9	0		0	
Early-seral (poor)	285	a5	284	84	284	a4	284	a4	0		0	
Ecological Trend [1]												
ALL VEGETATION TYPES												
Upward	264,753	25	493.441	46	555,009	52	264,753	25	**386,209**	36	400.663	38
Downward	112,057	10	9,314	1	9,314		112,057	10	49,361	5	9,314	
Static	690.767	65	505.967	47	378.704	35	690.767	65	632,007	59	657.600	61
"Other" [2]	0		58.855	6	124.550	12	0		0		0	
RIPARIAN VEGETATION												
Stream												
Upward	137	34	222	55	87	21	137	34	407	100	407	100
Downward	87	21	0		0		87	21	0		0	
Static	183	45	185	45	320	79	la3	45	0		0	
Reservoir												
Upward	23	7	23	7	23	7	23	7	336	100	336	100
Downward		<1	0		0			<1	0		0	
Static	312	93	313	93	313	93	312	93	0		0	
Plant diversity [3]												
High	**400.293**	37	**432.296**	40	398.152	37	**399.906**	37	467.587	44	449,849	42
Low	667.284	63	635.281	60	669,425	63	667.671	63	599.990	56	617,728	58
AVAILABLE FORAGE												
Production												
(AUMs)[4]	89.104		174.828		209,204		**129.770**		155.262		171.168	

Ecological trend data for the existing situation is unavailable. However, the projections for the no action alternative (2) are applicable: acres duplicate those under alternative 2

[2] Go to other" refers to natural vegetation which, upon conversion to crested wheatgrass, can no longer be evaluated on an ecological basis

[3] High diversity is the total Of the lower half of the acres in late-seral condition and the upper hall of the acres in mid-seral condition. Low diversity is the remainder.

[4] Not necessarily **allocated to livestock. See Table 3 and Figure 3.**

a

Rangeland improvements would affect plant diversity as related to changes in ecological condition discussed previously. While removal of juniper or sagebrush may eliminate that species from the treated area, plant diversity would'increase since a greater number of plant species would replace the jumper or sagebrush. Seeding would reduce plant diversity on 58,855 acres in the proposed action and 124,550 acres in alternative 1.

CONCLUSION

Plant diversity would be highest and would increase under alternative 3, followed by alternative 4, and the proposed action. Decreases in plant diversity would occur with alternatives 1 and 2 (Table 22).

AVAILABLE FORAGE PRODUCTION

The forage allocation proposed in this document would not significantly affect available forage production. However, forage production is affected by grazing systems because of their effect on ecological condition. Improvement of ecological condition through increased plant vigor, seed production, and establishment of more seedlings increases the forage yield (Shiflet, 1971). Therefore, the higher the ecological condition, the greater the amount of forage production.

Forage production would be increased by some land improvements. Brush and juniper control would result in improved ecological condition (Table 23) through improved grass vigor, seed production, and seedling establishment (Vallentine, 1971). Seeding would convert low production early- and mid-seral vegetation to crested wheatgrass. For example, forage production on crested wheatgrass seedings can be as much as 1,000 pounds or more per acre on big sagebrush sites (Hull, 1974). A seeding in the Prineville BLM District was recently grazed at a stocking rate of 2.5 acres per AUM, with 30 percent utilization. At 60 percent utilization, the stocking rate would be less than 1.5 acres per AUM. Available forage production was approximately 640 pounds per acre, assuming 800 pounds of forage consumption per AUM.

CONCLUSION

Through a change in ecological condition, or rangeland Improvements, available forage production is expected to increase under all alternatives (Table 22). Alternative 1 would result in the greatest Increase compared to the existing situation (135 percent Increase) followed by the proposed action (96 percent increase), alternative 4 (92 percent Increase), alternative 3 (74 percent increase), and alternative 2 (46 percent Increase). These values were predicted by assigning average available forage productron values to each ecological condition class. For example, vegetation in climax condition was expected to have an average available forage production of 3 acres per AUM. late-seral 7 acres per AUM, mid-seral 11 acres per AUM. early-seral 15 acres per AUM. and non-seeded other 20 acres per AUM. Crested wheatgrass seedings were assigned 2 acres per AUM.

RESIDUAL GROUND COVER

FORAGE ALLOCATION

The initial forage allocation under each alternative would affect residual ground cover on a short-term basis. For example, if an initial increase in livestock grazing use would occur in an allotment, residual ground cover would be expected to decrease since more available forage would be consumed, leaving less on the ground. An increase in residual ground cover would be expected with a decrease in allocation.

GRAZING SYSTEMS

Residual ground cover would subtly change in the long term as a result of changes in ecological condition caused by grazing. As ecological condition changed from mid-seral to late-seral, a corresponding increase in residual ground cover would be expected, since,as ecological condition moves toward climax a general increase in vegetative production occurs. This increase may not be pronounced since, as ecological condition changes, one plant will replace another and only a slight increase in residual ground cover would occur.

Differences in maximum forage utilization levels, as shown in Table 21, would affect residual ground cover in the short term if a change in grazing system is made. For example, residual ground cover would be reduced in the short term if the existing spring/summer grazing system (40 percent utilization). is changed to deferred rotation (55 percent utilization). This short-term reduction would be mitigated by increased forage production later as a result of improved management.

Based on maximum forage utilization levels for each grazing system compared to the number of acres for each system, alternative 4 would result in the greatest increase of residual ground cover in the short term, since no forage utilization would occur by livestock. This alternative is followed by alternative 3, with 34 percent utilization (a 26 percent decrease from the present 45 percent utilization), alternative 2 with no change from present, and the proposed action and alternative 1, with 50 percent utilization (an increase of 11 percent).

RANGELAND IMPROVEMENTS

Rangeland improvements would both increase and decrease residual ground cover in the short and long term depending on the nature of the improvement (Table 23).

Rangeland improvements would decrease residual ground cover in the short-term through construction. While a fence would not occupy enough land to reduce residual ground cover in the long term, trampling of vegetation during construction would reduce short term cover, although not significantly compared to the total EIS area.

Table 23 Acres of Long-Term Change, Residual Ground Cover

	Proposed Action	Alt. 1 (Optimize Livestock)	Alt. 2 (No Action)	Alt. 3 (Optimize Watershed& Wildlife)	Alt. 4 (Eliminate Livestock Grazing)
Juniper control	(+)[1] 97,733	(+) 153,012	0	(+) 68.028	0
Brush control					
Spray	(S) 57.635	(S) 143,400	0	0	0
Burn or chain	(-) 52,486	(-) 146.100	0	(+) 58,204	0
Seeding	(-) 58,855	(-) 124,550	0	0	0
Grazing systems [2]	(+)	(+ 112,497	(+) 264,753	(+) 259,977	(+) 400.663
	(-) 285,587 9.314	(-) 9,314	(-) 112.057	(-) 49,361	(-) 9,314
	(S) 505.967	IS) 378.704	(S) 690.767	(S) 632,007	(S) 657,600
TOTAL (+)	383.320	265,509	264,753	386,209	400,663
TOTAL (-)	120,655	279,964	112.057	49,361	9.314
TOTAL (S)	563.602	522,104	690,767	632,007	657.600

[1] (+) = increase in residual ground cover
(-) = decrease in residual ground cover
(S) = residual ground cover remains static

[2] Reflects trend in ecological condition for those acres not subjected to rangeland improvements

All methods of brush control except spraying would reduce residual ground cover in both the short and long term. The short-term reduction would occur since the sagebrush cover would be removed and grass or forb species would not yet occupy the area. A long-term reduction would occur since the brush species would be replaced by plants suitable for livestock forage Assuming these new plants would be grazed by livestock. the residual ground cover would be less due to fewer nonpalatable plants on site. Residual ground cover would Increase in alternative 3 because this Increased forage production is not allocated to livestock.

Spraying would increase residual ground cover in the short term since the dead, woody sagebrush plant would be left in place. There would be an initial release of the natrve vegetation resulting in greater vegetation production. In the long term, residual ground cover would be static as the dead sagebrush plant breaks down and decays.

Seeding would result in a decrease in residual ground cover in the short term since sagebrush or juniper cover would be removed or disturbed prior to or during seeding. In the long term, the proportion of forage plants would far outweigh the remaining non-forage species. and again, assuming utilization by livestock. residual ground cover would be less

In the same manner as sagebrush spraying. juniper control would Increase residual ground cover in the short term. In the long term. residual ground cover would also Increase since the dead juniper tree would remain In place while forage production would Increase

CONCLUSION

Short-term residual ground cover, primarily related to forage allocations and rangeland improvements, would show the greatest increase under alternative 4 followed by alternative 3. Alternative 1 would result in the greatest short-term decrease of residual ground cover followed by the proposed action.

Short-term residual ground cover under alternative 2 would not change from the existing situation. Short-term decreases in residual ground cover would be mitigated by long-term increases and are therefore not shown in Table 23.

The greatest net increase in long-term residual ground cover would occur under alternative 4, followed by alternative 3, the proposed action, and alternative 2. Alternative 1 would result in a net decrease in long-term residual ground cover, primarily as a result of rangeland improvements and the conversion of sagebrush to grassland or seeding (Table 23).

PLANTS OF SPECIAL CONCERN

Site-specific information concerning the occurrence of plants listed in Chapter 3 is not available. It is not known what effect, if any, livestock grazing per se would have on these plants since their occurrence in any given habitat has not been correlated to ecological condition. Also, it is not known what effect, if any, different allocations would have on these plants.

In relation to rangeland improvements. potential detrimental effects of the proposed action and

alternatives 1 and 3 would be avoided by conducting plant inventories before project implementation and modifying project layout if plants are found (Chapter 2, Standard Design).

Therefore, no impacts to plants of special concern are anticipated under the proposed action or any alternative.

AIR QUALITY

Air quality would be impacted by localized temporary increases in Total Suspended Particulates due to mechanical treatment or burning and dust from exposed and disturbed soil. These are not expected to significantly affect the Class II air quality designation.

WILDLIFE

UPLAND HABITAT DIVERSITY

Bureau policy states that public lands will be managed for the benefit of all wildlife species (BLM Manual Section 6500). The diversity of wildlife species is directly related to vegetative diversity and both are an integral portion of habitat stability (Thomas, 1979). The diversity of vegetation in any given habitat depends on its ecological condition class. Seral stages that commonly have the highest plant diversity range from mid-seral to the low end of late-seral ecological condition. Early-seral and climax ecological condition generally contain a lower diversity of plant species. Wildlife diversity and its relationship to habitat diversity is the basis for this impact analysis.

FORAGE ALLOCATION

Proposed vegetation allocation would not affect ecological condition (see chapter 4, Vegetation). Changes in ecological condition and vegetative diversity influenced by grazing systems are also discussed in the Vegetation section and are shown in Table 21.

GRAZING SYSTEMS

Rest rotation and deferred rotation grazing systems would Increase herbaceous ground cover for nesting waterfowl, upland birds, and nongame species. There would be a reduction of residual cover for nesting water birds along shorelines or reservoirs one year during the grazing cycle (Mundinger, 1975). Species dependent on bunchgrass would increase.

Short duration grazing systems would result in Increased cover for ground oriented wildlife species.

Exclusion of livestock would change ecological condition. It would approach late-seral ecological condition, improving habitat for nongame species on the 2,000 acres excluded. However, climax would not be reached in the long term. Waterfowl use would increase when exclusion areas are adjacent to water. Impacts for rest would be the same as exclusion.

RANGELAND IMPROVEMENTS

Rangeland improvements would have the primary effect on ecological condition on treated acres. Changes in vegetative composition through the removal of sagebrush and juniper would reduce structural habitat diversity (Thomas, 1979). The significance of the impact depends on the existing ecological condition of the area. Primary and secondary habitat for some species would be eliminated.

Removal of sagebrush would increase ground cover and forage for many species. Burning rather than chemical treatment would favor establishment of forbs. Nesting and escape cover for non-game species would be temporarily reduced. Detrimental effects can occur to sage grouse when sagebrush removal projects are located in nesting or wintering areas (Klebenow, 1969; Peterson, 1970).

Juniper removal would increase ground cover and edge effect (Maser and Gashwiler, 1978). Nesting structure and food value for species like wood rats, robins, and yellowpine chipmunks would be lost.

Water developments would enhance habitat diversity and improve distribution and survival of many species of wildlife. These watering areas would improve overall nongame, upland bird, and big game habitat by allowing expansion into previously unwatered areas.

Spring developments would temporarily reduce some riparian vegetation used for cover and forage. New water developments could reduce forage competition around existing water developments through better livestock distribution. This would change ecological condition and improve habitat diversity on some areas. Some forage competition could also result from livestock use in areas previously used only by wildlife.

Proposed reservoirs would increase water availability for all species. Livestock use would determine riparian habitat improvement and subsequent wildlife density.

Livestock fences have not proven to have a significant effect on habitat diversity. Some big game mortalities occur immediately after fence construction, but this generally is low.

Table 24 lists anticipated habitat changes resulting from rangeland improvements, Wildlife species are displayed in terms of “species lost” or those species where portions of their primary habitat would be changed to another habitat, and “species gained” or those species which would benefit from the anticipated changes in habitat (Appendix M). These

Table 24 Acres of Habitat and Numbers of Wildlife Species Affected by Changes in Habitat Caused by Rangeland Improvements

			Acres of Habitat Affected					Wildlife Species Affected		
Present Habitat	Existing Acres	Future Habitat	Proposed Action	Alt. 1 (Optimize Livestock)	Alt. 2 (No Change)	Alt. 3 (Optimize Wildlife& Watershed)	Alt. 4 (Eliminate Livestock)	Existing Use	Species Lost	Species Gained
Big sagebrush-bunchgrass	390,778	bunchgrass	110.121	269.500	0	53,384	0	119	35	15
Big sagebrush-bunchgrass	398.778	crested wheatgrass	50,955	104.450	0	4.820	0	119	78	1
Juniper-big sagebrush	393.580	sagebrush-bunchgrass	23.146	28,700	0	13.600	0	143	43	10
Juniper-big sagebrush	393,580	bunchgrass	74.587	124.312	0	54,400	0	143	55	g
Juniper-big sagebrush	393.580	crested wheatgrass	4.700	7.600	0	0	0	143	102	4
Low sagebrush-bunchgrass	131,205	crested wheatgrass	3,200	12,500	0	0	0	73	35	6
All other habitats	--	no changes proposed	0	0	0	0	0	[2]	0	0

effects are projected only for the areas where corresponding rangeland improvement projects are proposed.

CONCLUSION

Actual changes in habitat types would occur primarily as a result of rangeland Improvement projects. The largest change would occur in alternative 1 where 567.062 acres are proposed for vegetative manipulation. The proposed action would change 266,709 acres and alternative 3 would change 126,232 acres. No rangeland imorcvement projects are proposed icr alternatives 2 and 4.

Alternative 3 would provide the largest increase in habitat diversity (17 percent). Alternative 4 would Increase diversity 12 percent, and the proposed action would increase diversity 8 percent, Alternatives 1 and 2 would decrease diversity by 1 percent.

Table 24 lists numbers of wildlife species affected by the changes from one habitat to another. Alternative 1 would have the largest impact on changes on wildlife species in proposed projects. Big sagebrush-bunchgrass would be reduced by 92 percent (365.250 acres) and jumper-big sagebrush would decrease by 41 percent (160,612 acres). Crested wheatgrass would increase by 305 percent (124.550 acres). The proposed action would reduce big sagebrush-bunchgrass by 35 percent (137,930 acres) and juniper big sagebrush by 26 percent (102,433 acres). Crested wheatgrass would Increase by 144 percent (58.855 acres). Alternative 3 would reduce big sagebrush-bunchgrass by 11 percent (44,604 acres) and juniper big sagebrush by 17 percent (68,028 acres). No projects are planned for alternatives 2 and 4.

RIPARIAN HABITAT

Riparian habitat is used by more than 85 percent of the wildlife species found in the EIS area. Wildlife ripanan habitat condition is directly related to ecological condition. Plant diversity in nparian zones increases with an increase in ecologlcal condition. Wildlife species diversity increases with higher ecological condition (Thomas, Maser, Rodieck, 1979; Thomas, 1981). As ecologlcal condition increases the total area of riparian habitat also increases. This not only allows for an increase in the species of wildlife using the habltat. but also provides more habitat for individuals within each species.

Effects of forage allocation, grazing systems, and rangeland Improvements on riparian habltat are discussed in vegetation section.

Table 22 shows the anticipated Impacts on ecological condition of nparian vegetation for the proposed action and each alternative.

CONCLUSION

Improvements in riparian habitat are expressed in change toward climax ecologlcal condition. Alternatives 3 and 4 would improve all stream nparian habltat through livestock exclusion. The proposed action would improve 55 percent of stream riparian habltat primarily through livestock exclusion and grazing systems. Alternative 2 would Improve 33 percent of the riparian areas. Alternative 1 would provide the least riparian improvement with 21 percent.

Alternatives 3 and 4 would improve all perennial reservoir habitat through livestock reduction The proposed action, alternative 1 and alternative 2 would improve 7 percent of the reservoir riparian habitat.

FISHERIES

There are approximately 96 miles of fisheries habitat or potential habitat in the EIS area. Eighty-eight of these stream miles presently support fish. The remaining eight miles have good potential for fish introduction with improvements in habitat condition. None of the stream miles were rated as having excellent overall fisheries habitat although some riparian areas along streams were in climax ecological condition.

Limiting factors for fish include stream structure, bank and channel stability, water quality, and inadequate food supplies. These are a result of sedimentation, irregular flow patterns, lack of riparian vegetation, and physical trampling of the stream bank. The contributing factors and shortage of habitat are closely interrelated.

Stream habitat has many components. Rocky and gravel areas are important in producing insects for food and in providing a stable area for fish spawning. Because of the flowing water, these riffle and rapids areas are kept relatively free of silt and contain a comparatively high level of oxygen. Large rocks and woody material provide cover and help to stabilize channels. Often they are important in providing pool areas and in retaining gravel for spawning. When silt loads increase, pool areas often fill in. Gravel and rock areas become compacted with silt so that they become marginal or useless for fish.

Riparian vegetation, in addition to providing bank stability and reducing sedimentation, is an integral part of the aquatic habitat system. The vegetation provides shade helping maintain lower summer water temperatures essential for trout and providing protection from winter ice damage. Insects falling from riparian vegetation form an important part of the diet of fish.

Grazing systems and their effects of riparian habitat are discussed in riparian vegetation section. Proposed rangeland improvements are not expected to affect fish habitat.

Table 25 shows stream miles of fish habitat and estimated condition and trend for the proposed action and alternatives.

CONCLUSION

Alternatives 3 and 4 would increase fish habitat on all streams due to improvement of riparian and upland vegetation. The proposed action would increase fish habitat on 50 miles of stream. Alternatives 1 and 2 would increase habitat on 16 miles and 25 miles respectively. Alternative 2 would decrease fish habitat on 20 miles of stream.

Table 25 BLM Stream Miles of Fish Habitat, Estimated Conditon and Trend

Conditon

Alternative	Excellent	Good	Fair	Poor
Existing situation		18	40	38
Proposed action	27	38	29	2
Alternative 1. Optimize livestock	11	20	45	20
Alternative 2. No action	10	20	39	27
Alternative 3. Optimize watershed and wildlife	69	25	2	0
Alternative 4. Eliminate grazing	69	25	2	0

Trend

Alternative	Up	Static	Down
Proposed action	50	46	0
Alternative 1. Optimize livestock	16	80	0
Alternative 2. No action	25	51	20
Alternative 3. Optimize watershed and wildlife	96	0	0
Alternative 4. Eliminate grazing	96	0	0

DEER, ELK, AND ANTELOPE

There are 142,914 acres of crucial deer winter range and 64,312 acres of crucial antelope winter range on public lands in the EIS area. The period of use, intensity, and sequence of livestock grazing can determine the quality, quantity, vegetative diversity, and availability of big game habitat. The most important periods of grazing use for big game are during the spring and winter months when their body fat reserves are low and forage is limited.

The ecological condition of a habitat type directly affects the availability of forage, forage selectivity, and cover for big game species. However, net population trends are also affected by habitat condition, climate, predation, and disease. Because most of these factors are independent of livestock grazing management, actual populations were not estimated.

Allocation of forage for big game is the same for the proposed action and all alternatives. Short term allocations would meet present population needs for deer, elk, and antelope. There are 5,331 AUMs of competitive livestock forage allocated to big game in the short term and 7,427 AUMs allocated in the long term. The long term allocation is designed to accommodate ODFW proposed population increases of 27 percent for deer, 23 percent for antelope, and 71 percent for elk.

The anticipated population increase of 2.5 elk would not be significantly impacted by the proposed action or alternatives. It is therefore dropped from further discussion.

Deferred rotation grazing treatments would increase forage quality and availability for spring use by big game species by removing standing litter. Rest rotation systems would rotate early use between pastures, eliminating seasonal competition in each pasture every year. Rest rotation and deferred rotation would increase forage for big game.

Spring, spring/fall, and spring/summer systems would result in forage competition between big game and livestock each year in the same pasture. Short duration grazing would result in spring competition between big game and livestock if grazed between April 15 and May 15. However, year-long forage for big game would increase.

The shift of spring use by livestock to crested wheatgrass seedings from native range would increase the availability and big game use of grasses and forbs in both seeded and native pastures (Mackie, 1970; Knowles, 1975; Komberec, 1976). Burning to remove wolf plants and annual growth of crested wheatgrass would also increase big game use in seeded pastures (Leckenby and Adams, 1969).

The trend of crucial big game range was predicted by considering grazing systems, periods of use, changes in livestock allocation, and rangeland improvements. The results are tabulated in tables 26 and 27. Table 28 shows acres of deer an antelope crucial winter range that would be affected by rangeland improvements.

Sagebrush control and grass seedings would improve forage diversity for big game animals in monotypic stands of sagebrush. However, hiding and thermal cover could be lost (Leckenby et al., 1982). Generally the greatest habitat diversity would result from controlled burns which would create a higher percentage of diversity.

Juniper removal would increase big game forage, habitat diversity, and edge effect. However, thermal cover and escape habitat would be lost (Leckenby et al., 1982).

Impacts of water developments would be the same as discussed above in impacts on upland habitat diversity. Impacts of fences would be the same as discussed in upland habitat diversity.

CONCLUSION

Deer and antelope crucial winter range habitat trend would be upward in the proposed action and all alternatives. Alternative 3 has the largest increase while alternatives 2 and 4 have the smallest increases.

Allocations of forage for big game are the same for the proposed action and all alternatives. Net habitat trend would be up in the proposed action and all alternatives.

Projects having the largest positive impact are in alternative 3 and the proposed action. Alternative 1 would reduce essential cover and increase monotypic stands of crested wheatgrass. Alternatives 2 and 4 do not have any projects.

OTHER WILDLIFE

Impacts to upland birds and waterfowl are discussed in habitat diversity.

Table 26 Expected Trend, Acres of Crucial Deer Winter Range [1]

Trend	Proposed Action	Alt. 1 (Optimize Livestock)	Alt. 2 (No Action)	Alt. 3 (Optimize Watershed & Wildlife)	Alt. 4 (Eliminate Livestock)
UP	77,185	71,032	64,471	84,328	57,165
Static	61,889	64,489	23,837	57,166	64,312
Down	2,808	7,393	53,574	1,420	21,437
Unknown	1,032	0	1,032	0	0

[1] Figures based on proposed projects, grazing systems. and professional judgment.

Table 27 Expected Trend, Acres of Crucial Antelope Winter Range [1]

Trend	Proposed Action	Alt. 1 (Optimize Livestock)	Alt. 2 (No Action)	Alt. 3 (Optimize Watershed & Wildlife)	Alt. 4 (Eliminate Livestock)
UP	26,863	20,855	6 , 6 4 6	49,649	19,293
Static	34,234	33,811	46,062	12,863	38,587
Down	3,215	9,646	11,328	1,800	6,432
Unknown	0	0	286	0	0

[1] Figures based on proposed projects. grazing systems, and professional judgment.

Table 28 Acres'of Crucial Deer and Antelope Winter Range Affected by Rangeland Improvements

Trend	Proposed Action	Alt. 1 (Optimize Livestock)	Alt. 2 (No Action)	Alt. 3 (Optimize Watershed & Wildlife)	Alt. 4 (Eliminate Livestock)
Crucial deer range	11,234	3,696	0	6,000	0
Crucial antelope range	14,014	41,710	0	9,000	0

RECREATION

Beneficial and adverse Impacts to recreation are quantifiable in terms of the expected change in visitor use that would result from implementation of the proposed action or any alternative (Tables 29 and 30) For purposes of this analysis it is assumed that few recreationists would be disturbed by livestock grazing if big game habitat, vehicle access, and landscape character were not impaired (Meganck and Gibbs, 1979; Downing and Clark, 1979).

Neither the proposed action nor any alternative would have a significant impact on those segments of the Crooked or Deschutes Rivers contained in the nation wide rivers inventory.

For purposes of this analysis, it is assumed that allocations of forage to livestock and the types of grazing systems implemented would not significantly impact recreation values. It is recognized,

Table 29 Long-TermImpacts to Recreation Activities [1]

Recreation Activity	Proposed Action	Alt.1 (Optimize Livestock)	Alt.2 (No Action)	Alt.3 (Optimize Watershed & Wildlife)	Alt. 4 (Eliminate Livestock)
Driving for pleasure	+L[2]	-L	NC	+L	+L
Fishing	+M	-L	NC	+H	+H
Rockhounding	-L	-L	NC	+L	+L
Off-road vehicle driving	-L	-L	NC	+L	+L
Hunting	+M	-M	NC	+H	-L
Hiking/camping	-L	-L	NC	+L	+L
Overall Impact	+L	-L	NC	+M	+L

[1] Rating is overall average of quantity as well as quality.

[2] + beneficial impact
-adverse impact
NC no change

H high
M moderate
L low

Table 30 Estimated-Long-Term Changes in Visitor Days per Year

Visitor Days	Proposed Action	NET CHANGE Alternative 1 (Optimize Livestock)	Alternative 2 (No Action)	Alternative 3 (Optimize Wildlife & Watershed	Alternative 4: (Eliminate Livestock)
235,000 [1]	+2,900	-7,500	0	+9,400	+5,600

[1] Existing use, 1981.

however, that Improvements in habitat for wildlife resulting from a reduction in livestock forage allocation or changes in grazing system would have a positive effect on wildlife populations. This would result in a positive effect on hunting, fishing, and wildlife viewing opportunities.

Impacts to wildlife are discussed in the wildlife section. Impacts on driving for pleasure are related to effects on wildlife viewing opportunities and on scenic quality. Impacts on scenic quality are discussed in the visual section.

Fencing has the potential to create the most significant adverse impact on off-road vehicle driving, rockhounding. hiking, and hunting. Additional fencing would decrease cross-country access, creating an adverse impact on the estimated 94.000 visitors who participate in these activities each year The resultant long-term impact would be an annoyance to some recreationists, causing slight reductions or relocation of those visitors within the local area.

Impacts on driving for pleasure resulting from the design and placement of rangeland improvements on the land would be the same as those analyzed in the Impacts of visual section

CONCLUSION

Neither the proposed action nor any of the alternatives would cause major shifts in recreation visitor use levels. Alternatives 3. 4. and the proposed action, would have beneficial impacts on recreation. Alternative 1 would have an adverse impact on all recreation activities which occur in the Brothers EIS area (Table 29).

VISUAL

No significant impacts to visual resources would result from vegetation allocation or grazing systems from the proposed action and alternatives 1. 2. and 3. The elimination of grazrng (alternative 4) would improve visual resources primarily due to Increased plant diversity and density.

The effect of rangeland Improvements on scenic quality would be the greatest during implementation and would decrease over time. The degree of visual contrast of these improvements would vary by type and location (Table 31)

The greatest potential for adverse Impacts would result from the construction of reservoirs.

embankments, and changes in vegetative composition resulting from land treatments proposed in Class II visual resource areas. The remaining land treatments, fences, springs, wells, buried pipelines, and waterholes would not have a significant adverse impact on visual resources.

Rangeland improvement in Class II areas may cause a degradation of visual quality. In other areas, land treatments and project construction may improve visual quality by adding variety to the landscape.

CONCLUSION

Alternative 3 would have the least potential for adverse impacts on visual resource, followed by the proposed action and alternative 1. Alternatives 2 and 4 would have no significant visual impacts (Table 31).

CULTURAL

Appendix N describes coordination with State Historic Preservation Officer (SHPO) and compliance with policy.

Livestock grazing adversely impacts surface sites by displacing, altering, and breaking artifacts and other cultural material (Logsdon. 1976: Roney, 1977). Consequently the interpretation of the disturbed site may be adversely affected. Standing structures are disturbed by livestock rubbing against them and using them for shelter. These impacts are most significant where livestock concentrate at water sources, salt licks, along trails and fences, and under trees.

Table 31 Potential Short Term Visual Impact of Proposed Rangeland Improvements

Alternative	Public Land by Visual Resource Classification I	II	III	IV
Proposed action				
Fences (miles)	0	48 (M)	163 (L)	180 (-)
Springs (#)	0	2 (L)	9 (-)	2 (-)
Buried pipelines (miles)	0	39 (L)	145 (-)	282 (-)
Wells, reservoirs, waterholes (#)	0	4 (H)	4 (M)	26 (L)
Vegetation manipulation (acres)	0	26,436 (H)	75,744 (M)	164,529 (L)
Alternative 1. Optimize grazing				
Fences (miles)	0	38 (M)	123 (L)	154 (-)
Springs (#)	0	2 (L)	9 (-)	2 (-)
Buried pipelines (miles)	0	39 (L)	148 (-)	282 (-)
Wells, reservoirs, waterholes (#)	0	4 (H)	4 (M)	26 (L)
Vegetation manipulation (acres)	0	71,731 (H)	134,815 (M)	360,516 (L)
Alternative 2. No action				
Fences (miles)	0	0	0	0
Springs (#)	0	0	0	0
Buried pipelines (miles)	0	0	0	0
Wells, reservoirs, waterholes (#)	0	0	0	0
Vegetation manipulation (acres)	0	0	0	0
Alternative 3. Optimize wildlife & watershed				
Fences (miles)	0	44 (M)	143 (L)	162 (-)
Springs (#)	0	0	3 (-)	0
Buried pipelines (miles)	0	0	0	0
Wells, reservoirs, waterholes (#)	0	0	7 (M)	8 (L)
Vegetation manipulation (acres)	0	15,425 (H)	17,373 (M)	35,230 (L)
Alternative 4. Eliminate livestock				
Fences (miles)	0	0	0	0
Springs (#)	0	0	0	0
Buried pipelines (miles)	0	0	0	0
Wells, reservoirs, waterholes (#)	0	0	0	0
Vegetation manipulation (acres)	0	0	0	0

* Degree of adverse impact (H): high; (M): moderate; (L): low; (-): no impact.

Impacts of grazing systems are essentially the same as those described under forage allocations. The amount of livestock trampling damage to cultural resources sites depends primarily on soil characteristics. such as soil stability and moisture content.

Rangeland improvements would indirectly benefit cultural resources due to increased Information obtained from the Class III surveys and mitigation work done before the improvements (Chapter 1). In one sense, mitigation work would destroy archeological sites. Future scientific use would be precluded since the information extracted would be limited by current research techniques andavailable technology. The potential for interpretation and sociocultural uses would be eliminated.

Sites could be impacted by range Improvement projects if the intensive survey failed to identify them. Where subsurface disturbance is involved (pipelines. guzzlers), burled sites may be simultaneously discovered and adversely impacted since they are rarely identified during survey. Fencing riparian areas and developing water sources away from springs would reduce trampling impacts to areas which often have a high density of sites.

Burning destroys perishable material and alters nonperishable material. Projects involving the temporary removal of vegetative cover may impact sites due to Increased wind and water erosion.

An increase of collecting and other vandalism would result as more people are out on the ground. Site locations become common knowledge and there is increased ground visibility due to short term removal of vegetation.

Rangeland Improvements intrude upon tne environmental setting of some cultural resources sites. Consequently, they may lessen interpretive value of sites to be used for this purpose.

CONCLUSION

Alternative 1 and to a lesser extent the proposed action would have the greatest potential for adverse Impacts to cultural resources due to proposed range Improvements and numbers of livestock. Alternative 2 would be next because of continued spring grazing when sites are susceptible to disturbance.

Alternative 3 would result in an areawide reduction of cultural site trampling and erosion by reducing the numbers of livestock on the ground as well as the amount of grazing which would occur during the spring. Also, adverse Impacts would result from proposed rangeland improvements.

Alternative **4** would have no impacts because it eliminates livestock grazing and does not propose any rangeland Improvements.

Table 32 shows the estimated number of cultural resource sites that may be found in areas where rangeland improvements will occur.

Possible numbers of sites are based on estrmates of one site per.100 acres for mechanical treatments. one site per two linear miles for pipelines, and one site every third water development.

Table 32 Summary of Potential Impacts on Cultural Resources

Alternative	Estimated Number of Surface Sites [1]
Proposed action	
Mechanical treatments [2]	2,667
Water developments [3]	42
Pipelines [4]	233
Alternative 1. Optimize livestock	
Mechanical treatments	5,603
Water developments	29
Pipelines	235
Alternative 2. No action	
Mechanical treatments	0
Water developments	0
Pipelines	0
Alternative 3. Optimize wildlife & watershed	
Mechanical treatments	1,260
Water developments	39
Pipelines	0
Alternative 4. Eliminate livestock	
Mechanical treatments	0
Water developments	0
Pipelines	0

[1] These figures do not Include entirely buried sites.
[2] Mechanical treatments include burning, thinning, plowing, chaining, and seeding
[3] Water developments include reservoirs. wells. spring developments and guzzlers.
[4] Pipelines are burled lines that distribute wafer from its source.

PALEONTOLOGY

Paleontological resources would be adversely affected from trampling by livestock. Increased livestock forage allocations and grazing systems allowing grazing in wetland areas or during the spring would adversely affect the Integrity of the sites.

Complete field surveys would be conducted prior to carrying out any surface disturbing activities (Chapter 2, Standard Design). Paleontological resources buried beneath the ground would, however, not be discovered until they had been disturbed by project work. This disturbance would

adversely affect the integrity of the site involved. However, equipment operators would be alerted to the possibility of fossil remains. With this awareness there would be a greater potential for gaining additional knowledge of the resource as new paleontological resources are found.

Although the extent of paleontological resources is unknown, it is estimated to be an average of one site per 10,000 acres of land surface or less.

CONCLUSION

Alternative 4 would have a beneficial impact on paleontological resources because it eliminates all livestock from the public lands. Even with preconstruction site surveys and salvage, alternative 1 would have the greatest adverse impact, having the potential of impacting an extimated 50 sites. The proposed action, alternative 3 and alternative 2 respectively would create the next greatest adverse impacts.

WILDERNESS

Within identified wilderness study areas interim management policy guidelines dictate whether changes in forage allocation, grazing systems, or rangeland improvements can be implemented. Changes in forage allocations or grazing systems can be made if those changes would not impair wilderness suitability. Rangeland improvements are permissable if they are non-impairing individually as well as collectively, or are temporary in nature.

Naturalness would be enhanced under Alternative 4 as livestock grazing would be eliminated and vegetation allowed to move up in ecological condition. No significant changes in naturalness would occur under the proposed action or alternatives 1, 2, or 3.

Table 33 shows the proposed rangeland improvements in WSAs for the proposed action and alternatives. Some rangeland improvements could comply with interim management policy guidelines and could be constructed prior to a final decision regarding wilderness designation. Brush control, juniper control, and those improvements not in compliance with interim management policy guidelines would be delayed until a decision regarding designation is made. Improvements would only be implemented if the areas were not designated as wilderness.

CONCLUSION

Alternative 1, followed by the proposed action, would have the greatest potential for adverse impacts to the natural character of the wilderness study areas. No change from present conditions would result under Alternative 2. Alternative 3 would have a limited beneficial impact with alternative 4 having the greatest positive effect on wilderness values.

Table 33 Proposed Rangeland Improvements within WSA s [1]

Type of Project	Proposed Action	Alt. 1 (Optimize Livestock)	Alt. 2 (No Action)	Alt. 3 (Optimize Watershed & Wildlife)	Alt. 4 (Eliminate Livestock)
fence construction (miles)	23	23	0	15	0
spring developments (#)	1	2	0	0	0
water wells (#)	6	7	0	0	0
buried water pipelines (miles)	30	42	0	0	0
reservoirs (#)	4	5	0	0	0
brush control (acres)	0	27,270[2]	0	0	0
juniper control (acres)	0	34,000[2]	0	0	0
seeding (acres)	0	0	0	0	0
wildlife guzzlers (#)	18	11	0	26	0
stream rip-rap (milks))	4	3	0	8	0
stream structure (#)	47	9	0	60	0
nesting structures (#)	30	19	0	50	0

[1] These projects would be implemented only if they were found to be in compliance with interim management guidelines and wilderness management policy.

[2] These projects would not be implemented if the WSAs were designated wilderness.

SOCIOECONOMIC CONDITIONS

Economic impacts of the proposed action and alternatives are expressed in terms of the effect on: annual forage needs of operators. ranch values, ranch income and operations. local personal income and employment from grazing, construction of rangeland improvements hunting and fishing, and other recreation activities. Social impacts not economic in nature are discussed as appropriate. Alternative 2, no action, is considered to have no socioeconomic effects.

ANNUAL FORAGE NEEDS OF OPERATORS

For purposes of this analysis the effect of change in forage allocations resulting from the proposed action and alternatives was based on 1981 actual use rather than active preference. This was done to measure net change from what actually occurred in 1981 rather than what would have been premitted had there been a demand for that available forage.

Table 34 summarizes the number of operators affected by changes in public forage allocation in the short and long term. Also shown is the average change in BLM-produced forage as a percent of operator's total annual requirements.

In the short term, only one operator would experience a loss of forage greater than IO percent of the operator's annual requirements under the proposed action or alternative I. Available forage for livestock would remain unchanged from present levels under alternative 2. Under alternative 3, IO operators would lose I0 percent or more of their annual requirements. Under alternative 4 there would be no livestock use of forage; this loss would amount to I0 percent or more of total forage requirements for 63 operators.

In the long term under the proposed.action, available forage would be increased by IO percent or more of annual requirements for 48 operators and

Table 34 Number of Operators Affected by Change in Public Forage Allocation (Change expressed as percent of annual forage requirements.)

Change in forage as percent of annual requirements	Proposed Action		AH.1		Alt. 3'	Alt. 4 '
	Short Term	Long Term	short Term	Long Term		
HERD SIZE - UNDER 100 ANIMAL UNITS						
Loss over -30.0%	-	-	-	-		4
-20.0 to -29.9%	-		-	-	1	7
-10.0 to -19.9%	1	1	1		2	12
Loss under -10%	5	1	5	1	10	21
No change	19	6	19	3	16	2
Gain to 9.9%	14	20	14	17	11	
+10.0 to 19.9%	3	9	3	8	4	
+20.0 to 29.9%	2	3	2	6	1	
+30.0 to 49.9%	2	5	2	5	1	-
+50.0% or more	-	1	-	6		
Average Change	+3.3%[2]	+10.3%	+3.3%	+21.6%	+0.5%	-13.7%
HERD SIZE - 100 to 399 ANIMAL UNITS						
Loss over -30.0%	-	-	-	-		5
-20.0 to -29.9%	-	-	-	-	3	8
-10.0 to -19.9%					2	12
Loss under -10%	7	1	6	1	19	14
No change	5	2	6	2	3	
Gain to 9.9%	23	18	23	15	10	
+10.0 to 19.9%	3	11	3	9	1	-
+20.0 to 29.9%	1		1	2	1	-
+30.0 to 49.9%		3		2		
+50.0% of more		4		8		
Averagechange	+2.5%	+13.6%	+2.7%	+29.1%	-0.9%	-13.1%

Table 34 Number of Operators Affected by Change In Public Forage Allocation (Change expressed a8 percent of annual forage requirements.) (continued)

Change in forage as percent of annual requirements	Proposed Action Short Term	Proposed Action Long Term	Aft.1 Short Term	Aft.1 Long Term	Alt. 3'	Alt. 4'
HERD SIZE - 400 to 999 ANIMAL UNITS						
Loss over -30.0%						3
-20.0 to 29.9%	-	-		-	1	2
-10.0 to - 19.9%				-	1	6
Loss under -10.0	4	1	3	1	14	1 4
No change	4		4		4	
Gain to 9.9%	13	16	14	14	5	
+10.0 to 19.9%	4	4	4	1	-	
+20.0 to 29.9%		1		1		
+30.0 to 49.9%	-	1		2		
+50.0% or more	-	2		6	-	-
Average change	+3.5%	+13.6%	+3.6%	+32.4%	-1.9%	-12.3%
HERD SIZE - 1,000 OR MORE ANIMAL UNITS						
Loss over -30.0%	-	-			-	
- 2 0 . 0 t o -29.9%	-					2
-10.0 to -19.9%		-		-		2
Loss under -10.0%	-	-	-	-	7	5
No change	3	-	2	-	1	-
Gain to 9.9%	5	5	6	4	1	-
+10.0 to 19.9%	1	3	1	2		-
+20.0 to 29.9%		1		2	-	
+30.0 to 49.9%		-		1		-
+50.0% or more						
Average change	+2.5%	+9.2%	+2.6%	+15.0%	- 1 . 9 %	- 9 . 5 %
ALL OPERATORS						
Loss over -30.0%						12
-20.0 to -29.9%		-	-	-	5	19
-10.0 to -19.9%	1	1	1		5	32
Loss under -10.0%	16	3	14	3	50	54
No change	31	8	31	5	24	2
Gain to 9.9%	55	59	57	50	27	
+10.0 to 19.9%	11	27	11	20	5	
+20.0 to 29.9%	3	5	3	11	2	
+30.0 to 49.9%	2	9	2	10	1	
+50.0% or more		7		20		
Average change	+2.8%	+1 1.3%	+3.0%	+23.0%	-1.6%	-1 1.2%

[1] Effect of alternatives 3 and 4 are same for both short and long term.
[2] Net change in overall forage.

for 6l operators under alternative I (Table 34). Long-term Impacts under Alternatives 3. and 4 would be the same as short-term impacts.

An operator experiencing a substantial loss of forage might be forced to sell his ranch if he could not find replacement forage. The social impact for the operator and family would be severe because of the connectron between the ranching occupation and lifestyle. Due to Involvement of the family in the ranch business, there would be a substantial social adjustment in changing livelihoods, A second factor

increasing the difficulty of change may be the distance some ranches are from other job opportunities.

EFFECT ON RANCH VALUE

A temporary reduction in ranch value during implementation of rangeland Improvements would probably not be consequential unless a loan were sought or the property sold during that period.

The effect on ranch values for each alternative is shown in Table 35. Appendix R lists the number of operators who would experience a change in ranch value.

EFFECT ON RANCH INCOME AND OPERATIONS

Representative budgets for the four herd size classes were developed to determine the effect of changes in the availability of public forage on ranch sales and operating income. Ranch budgets and results of the analysis are presented in Appendix R.

The average and total changes in operator's return above cash costs are shown in Table 36 for the proposed action and each alternative.

Table 35 Effects on Ranch Collateral and Sale Value

	Short Term	Long Term
	..... millions of $	
Proposed action	+ 1.2	+ 3.4
Alternative I		
Optimize livestock	+ 1.2	+ 6.5
Alternative 2		
No action	0	0
Alternative 3		
Optimize wildlife and watershed	- 0.9	- 0.9
Alternative 4		
Eliminate grazing	- 2.9	- 2.9

Table 36 Effect on Return Above Cash Costs[1]
(Change from existing condition in dollars, 1978-80 average prices)

Effect	Proposed Action		Alternative I		Alt. 3[2]	Alt. 4[2]
	Short Term	Long Term	Short Term	Long Term		
HERD SIZE - UNDER 100 ANIMAL UNITS						
Average change	+277	+784	+277	+1,630	0	-1,361
Total change for group	+12,742	+36,064	+12,742	+74,980	0	-62.606
HERD SIZE - 100 to 399 ANIMAL UNITS						
Average change	+1,102	+4,071	+1,107	+8,624	-230	-3,799
Total change for group	+42,978	+158,769	+43,173	+336,336	-8,970	-148,161
HERD SIZE - 400 to 999 ANIMAL UNITS						
Average change	+2,880	+11,404	+2,980	+27,161	-1,581	- 9,913
Total change for group	+72,000	+285,100	+74,500	+679,025	-39,525	-247,825
HERD SIZE - 1000 OR MORE ANIMAL UNITS						
Average change	+7,190	+26,004	+7,401	+42,282	-5,283	-21,142
Total change for group	+64,710	+234,036	+66,609	380,538	-47,547	-190,278
ALL OPERATORS						
Average change	+1,617	+6,000	+1,656	+12,360	-807	-5,453
Grand Total	+ 192,430	+713,969	+ 197,204	+1,470,879	-96,042	-648,870

[1] Results of linear program analysts (see Appendix P).
[2] Short- and long-term effects are the same for alternative 3 and 4

Table 37 Effects of Changes in Public Forage on Personal Income and Employment [1] (Income In thousands of dollars,, 1978-80 average prices)

Effect	Proposed Actlon		Alternative I		Alt. 3[2]	Alt. 4[2]
	Short Term	Long Term	Short Term	Long Term		
Livestock industry:						
Personal income	$120.7	$449.0	$123.7	$915.1	-$ 61.7	-$389.2
Employment	24	91	25	186	- 13	- 79
Local economy [3]:						
Personal income	$405.6	$1,508.2	$415.6	$3,074.4	-$207.3	-$1,307.4
Employment	58	216	59	440	-30	- 187

[1] Effects of forage changes based on factors shown in Appendix 0.
[2] Effects for short-term and long-term are the same.
[3] Crook and Deschutes Counties.

EFFECTS ON LOCAL PERSONAL INCOME AND EMPLOYMENT

The effects of the proposed action or alternatives on personal income and employment are shown in Table 37.

In the short term under the proposed action, local income and employment attributable to public forage use would be increased, assuming that all active grazing preferences were utilized. Under alternative I, slightly larger increases would occur. Losses would be experienced under alternatives 3 and 4. Employment loss under alternative 4 would amount to 187 jobs.

In the long term under the proposed action, increased public forage would generate 216 more local jobs, and under alternative 1, 440 more jobs. Effects from alternatives 3 and 4 would not change from the short term.

OTHER EFFECTS

Table 38 shows the effects of construction activity resulting from the proposed action or alternatives. These effects would occur over the total construction period.

Effects of long term changes in recreational activity resulting from the proposed action and other alternatives are shown in Table 39.

In the short term, it is anticipated that about $1.5 million income and 194 jobs would be generated, and in the long term there would be 52.3 million in income and 285 jobs with alternative 2. Table 39 shows how the implementation of the proposed action or alternatives I, 3, or 4 would effect this trend.

Table 38 Effects of Construction on Personal Income and Employment [1]

Alternative	Personal Income[2] ($000)	Employment (work-years)
Proposed action	6,683	499
Alternative 1		
Optimize livestock	10,462	781
Alternative 3		
Optimize wildlife and watershed	513	38

[1] Represents total amount generated during the construction period. Alternatives 2 and 4 would not involve construction activity.
[2] 1978-1980 average prices.

Table 39 Effects of L&g-Term Changes in Recreational Activity on Personal Income and Employment [1]

Alternative[2]	Personal Income[3] ($)	Employment (jobs)
Proposed action	+ $24,300	+ 3
Alternative I		
Optimize livestock	- 49,900	- 6
Alternative 3		
Optimize wildlife and watershed	+ 71,600	+ 9
Alternative 4		
Eliminate livestock	+ 11,900	+ 1

[1] Long-term estimates are for the year 2031 (50 years In the future). Short-term effects are negligible.

[2] Alternative 2 was not considered because no long term change would occur.

[3] 1979 prices.

BENEFIT/COST ANALYSIS

Economic efficiency is one of the criteria used to determine rangeland improvement project design and priority of implementation. In addition, multiple use benefits which cannot be easily quantified or assigned a monetary value are also considered. These values include water quality, soil erosion, visual and archeological resources.

A benefit/cost analysis of rangeland improvement projects contained in the proposed action and alternatives 1 and 3 will be completed before any decisions are made (see Chapter 1, The Decision). The record of decision will contain benefit/cost analysis information and will be circulated for public review and comment.

CONCLUSION

One operator would experience a long-term loss of BLM-produced forage greater than 10 percent of his total annual requirements under the proposed action. No long-term losses would result from alternative 1 or 2. Ten operators would experience a permanent loss of BLM-produced forage greater than 10 percent of their total forage requirements under alternative 3; 63 operators would lose similiar amounts under alternative 4.

Forage availability for BLM permittees would be increased in the long term by 11 percent under the proposed action and by 23 percent under alternative 1. No change would occur with alternative 2. A decrease in available forage of 2 percent and 11 percent would result under alternatives 3 and 4, respectively.

Two operators potentially would be affected by a reduction in their ranch value of more than $5,000 in the short term under the proposed action and alternative 1. Twenty-one operators would have losses of $5,000 or more in ranch value under alternative 3. Under alternative 4, 69 operators would have losses of this magnitude or greater. In the long term, under the proposed action and alternative 1, most operators would gain increased ranch value. Long-term effects under alternatives 3 and 4 would be the same as short-term effects.

Effects on local personal income and employment are summarized in Table 40.

ADVERSE IMPACTS OF THE PROPOSED ACTION WHICH CANNOT BE AVOIDED

This section presents an analysis of the unavoidable adverse impacts which would result from the proposed action. Project design features discussed in Chapter 2 constitute best management practices; therefore, no additional mitigating measures are proposed.

As a result of rangeland improvements, shot-t-term soil disturbance would occur on 268,041 acres, exposing soil to potential wind or water erosion. A short-term increase in sediment would occur during rip-rap and stream structure construction and during debris removal.

Residual ground cover, important to wildlife for cover and important to soils for protection from erosion, would decrease in the short term due to an increased livestock forage allocation and construction of rangeland improvements.

Wildlife would be adversely affected due to a reduction in habitat diversity. Rangeland

Table 40 Summary of Effects on Personal Income and Employment (Income in thousands of dollars, 1978-80 average prices)

Activity	Proposed Action Short Term	Proposed Action Long Term	Alternative 1 Short Term	Alternative 1 Long Term	Alternative 3 Short Term	Alternative 3 Long Term	Alternative 4 Short Term	Alternative 4 Long Term
LOCAL PERSONAL INCOME								
Livestock forage	+$ 405.6	+$ 1,508.2	+$ 415.6	+$ 3,074.4	-$ 207.3	-$ 207.3	-$ 1,307.4	-$ 1,307.4
Recreation	-	+ 24.3	-	- 49.9		+ 71.0	-	+ 11.9
Construction [1]	+ 668.3	-	+ 1,046.2	-	+ 51.3	-	-	-
Total	+$ 1,073.6	+$ 1,532.5	+$ 1,461.8	+$ 3,024.5	-$ 156.0	-$ 135.7	-$ 1,307.4	-$ 1,295.5
LOCAL EMPLOYMENT								
Livestock forage	+ 58	+216	+ 59	+440	- 30	- 30	- 187	- 187
Recreation	-	+ 3	-	- 6	-	+ 9	-	+ 1
Construction [1]	+ 50	-	+ 78	-	+ 4	-	-	-
Total	+108	+219	+137	+434	- 26	- 21	- 187	- 186

[1] Construction activity is treated as If It were evenly spread over the first 10-year period.

improvement on 266,709 acres would create a loss of thermal and escape cover. As wildlife habitat, big-sagebrush-bunchgrass would be reduced by 35 percent and juniper-big sagebrush reduced by 26 percent.

The construction of 320 miles of new fence would restrict use of the public land by off-road vehicles and would be additional hindrance to rockhounds and hikers. Rangeland improvements on 26,440 acres would have a significant adverse impact on Class II visual resource management areas.

An increase in livestock forage allocation would have an additional impact on cultural and paleontological resources through trampling and breaking by livestock. Subsurface cultural and paleontological sites could be damaged during rangeland improvement construction if they are not detected prior to work.

RELATIONSHIP BETWEEN SHORT-TERM USE AND LONG-TERM PRODUCTIVITY

This section analyzes the trade-offs between short-term uses of the environment and the long-term environmental enhancement expected as a result of these uses for the proposed action,

The overall increase in livestock forage allocation would reduce residual ground cover in the short term, affecting wildlife cover and soil protection. Short-term localized soil erosion and compaction, loss of structural habitat diversity important to wildlife, and increased visual contrasts would result from rangeland improvement. These short-term impacts would be mitigated by long-term changes in ecological condition resulting in increased forage production, a net increase in residual ground cover, and vegetation reestablishment on disturbed areas.

Proposed grazing systems may have initial short-term impacts on some ranch operations by increasing the cost of the basic operation, increasing hay usage, or requiring more labor for livestock supervision, but these impacts would be mitigated in the long term through increased forage production and hence, increased livestock forage allocations.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This section identifies the extent to which the proposed action would irreversibly limit potential uses of the land and irretrievably commit other resources.

The 500 acres which would be occupied by range improvements such as water troughs, pipelines, guzzlers, etc., would lose their capacity to produce vegetation for the life of the improvement. This would be an irretrievable although insignificant commitment of the vegetation resource. The loss of soil through increased wind and water erosion during the construction of range improvements would also be an irretrievable loss.

Seeding of crested wheatgrass on 58,855 acres would irreversibly change the vegetation composition.

Damage to undiscovered cultural and paleonto-logical resources through rangeland improvement would result in an irreversible and irretrievable loss of information from these sites, although new sites would be discovered through this process.

Energy would be irretrievably committed to install, operate, and maintain rangeland projects. The initial investment of energy for improvement construction during the implementation period and the annual investment of energy for project maintenance represent an irretrievable reduction of supplies of petroleum-derived energy.

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

Comments on the DEIS will be requested from the following agencies and interest groups:

Federal Agencies

Advisory Council on Historic Preservation
Department of Agriculture
  Forest Service
  Soil Conservation Service
Department of Defense
  Army Corps of Engineers
Department of Energy
  Region X
Department of the Interior
  Bureau of Mines
  Bureau of Reclamation
  Corps of Engineers
  Fish and Wildlife Service
  Geological Survey
  National Park Service
Environmental Protection Agency

State and Local Government

Association of Oregon Counties
Central Oregon Intergovernmental Council
Crook County Planning Commission
Deschutes County Planning Commission
Harney County Planning Commission
Lake County Planning Commission
National Assoc. of Conservation Districts
Oregon Dept. of Fish and Wildlife
Oregon State Clearinghouse
Oregon State Department of Forestry
Oregon State Historic Preservation Officer

310 interested individuals also received copies of the document, including all grazing permittees in Brothers EIS area.

Interest Groups

1000 Friends of Oregon
Ada County Fish and Game League
All Grazing Permittees in the Brothers EIS Area
American Fisheries Society
American Horse Protection Association
Association of Oregon Archaeologists
Audubon Society
Defenders of Wildlife
Deschutes 4-Wheelers
Desert Trails Association
Federation of Western Outdoor Clubs
Friends of the Earth
Izaak Walton League
League of Women Voters
Maintain Eastern Oregon Wilderness
Mazamas
National Association of Conservation Districts
Mazamas
National Council of Public Land Users
National Wildlife Federation
Native Plant Society of Oregon
Natural Resources Defense Council, Inc.
Nevada Outdoor Recreation Assoc., Inc.
Northwest Federation of Mineralogical Societies
Oregon Association of Conservation Districts
Oregon Cattlemen's Association
Oregon Council of Rock and Mineral Clubs
Oregon Environmental Council
Oregon High Desert Study Group
Oregon Natural Area Preserve Advisory Comm.
Oregon Natural Heritage Program
Oregon Sheepgrowers
Oregon Snowmobile Association
Oregon Student Public Interest Research Gp.
Oregon Wilderness Coalition
Oregon Wildlife Federation
Pacific N.W. 4-Wheel Drive Association
Public Lands Council
Sagecounty Alliance for a Good Environment (SAGE)
Sierra Club
Society for Range Management
Southern Oregon Resource Alliance(SORA)
Sunrise I-Wheelers
The Wilderness Society
Wildlife Management Institute
Wildlife Society, Oregon Chapter

LIST OF PREPARERS

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

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Suzanne Crowley	Cultural Resources	Archeology, Anthropology	5 years, BLM (Archeologist)
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Appendices

APPENDIX A Summary and Results of EIS Scoping

Public meetings for the purpose of scoping the Brothers Grazing Management Environmental Impact Statement (EIS) were combined with the meetings to discuss the development of the preferred alternative for the Brothers Management Framework Plan (MFP). The MFP at that stage consisted of three land use allocation alternatives which had been developed from criteria established with earlier public input. All three alternatives called for increased allocation of forage for livestock.

Alternatives presented in the MFP were discussed in public meetings in Portland, Prineville, and Bend, and with the Prineville District Advisory Council in September, 1981. Many oral and written comments were received and used in developing the proposed action and other alternatives analyzed in the Brothers EIS.

Public comment established a solid consensus favoring implementation of a juniper control program which was identified in alternative 1 of the MFP. As a result, juniper control in the EIS proposed action was subsequently set at 102,433 acres.

Consistent public support was expressed for protection and increased management of riparian habitat. Livestock operators did not express concerns regarding a significant impact to their ranching operations. In response to public comments and BLMs concern for riparian habitat management, one of the major elements of the EIS proposed action is the protection and management of riparian areas to maintain 60 to 100 percent of vegetative potential. A channel stability rating of good or better is proposed for all streams.

Concern was expressed in the Portland and Bend meetings that all MFP alternatives proposed increases in livestock grazing at the expense of other values. Many felt that the EIS should consider an alternative that analyzed a significantly lower level of livestock grazing from what presently exists. It was felt that this alternative should be oriented toward natural ecosystem management, maximizing habitat diversity. Public comment also requested an alternative which eliminated livestock grazing from the public lands. These comments were analyzed and used to formulate EIS alternatives 3 and 4.

Alternative 1, analyzed in the EIS, is essentially the same as the rangeland management elements of the “commodity production alternative” in the MFP, since the public suggested little modification of that alternative. Alternative 2 (continue present management) is required by law and provides a basis for comparison between present management and management changes under the proposed action and each of the alternatives. Alternative 3 (optimize wildlife habitat and watershed values), calls for a significantly lower level of livestock grazing than did any of the MFP alternatives. Alternative 4 calls for total elimination of all livestock grazing public lands.

Other potential EIS alternatives suggested during the scoping process were the selling of livestock forage allocations on the open market by various means and the paying of ranchers for not using livestock forage allocated to them. These suggestions were considered but not included in the EIS because they were felt to be beyond the scope of this document; they raise larger questions (requiring Congressional legislation to implement) than can be effectively addressed in a grazing management EIS for a single BLM district.

APPENDIX B Available Forage Allocation and Production (AUMs)

Allotment No. and Name		Acres Public Land	Active Pref.	LIVESTOCK A-NATIVES Proposed Action Initial	Proposed Action Long Term	1 Maximize Livestock Initial	1 Maximize Livestock Long Term	2 No Change Initial	2 No Change Long Term	3 Optimize Watershed/Wildlife Initial	3 Optimize Watershed/Wildlife Long Term	WILDLIFE Proposed Action and all Alternatives Initial	WILDLIFE Proposed Action and all Alternatives Long Term	Adjust. AUMs[1]	Existing AUMs Available Forage
0001	ALASKA PACIFIC	2 172	123	98	142	123	178	123	123	51	51	30	53	-25	153
0003	HAMPTON	57,438	6 629	6.629	7 790	6.629	a 395	6 629	6 629	6.229	6.229	152	172	0	6.781
0004	MINERS FLAT	2.908	201	291	471	291	481	201	201	0	0	52	63	90	343
0006	POST	1.240	78	98	147	98	147	78	78	37	37	22	25	20	120
0007	RIVER	240	0	0	0	0	0	0	0	0	0	4	5	0	4
0009	COLD SPRINGS	37.134	2.142	2,554	3.229	2.652	3 558	2.142	2.142	2.142	2 142	64	143	412	2.716
0012	WINDMILL	920	70	70	70	70	70	70	70	50	50	4	8	0	74
0013	SHEEP MTN COMM	5 782	298	474	574	582	682	298	298	298	298	29	65	176	611
0014	SHEEP MTN INDIVIDUAL	3.050	305	322	352	330	360	305	305	157	157	27	57	17	357
0016	INDIAN CREEK	1.831	81	93	116	93	116	81	81	0	0	41	49	12	134
0017	BONNIEVIEW	1.436	168	96	96	96	96	168	16.8	96	96	20	23	-72	116
0018	JUNIPER SPRINGS	1,625	165	187	287	187	345	165	165	0	0	44	51	22	2 3 1
0019	IBEX BUTTE	12 230	910	910	1 834	910	2 296	910	910	0	0	112	131	0	1.022
0020	LOWER 12 MILE TABLE	9.722	684	684	1.113	684	1 227	684	684	0	0	91	107	0	775
0021	MID FK TWELVE MILE CK	1.795	193	193	193	193	193	193	193	193	193	14	17	0	207
0022	LAUGHLIN	7 672	483	600	912	639	1 097	483	483	0	0	18	33	117	657
0023	ANGELL	1517	141	125	206	125	222	141	141	125	125	11	14	-16	136
0024	UPPER BUCK CREEK	6,991	624	644	791	644	791	624	624	0	0	112	132	20	756
0025	BUCK CREEK FLAT	5.850	271	325	542	325	610	271	271	0	0	47	55	54	372
0026	HUMPHREY	4,936	635	562	753	562	753	635	635	56	56	103	116	-73	665
0027	UPPER POCKET COMM	4,853	274	330	396	330	396	274	274	274	274	93	121	56	423
0028	FERIAN	446	30	30	30	30	30	30	30	0	0	11.	12	0	41
0029	JIMMY MCCUEN	865	0	83	83	83	83	0	0	83	83	19	23	a3	102
0033	CONGLETON	2.128	197	203	244	226	271	197	197	184	184	79	114	6	305
0034	LOWER POCKET COMM	1.968	160	160	192	160	192	160	160	a2	a2	31	36	0	191
0035	BULGER CREEK	2.560	775	a55	a55	a55	855	775	775	660	660	9	11	80	864
0036	DELORE	80	12	10	10	10	10	12	12	10	10	10	9	-2	20
0037	FOSTER. V	160	15	15	15	15	15	15	15	15	15	4	6	0	19
0038	CAVE	3.035	165	194	312	215	338	165	165	30	30	23	47	29	238
0039	PAULINA	1.642	a7	103	124	103	124	07	87	74	74	28	41	16	131
004 1	LAYTON	1.418	123	111	167	123	185	123	123	71	71	24	26	-12	147
0042	OWENS WATER COMM	4.389	241	293	464	293	498	241	241	241	241	15	35	52	308
0043	BARNEY BUCK CREEK	5.150	242	409	596	409	709	242	242	0	0	66	79	167	475
0044	G I	131.678	10,744	10.068	13 143	10.068	1546.3	10,744	10.744	6.669	6,669	285	351	-676	10.353
0045	EAST MAURY	5.133	295	326	518	408	654	295	295	169	169	58	118	31	466
0047	LISTER	27 174	2.155	2.614	3 137	2.614	3 141	2 155	2.155	1,260	1,260	92	163	459	2,706
0048	DURGIN	324	39	39	39	39	39	39	39	39	39	10	14	0	49
0049	MCCULLOUGH	163	10	5	5	5	5	10	10	5	5	2	2	-5	7
0050	RABBIT VALLEY	15.160	548	493	567	548	630	548	548	113	113	331	395	-55	879
005 1	PAULINA CREEK	2.622	125	148	171	164	189	125	125	112	112	65	84	23	229
0052	MILLER	120	22	13	13	13	13	22	22	13	13	2	2	-9	15
0053	NORTH FORK	10.999	740	752	902	752	902	740	740	a3	83	244	287	12	996
oo54	BEAVERCREEK	880	a2	a2	111	82	128	02	82	0	0	19	21	0	101
0056	DAGIS LAKE	11401	487	868	1 076	949	1 259	487	487	0	0	26	62	381	975
0058	COYOTE SPRINGS	4 418	404	404	610	427	738	404	404	404	404	89	102	0	516
0059	DRY LAKE	610	33	33	33	33	33	33	33	33	33	4	10	0	37
3060	FLAT TOP BUTTE	1,706	80	80	80	80	80	80	80	80	80	31	34	0	111
0062	BENNETT FIELD	1314	68	68	68	68	68	68	68	68	68	38	77	0	106
0064	CAMP CREEK COMM	17,861	966	1 122	1,801	1.122	1,877	966	966	916	916	88	218	156	1.210
0066	BUTLER	80	13	5	5	5	5	13	13	5	5	1	1	-8	6
0070	CLOVER CREEK	8,017	541	423	549	518	718	541	541	423	423	25	57	-118	543
0071	COFFEE BUTTE	4.266	468	609	792	609	911	468	468	385	385	2:	72	141	636
0072	MILTENBERGER	1 120	52	52	80	52	98	52	52	52	52	0	0	0	52
0075	WEIGAND	160	15	15	15	15	15	15	15	15	15	2	5	0	17
0076	WEST PINE CREEK	481	45	35	45	45	45	45	45	45	45	3	7	0	48
5001	WHITAKER	120	7		14	7	14	7	7	0	0	1	1	0	8
5002	SANOWSKI	40	10	10	10	10	10	10	10	10	10	1	1	0	11
5003	BROADDUS-CARTER	15	4	2	2	2	2	4	4	0	0	5	5	-2	7
5004	LAMB	63	6	6	7	6	10	6	6	6	6	5	5	0	11
5006	EMMRICH	107	0	20	20	20	22	0	0	20	20	5	5	20	25
5007	HARSCH	506	19	19	19	19	47	19	19	19	19	6	6	0	25
5010	HARRINGTON	80	2	2	4	2	7	2	2	2	2	0	0	0	2
5018	WIERLESKE	a92	49	49	91	49	114	49	49	49	49	5	5	0	54
5022	AIRPORT	597	49	49	64	49	64	49	49	49	49	4	5	0	53
5024	COUCH	768	0	30	30	30	32	0	0	30	30	7	7	30	37
5029	CLAYPOOL	80	4	4	4	4	11	4	4	4	4	1	,	0	5
5030	KEYSTONE	296	30	30	40	30	44	30	30	10	10	4	5	0	34
5031	MAYFIELD-HARRIS	1 509	124	124	132	124	135	124	124	109	109	5	6	0	129
5032	BARRETT	238	24	24	24	24	34	24	24	24	24	4	5	0	28
5050	GREY BUTTE	809	28	28	64	28	135	28	28	28	20	3	5	0	31
5051	SHERWOOD CANYON	, 117	51	65	100	65	162	51	51	51	51	5	IO	14	70
5052	SMITH ROCKS	174	9	17	24	17	33	9	9	9	9	3	5	8	20
5061	MCWEIZZ	6 065	0	348	348	348	346	0	0	338	338	0	0	348	348
5064	WILLIAMS	763	44	44	52	44	52	44	44	0	0	26	31	0	70
5065	LOWER BRIDGE	5 521	310	310	516	310	969	310	310	310	310	107	113	0	417
5066	PINE RIDGE	358	34	34	44	34	50	34	34	34	34	5	6	0	39
5067	FISHER	389	0	14	14	14	14	0	0	14	14	4	5	14	18
506.3	STEVENS-FREMONT	285	0	46	46	46	46	0	0	46	46	5	7	46	51
5069	SQUAW CREEK	192	0	17	20	17	20	0	0	17	17	4	5	17	21
5070	LAFOLLETTEBUTTE	3.795	0	258	258	258	500	0	0	258	258	54	57	258	312
5071	ODIN FALLS	3 869	0	252	252	252	416	0	0	242	242	40	42	252	292
5072	STRUSS	2.294	143	143	143	143	238	143	143	143	143	10	10	0	153
5073	CLINE BUTTE	4 422	202	202	333	202	398	202	202	202	202	15	15	0	217
5074	FRYREAR BUTTE	6 994	498	498	992	498	789	498	498	498	498	20	20	0	518
5075	DESERT SPRINGS	1 947	112	150	247	150	296	112	112	112	112	10	10	38	160
5078	HOME RANCH	3.831	193	246	348	246	400	193	193	193	193	0	0	53	246
5079	WHISKEY STILL	1 034	111	111	166	111	166	111	111	111	111	4	4	0	115
5080	MASTON	3 382	209	209	329	209	390	209	209	209	209	13	13	0	222
5081	PAULUS	152	14	14	18	14	25	14	14	14	14	4	5	0	18
5082	BULLFLAT	116	0		35	7	50	0	0	7	7		2	7	8

Allotment No.	Name	Acres Public Land	Active Pref.	LIVESTOCK ALTERNATIVES: Proposed Action Initial	Proposed Action Long Term	1 Maximize Livestock Initial	1 Maximize Livestock Long Term	2 No Change Initial	2 No Change Long Term	3 Optimize Watershed/Wildlife Initial	3 Optimize Watershed/Wildlife Long Term	WILDLIFE: Proposed Action and all Alternatives Initial	Proposed Action and all Alternatives Long Term	Adjust AUMs[1]	Existing AUMs Available Forage
5086	LONE PINE CANYON	120	5	5	6	3	8	5	5	5	5	1	1	0	6
5088	BURNS-MONTGOMERY	160	17	8	a	8	9	17	17	17	17	3	5	-9	11
5089	KNOCHE	185	6	6	13	6	18	6	6	6	6	1	1	0	7
5090	ZEMLICKA	344	18	18	26	18	26	18	18	18	18	2	3	0	20
5092	REDCLOUD	717	33	62	100	62	130	33	33	33	33	4	5	29	66
5093	CRONIN	321	19	19	51	19	67	19	19	0	0	4	5	0	23
5094	BROWN	493	40	JO	78	40	97	40	40	30	30	8	11	0	48
5096	FOSTER	200	24	24	24	24	27	24	24	24	24	2	2	0	26
5097	RUSSELL	277	16	16	33	-16	41	16	16	16	16	7	9	0	23
5107	CAIN FIELDS	114	36	36	36	36	36	36	36	36	36	3	3	0	39
5108	ZELL POND	1.228	75	75	75	75	113	75	75	75	75	4	5	0	79
5109	HOHNSTEIN-TATTI	5 096	262	262	356	262	403	262	262	262	262	17	21	0	279
5110	BRUCKERT	126	35	35	35	35	35	35	35	35	35	4	5	0	39
5111	COOK	1 860	0	49	49	49	60	0	0	49	49	8	15	49	57
5112	DRIVEWAY	3 058	100	138	172	138	172	100	100	100	100	10	20	38	148
5113	HACKER-HASSING	4019	99	99	172	99	238	99	99	99	99	13	25	0	112
5114	WEIGANO. N	2.651	177	177	233	177	233	177	177	177	177	9	10	0	186
5115	ALLEN	3 554	110	110	165	110	193	110	110	110	110	6	10	0	118
5116	REDMOND AIRPORT	5,467	228	226	228	226	394	228	228	228	228	17	20	0	245
5117	PIPELINE	8 227	513	513	723	513	723	513	513	513	513	21	25	0	534
5118	CRENSHAW	7 267	392	405	505	405	555	392	392	392	392	21	25	13	426
5119	BLACKROCK	254	0	24	24	24	24	0	0	24	24	0	0	24	24
5120	HUTTON	4.616	254	254	331	254	370	254	254	254	254	13	15	0	267
5121	OERTLE	2.629	120	120	157	120	175	120	120	120	120	9	10	0	129
5122	HOWARD	1.394	68	68	91	68	102	68	68	68	68	4	5	0	72
5124	SMEAD	755	23	23	50	23	50	23	23	23	23	2	3	0	25
5125	MAYFIELD POND	4.549	305	305	364	305	394	305	305	305	305	13	15	0	318
5126	POWELL BUTTE	13.156	680	680	950	680	1.100	680	680	680	680	30	35	0	710
5130	PILOT BUTTE	1.394	a4	84	435	84	782	84	64	a4	84	26	28	0	110
5131	MCCLELLAN	661	75	75	75	75	229	75	75	75	75	15	20	0	90
5133	LONG HOLLOW	300	17	17	50	17	90	17	17	12	12	2	5	0	19
5134	STEARNS	18.407	652	852	1.140	652	1.330	852	1352	817	817	106	126	0	958
5135	DRY CREEK	7.055	334	334	1.134	334	1 386	334	334	101	101	67	74	0	401
5136	DAVIS	3.584	213	234	253	234	708	213	213	0	0	34	38	21	268
5137	PRINEVILLE DAM	3.925	276	276	321	276	900	276	276	0	0	0	0	0	276
5138	PLATEAU	5 47i	252	252	441	252	532	252	252	0	0	15	1.5	0	267
5139	DUNHAM	6.126	323	338	1.150	338	2.110	323	323	313	313	37	66	15	375
5140	SALT CR ALKALI BU	10.118	688	800	1,400	800	3.214	688	688	417	417	32	80	112	632
5141	SANFORD CREEK	6.924	152	152	536	152	2.280	152	152	0	0	10	24	0	162
5142	CAREY	1.129	46	46	136	46	225	46	46	0	0	20	22	0	66
5145	EAGLE ROCK-BAILEY	4 766	262	262	622	262	1,660	262	262	0	0	45	50	0	307
5149	EEOLETTO	968	55	84	89	84	260	55	55	4	4	24	40	29	108
5176	MCCABE	350	10	22	22	22	22	10	10	10	10	0	0	12	22
5177	REYNOLDS	1,838	101	176	319	176	372	101	101	61	61	15	30	75	191
5178	GRIZZLY MTN	701	69	69	69	69	152	69	69	69	69	3	5	0	72
5179	LYTLE CREEK	120	a	a	8	8	18	8	a	0	0	1	2	0	9
5180	GOLDEN HORSESHOE	197	14	14	23	14	42	14	14	14	14	3	5	0	17
5162	F JONES	1 027	77	166	1.36	166	230	77	7 i	16	16	25	35	89	191
5183	RAIL HOLLOW	115	10	10	14	10	22	10	10	0	0	2	3	0	12
5198	LAIER-GOVE	529	15	15	96	15	137	15	15	15	15	3	5	0	18
5201	ALFALFA MKT	2 436	141	141	200	141	200	141	141	141	141	8	10	0	149
5204	SINCLAIR	630	38	30	30	30	67	38	3.8	30	30	3	6	-8	33
5206	ARNOLD CANAL	2.791	0	87	87	87	270	0	0	0	0	16	19	a7	103
5207	MICHAELS	6.353	280	196	196	196	400	280	280	196	196	22	26	-64	218
5208	BARLOW CAVE	9,101	600	600	930	600	2 900	600	600	0	0	a4	99	0	684
5209	LAVA BEDS COMM	16 354	729	508	508	508	1.214	729	729	470	478	80	94	-221	588
5210	HORSE RIDGE	22 092	1 624	1 839	2911	1 839	6 070	1.624	1,624	1 580	1.580	107	127	215	1.946
5211	PINE MOUNTAIN	5 323	320	320	740	320	1 390	320	320	320	320	21	27	0	341
5212	MILLICAN	32.560	1705	2 800	4.368	2 800	8 932	1 705	1 705	805	805	106	126	1,095	2,906
5213	RAMBO	15 997	572	605	1019	605	1 019	672	672	605	605	53	63	-67	658
5214	WILLIAMSON CREEK	12905	1 007	1 007	1 603	1 007	1.901	1,007	1,007	992	992	44	52	0	1.051
5215	COATS	9.594	653	1 063	1 400	1 063	2 516	853	653	638	638	26	36	210	1.091
5216	GRIEVE	64	4	4	5	4	6	4	4	4	4	1	1	0	5
5229	KLOOTCHMAN	210	26	26	36	26	45	26	26	26	26	0	0	0	26
5231	WEST BUTTE	11 386	806	942	2012	942	5 665	806	806	761	781	50	59	136	992
5232	NYE	8 627	422	422	1,009	422	3 163	422	422	299	299	34	62	0	456
5233	SCOTT	4 625	255	255	693	755	1 337	255	255	199	199	5	9	0	260
5234	HAUGHTON	18 437	1061	1 552	3.009	1 552	4 960	1061	1061	771	771	30	64	491	1.582
5235	MOFFITT	30 506	2,334	2 830	4 326	2 830	8051	2 334	2.334	1,614	1.614	107	129	496	2.937
5236	BEAR CREEK	1 750	98	200	292	200	520	98	98	0	0	4	10	102	204
5237	BROTHERS	28 465	2 429	3 008	4 270	3008	7 520	2.429	2 429	2.429	2 429	65	73	579	3.073
5238	zx	76 490	7 100	7 100	17 662	7 100	27 344	7 100	7 100	6 980	6 980	223	474	0	7.323
5239	GRASSY BUTTE	25 701	3.018	4 100	4 466	4 100	5 376	3.018	3018	3.006	3,008	50	67	1.062	4.150
5240	FEHRENBACHER	6,285	492	800	1 240	800	2,270	492	492	492	492	7	16	308	807
5241	RICKMAN-MCCORMACK	7 991	398	567	2 494	567	4 969	398	398	370	378	23	54	169	590
5242	SPRING CREEK	6 245	401	401	978	401	1 820	401	401	0	0	25	69	0	429
5243	BRIGHT	6 269	643	1000	1 000	1 000	1.482	643	643	623	623	22	44	357	1.022
5244	IMPERIAL	12332	777	777	2.802	777	4 553	777	777	777	777	37	55	0	814
5245	RAM LAKE	10 235	499	519	2 740	519	4 630	499	499	499	499	41	45	20	560
5246	HATFIELD	122	3	5	15	5	25	5	5	5	5	0	0	0	5
5247	LIZARD CREEK	3 263	280	280	636	280	1.113	280	280	280	280	7	15	0	287
5248	POTHOOK	2 454	140	140	140	140	915	140	140	140	140	15	32	0	155
5249	MCCORMACK HOME RANCH	1 274	54	66	328	68	874	54	54	54	54	13	13	14	81
5250	COFFELT	440	20	20	69	20	123	20	20	20	20	2	5	0	22
5251	96 RANCH	6 771	482	482	2 145	482	4 477	482	482	17	17	19	46	0	501
5252	MEISNER	124	34	34	34	34	34	34	34	34	34	4	5	0	38
5254	BARBWIRE	7 029	694	870	1.450	870	2 550	694	694	694	694	12	25	176	882
9998	C 0 UNALLOTTED	414		—	—	—	—		—	—	—	—		—	—
9999	DESC UNALLOTTED	11 260			—	—	—								
	TOTALS	1 067 577	74 769	83 087	132.795	83.773	201 777	74 769	74 769	56.831	56.83	15.33	17.427	6.318	89.104

[1] Difference between existing livestock allocation and proposed action initial livestock allocation

APPENDIX C Existing and Proposed Grazing Systems,' by Allotment

Allot.	Rest Rotation EX	Rest Rotation PR	Deferred Rotation EX	Deferred Rotation PR	Rotation EX	Rotation PR	Deferred EX	Deferred PR	Early EX	Early PR	Spring/Summer EX	Spring/Summer PR
0001	0	0	0	2.172	0	0	0	0	0	0	2,172	0
0003	46,309	50,688	3,769	6,750	0	0	0	0	0	0	0	0
ooo4	2,696	2,696	0	212	0	0	0	0	0	0	0	0
0006	0	0	360	1,240	0	0	0	0	0	0	0	0
cm7	0	0	0	0	0	0	0	0	0	0	0	0
ooo9	33,288	37,132	0	0	0	0	0	0	0	0	3.271	0
0012	0	0	0	920	0	0	0	0	0	0	0	0
0013	0	1.477	5.695	4.210	0	0	0	0	0	0	0	0
0014	0	1.704	2.413	1.343	0	0	0	0	0	0	0	0
0016	0	0	1.631	1.622	0	0	0	0	0	0	0	0
0017	0	0	0	1,436	0	0	0	0	0	0	0	0
0018	0	1.625	0	0	0	0	0	0	0	0	1.625	0
0019	0	12,230	0	0	0	0	0	0	0	0	12.230	0
0020	0	9,714	0	0	0	0	0	0	0	0	9,722	0
0021	0	0	0	1.795	0	0	1.795	0	0	0	0	0
0022	0	0	0	7.672	0	0	0	0	7,672	0	0	0
0023	0	0	0	1.517	0	0	0	0	1.157	0	0	0
0024	0	0	2,075	6.991	4,116	0	0	0	0	0	0	0
0025	0	5,850	5,850	0	0	0	0	0	0	0	0	0
0026	0	0	2.266	4.936	0	0	0	0	0	0	0	0
0027	0	0	4.653	4.650	0	0	0	0	0	0	0	0
0028	0	0	0	446	0	0	0	0	0	0	0	0
0329	0	0	0	065	0	0	665	0	0	0	0	0
0033	1,759	1.759	0	369	0	0	0	0	0	0	0	0
0034	1,968	1,968	0	0	0	0	0	0	0	0	0	0
a135	0	0	2.560	2.560	0	0	0	0	0	0	0	0
0036	0	0	0	80	0	0	0	0	0	0	0	0
0037	0	0	0	160	0	0	0	0	0	0	0	0
0038	0	0	0	3.027	0	0	0	0	0	0	0	0
0039	0	0	1,138	1.642	0	0	0	0	0	0	0	0
C041	0	0	0	1.416	0	0	0	0	0	0	0	0
co42	0	0	0	4.389	0	0	0	0	0	0	4.389	0
0043	0	5.150	0	0	0	0	0	0	5.150	0	0	0
0044	0	120.021	126,100	3.775	0	5.755	0	0	0	0	0	0
0045	0	0	0	5.133	0	0	0	0	4.493	0	0	0
0047	23.616	23.599	594	3.464	0	0	0	0	0	0	0	0
0048	0	0	0	324	0	0	0	0	0	0	0	0
0049	0	0	0	163	0	0	0	0	0	0	0	0
0050	0	0	0	15,130	0	0	0	0	0	0	15,130	0
0051	0	0	0	2,620	0	0	0	0	0	0	2,622	0
C052	0	0	0	120	0	0	0	0	120	0	0	0
0053	7.693	7,673	2,640	2.640	0	0	0	0	0	0	0	0
0054	0	0	0	060	0	0	0	0	595	0	0	0
0056	11,121	11,115	0	280	0	0	0	0	0	0	0	0
0058	0	0	0	4,418	0	0	0	0	4.416	0	0	0
0059	0	0	0	610	0	0	0	0	610	0	0	0
0060	0	0	0	1,694	0	0	0	0	1,706	0	0	0
0062	0	0	0	1.311	0	0	0	0	0	0	1,314	0
0064	0	17.617	0	0	15.936	0	1.913	0	0	0	0	0
0066	0	0	0	80	0	0	0	0	0	0	0	0
0070	7.265	7.265	0	752	0	0	0	0	0	0	0	0
0071	0	0	0	4.266	0	0	0	0	0	0	0	0
0072	0	0	0	0	0	0	0	0	1,120	0	0	0
0075	0	0	0	160	0	0	0	0	0	0	0	0
0076	0	0	0	461	0	0	0	0	0	0	0	0
5001	0	0	0	0	0	0	0	0	120	0	0	0
5002	0	0	0	0	0	0	0	0	40	0	0	0
5003	0	0	0	0	0	0	0	0	15	0	0	0
5004	0	0	0	0	0	0	0	0	63	0	0	0
5006	0	0	0	0	0	0	0	0	107	0	0	0
5007	0	0	0	0	0	0	0	0	0	0	506	0
5010	0	0	0	0	0	0	0	0	0	0	80	0
5018	0	0	0	0	0	0	0	0	0	0	0	0
5022	0	0	0	0	0	0	0	0	597	0	0	0
5024	0	0	0	0	0	0	0	0	768	0	0	0
5029	0	0	0	0	0	0	0	0	0	0	0	0
5030	0	0	0	0	0	0	0	0	0	0	0	0
5031	0	0	0	1.509	0	0	0	0	0	0	0	0
5032	0	0	0	0	0	0	0	0	0	0	0	0
5050	0	0	0	0	0	0	0	0	0	0	em	0
5051	0	0	0	0	0	0	0	0	0	0	1.117	0
5052	0	0	0	0	0	0	0	0	0	0	174	0
5061	0	0	0	0	0	0	0	0	6,065	0	0	0
5064	0	0	0	763	0	0	0	0	0	0	763	0
5065	0	0	0	5.521	0	0	5,339	0	0	0	0	0
5066	0	0	0	0	0	0	0	0	0	0	350	0
5067	0	0	0	0	0	0	0	0	389	0	0	0
5068	0	0	0	0	0	0	0	0	265	0	0	0
5069	0	0	0	0	0	0	0	0	192	0	0	0
5070	0	0	0	3,795	0	0	0	0	3.795	0	0	0
5071	0	0	0	0	0	0	0	0	3.069	0	0	0
5072	0	0	0	2.294	0	0	0	0	2.294	0	0	0
5073	0	0	0	4,422	4,422	0	0	0	0	0	0	0
5074	0	0	0	6.994	6.994	0	0	0	0	0	0	0
5075	0	0	0	1.947	0	0	0	0	0	0	1.947	0
5076	0	0	0	0	0	0	0	0	3.631	0	0	0

Allot.	Spring/SummerFall EX	PR	Spring/Fall EX	PR	Short Duration EX	PR	Winter EX	PR	Exclusion EX	PR	Rest EX	PR	Fenced Federal Range EX	PR-
0001	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0003	0	0	1,095	0	0	0	0	0	0	0	5.054	0	1.211	0
0004	0	0	0	0	0	0	0	0	0	0	0	0	212	0
0006	0	0	0	0	0	0	0	0	0	0	0	0	880	0
0007	0	0	0	0	0	0	0	0	4	4	236	236	0	0
0009	275	0	0	0	0	0	0	0	0	2	0	0	300	0
0012	0	0	0	0	0	0	0	0	0	0	0	0	920	0
0013	0	0	0	0	0	0	0	0	67	87	0	0	0	0
0014	0	0	0	0	0	0	0	0	0	3	0	0	637	0
0016	0	0	0	0	0	0	0	0	0	9	0	0	0	0
0017	0	0	0	0	0	0	0	0	0	0	0	0	1,436	0
0018	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0019	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0020	0	0	0	0	0	0	0	0	0	6	0	0	0	0
0021	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W22	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0023	0	0	0	0	0	0	0	0	0	0	0	0	360	0
0024	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0026	0	0	0	0	0	0	0	0	0	0	0	0	2.670	0
0027	0	0	0	0	0	0	0	0	0	3	0	0	0	0
0028	0	0	0	0	0	0	0	0	0	0	0	0	446	0
0029	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0033	0	0	0	0	0	0	0	0	0	0	0	0	369	0
0034	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0035	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0036	80	0	0	0	0	0	0	0	0	0	0	0	0	0
0037		0	0	0	0	0	0	0	0	0	0	0	160	0
0038	3.03:	0	0	0	0	0	0	0	0	8	0	0	0	0
0039	504	0	0	0	0	0	0	0	0	0	0	0	0	0
0041	757	0	0	0	0	0	0	0	0	0	0	0	661	0
0042	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0043	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0044	0	0	630	0	0	0	2,821	0	505	505	1,622	1,622	0	0
0045	640	0	0	0	0	0	0	0	0	0	0	0	0	0
0047	703	0	0	0	0	0	0	0	72	91	0	0	2.187	0
0048	0	0	0	0	0	0	0	0	0	0	0	0	324	0
0049	0	0	163	0	0	0	0	0	0	0	0	0	0	0
0050	0	0	0	0	0	0	0	0	30	30	0	0	0	0
0051	0	0	0	0	0	0	0	0	0	2	0	0	0	0
0052	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0053	0	0	0	0	0	0	0	0	405	486	0	0	178	0
0054	285	0	0	0	0	0	0	0	0	0	0	0	0	0
0056	0	0	0	0	0	0	0	0	0	6	0	0	280	0
0058	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0059	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0060	0	0	0	0	0	0	0	0	0	12	0	0	0	0
0062	0	0	0	0	0	0	0	0	0	3	0	0	0	0
0064	0	0	0	0	0	0	0	0	10	44	0	0	0	0
0066	0	0	0	0	0	0	0	0	0	0	0	0	60	0
0070	0	0	0	0	0	0	0	0	0	0	0	0	752	0
0071	4,266	0	0	0	0	0	0	0	0	0	0	0	0	0
W72	0	0	0	0	0	1,120	0	0	0	0	0	0	0	0
w75	0	0	0	0	0	0	0	0	0	0	0	0	160	0
0076	0	0	0	0	0	0	0	0	0	0	0	0	481	0
5001	0	0	0	0	0	120	0	0	0	0	0	0	0	0
5002	0	0	0	0	0	40	0	0	0	0	0	0	0	0
5003	0	0	0	0	0	15	0	0	0	0	0	0	0	0
5004	0	0	0	0	0	63	0	0	0	0	0	0	0	0
5006	0	0	0	0	0	107	0	0	0	0	0	0	0	0
5007	0	0	0	0	0	506	0	0	0	0	0	0	0	0
5010	0	0	0	0	0	80	0	0	0	0	0	0	0	0
5018	0	0	692	0	0	892	0	0	0	0	0	0	0	0
5022	0	0	0	0	0	597	0	0	0	0	0	0	0	0
5024	0	0	0	0	0	766	0	0	0	0	0	0	0	0
5029	0	0	0	0	0	80	0	0	0	0	0	0	80	0
5030	0	0	0	0	0	296	0	0	0	0	0	0	296	0
5031	0	0	1.509	0	0	0	0	0	0	0	0	0	0	0
5032	0	0	0	0	0	236	0	0	0	0	0	0	238	0
5050	0	0	0	0	0	809	0	0	0	0	0	0	0	0
5051	0	0	0	0	0	1,117	0	0	0	0	0	0	0	0
5052	0	0	0	0	0	174	0	0	0	0	0	0	0	0
5061	0	0	0	0	0	6,065	0	0	0	0	0	0	0	0
5064	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5065	0	0	0	0	0	0	0	0	0	0	0	0	162	0
5066	0	0	0	0	0	358	0	0	0	0	0	0	0	0
5067	0	0	0	0	0	369	0	0	0	0		0	0	0
5066	0	0	0	0	0	265	0	0	0	0	8	0	0	0
5069	0	0	0	0	0	192	0	0	0	0	0	0	0	0
5070	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5071	0	0	0	0	0	3.869	0	0	0	0	0	0	0	0
5072	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5073	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5074	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5075	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5078	0	0	0	0	0	3.831	0	0	0	0	0	0	0	0

APPENDIX C (continued)

Allot.	Rest Rotation EX	PR	Deferred Rotation a	PR	Rotation EX	PR	Deferred LX	PR	Early EX	PR	Spring/Summer EX	PR
5079	0	0	0	1.034	0	0	0	0	1034	0	0	0
5080	0	0	0	3.382	0	0	0	0	0	0	3.362	0
5081	0	0	0	0	0	0	0	0	152	0	0	0
5362	0	0	0	0	0	0	0	0	116	0	0	0
5086	0	0	0	0	0	0	0	0	120	0	0	0
5088	0	0	0	0	0	0	0	0	160	0	0	0
5089	0	0	0	0	0	0	0	0	0	0	165	0
5090	0	0	0	0	0	0	0	0	344	0	0	0
5092	0	0	0	0	0	0	0	0	717	0	0	0
5093	0	0	0	321	0	0	0	0	321	0	0	0
5094	0	0	0	0	0	0	0	0	0	0	493	0
5096	0	0	0	0	0	0	0	0	0	0	277	0
5107	0	0	0	0	0	0	0	0	0	0	114	0
5108	0	0	0	0	0	0	0	0	1.196	0	0	0
5109	0	0	0	5.096	0	0	0	0	0	0	0	0
5110	0	0	0	0	0	0	0	0	0	0	0	0
5111	0	0	0	0	0	0	0	0	1,860	0	0	0
5112	0	0	0	3.058	0	0	0	0	0	0	3.058	0
5113	0	0	0	4.019	0	0	0	0	0	0	4.019	0
5114	0	0	0	2.651	0	0	0	0	0	0	2.651	0
5115	0	0	0	3.554	0	0	0	0	0	0	3.554	0
5116	0	0	0	5.467	5.467	0	0	0	0	0	0	0
5117	0.227	0	0	a.227	0	0	0	0	0	0	0	0
5116	0	0	0	7.267	7.267	0	0	0	0	0	0	0
5119	0	0	0	254	0	0	0	0	254	0	0	0
5120	0	0	0	4.616	4,818	0	0	0	0	0	0	0
5121	0	0	2.629	2,629	0	0	0	0	0	0	0	0
5122	0	0	0	1.394	1.394	0	0	0	0	0	0	0
5124	0	0	0	755	755	0	0	0	0	0	0	0
5125	0	0	0	4.549	4.549	0	0	0	0	0	0	0
5127	0	0	0	13,156	0	0	0	0	13.158	0	0	0
5130	0	0	0	0	0	0	0	0	0	0	0	0
5131	0	0	0	0	0	0	0	0	661	0	0	0
5133	0	0	0	0	0	0	0	0	0	0	0	0
5134	0	0	18,407	16.407	0	0	0	0	0	0	0	0
5135	0	0	7.055	7,055	0	0	0	0	0	0	0	0
5136	0	0	0	3.583	0	0	0	0	3.564	0	0	0
5137	0	0	0	3.925	0	0	3,925	0	0	0	0	0
5138	0	0	0	5.477	5.477	0	0	0	0	0	0	0
5139	0	0	0	6,126	6.126	0	0	0	0	0	0	0
5140	0	0	10.116	10.107	0	0	0	0	0	0	0	0
5141	0	0	0	6.924	0	0	0	0	6,924	0	0	0
5142	0	0	0	1.129	0	0	0	0	0	0	1.129	0
5145	4,766	4.761	0	0	0	0	0	0	0	0	0	0
5149	0	0	0	968	0	0	0	0	0	0	0	0
5176	0	0	0	0	0	0	0	0	350	0	0	0
5177	0	0	0	0	0	0	0	0	1,838	0	0	0
5176	0	0	0	0	0	0	0	0	701	0	0	0
5179	0	0	0	0	0	0	0	0	0	0	120	0
5180	0	0	0	0	0	0	0	0	0	0	197	0
5182	0	0	0	0	0	0	0	0	1.027	0	0	0
5183	0	0	0	0	0	0	0	0	115	0	0	0
5196	0	0	0	529	0	0	0	0	0	0	0	0
5201	0	0	0	2.436	0	0	0	0	0	0	2.436	0
5204	0	0	0	630	630	0	0	0	0	0	0	0
5206	0	0	0	2.791	0	0	0	0	0	0	2.791	0
5207	0	0	0	6.353	6.353	0	0	0	0	0	0	0
5206	0	0	0	9.101	0	0	0	0	0	0	9,101	0
5209	0	0	0	16.354	0	0	0	0	0	0	16,354	0
5210	0	0	0	21.492	0	0	21.492	0	0	0	0	0
5211	0	0	5.003	5.323	0	0	0	0	320	0	0	0
5212	32.560	0	0	32.560	0	0	0	0	0	0	0	0
5213	0	0	0	15.997	15,997	0	0	0	0	0	0	0
5214	12,905	0	0	12,905	0	0	0	0	0	0	0	0
5215	0	0	6,164	8.256	0	0	0	0	92	0	0	0
5216	0	0	0	0	0	0	0	0	0	0	84	0
5229	0	0	0	0	0	0	0	0	0	0	0	0
5231	0	0	11,386	11.386	0	0	0	0	0	0	0	0
5232	0	0	0	a.579	0.579	0	0	0	0	0	0	0
5233	0	0	4.625	4,622	0	0	0	0	0	0	0	0
5234	0	0	18.437	16.437	0	0	0	0	0	0	0	0
5235	20.413	0	0	20763	0	0	0	0	350	0	0	0
5236	0	0	0	0	0	0	0	0	0	0	1,750	0
5237	0	0	25.068	25.068	0	0	0	0	0	0	0	0
5236	76.496	76.496	0	0	0	0	0	0	0	0	0	0
5239	0	0	25701	25701	0	0	0	0	0	0	0	0
5240	0	0	6.265	6.265	0	0	0	0	0	0	0	0
5241	0	0	7,991	7,991	0	0	0	0	0	0	0	0
5242	0	0	0	6,245	6,245	0	0	0	0	0	0	0
5243	0	0	0	6 269	0	0	0	0	0	0	6.269	0
5244	0	0	0	12.332	12.332	0	0	0	0	0	0	0
5245	0	0	10.235	10.235	0	0	0	0	0	0	0	0
5246	0	0	122	122	0	0	0	0	0	0	0	0
5247	0	0	0	3.263	3.263	0	0	0	0	0	0	0
5246	0	0	2.454	2.454	0	0	0	0	0	0	0	0

Allot.	Spring/Summer/Fall EX	Spring/Fall PR	Spring/Fall EX	Spring/Fall PR	Short Duration EX	Short Duration PR	Winter EX	Winter PR	Exclusion EX	Exclusion PR	Rest LX	Rest PR	Fenced Federal Range EX	Fenced Federal Range PR
5079	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5080	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5081	0	0	0	0	0	152	0	0	0	0	0	0	0	0
5082	0	0	0	0	0	116	0	0	0	0	0	0	0	0
5086	0	0	0	0	0	120	0	0	0	0	0	0	0	0
5088	0	0	0	0	0	160	0	0	0	0	0	0	0	0
5069	0	0	0	0	0	185	0	0	0	0	0	0	0	0
5090	0	0	0	0	0	344	0	0	0	0	0	0	0	0
5092	0	0	0	0	0	717	0	0	0	0	0	0	0	0
5093	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5094	0	0	0	0	0	493	0	0	0	0	0	0	0	0
5096	0	0	0	0	0	2oo	0	0	0	0	0	0	0	0
5097	0	0	0	0	0	277	0	0	0	0	0	0	0	0
5107	0	0	0	0	0	114	0	0	0	0	0	0	0	0
5106	0	0	0	0	0	1,198	0	0	30	30	0	0	0	0
5109	0	0	5,096	0	0	0	0	0	0	0	0	0	0	0
5110	0	0	126	0	0	126	0	0	0	0	0	0	0	0
5111	0	0	0	0	0	1,860	0	0	0	0	0	0	0	0
5112	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5113	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5114	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5115	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5117	0	0	0	0	0	0	0	0	0	0	0	0	0	0
511%	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5119	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5120	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5121	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5122	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5124	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5125	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5127	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5130	1,394	0	0	0	0	1,394	0	0	0	0	0	0	0	0
5131	0	0	0	0	0	861	0	0	0	0	0	0	0	0
5133	0	0	0	0	0	300	0	0	0	0	0	0	300	0
5134	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5136	0	0	0	0	0	0	0	0	0	1	0	0	0	0
5137	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5138	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5139	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5140	0	0	0	0	0	0	0	0	0	11	0	0	0	0
5141	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5142	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5145	0	0	0	0	0	0	0	0	0	5	0	0	0	0
5149	968	0	0	0	0	0	0	0	0	0	0	0	0	0
5176	0	0	0	0	0	350	0	0	0	0	0	0	0	0
5177	0	0	0	0	0	1.838	0	0	0	0	0	0	0	0
517%	0	0	0	0	0	701	0	0	0	0	0	0	0	0
5179	0	0	0	0	0	120	0	0	0	0	0	0	0	0
5180	0	0	0	0	0	197	0	0	0	0	0	0	0	0
5162	0	0	0	0	0	1.027	0	0	0	0	0	0	0	0
5183	0	0	0	0	0	115	0	0	0	0	0	0	0	0
5198	0	0	0	0	0	0	0	0	0	0	0	0	529	0
5201	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5204	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5206	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5207	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5208	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5209	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5210	0	0	0	0	0	0	0	0	600	600	0	0	0	0
5211	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5212	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5213	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5214	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5215	0	0	0	0	0	0	1.338	1,338	0	0	0	0	0	0
5216	0	0	0	0	0	84	0	0	0	0	0	0	0	0
5229	0	0	0	0	0	210	0	0	0	0	0	0	210	0
5231	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5232	0	0	0	0	0	0	0	0	48	40	0	0	0	0
5233	0	0	0	0	0	0	0	0	0	3	0	0	0	0
5234	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5235	0	0	0	0	0	0	9.743	9,743	0	0	0	0	0	0
5236	0	0	0	0	0	1.750	0	0	0	0	0	0	0	0
5237	0	0	0	0	0	0	3.397	3.397	0	0	0	0	0	0
5238	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5239	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5240	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5241	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5242	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5243	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5244	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5245	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5246	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5247	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5240	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX C (continued)

Allot.	Rest Rotation Ex	PR	Deferred Rotation EX	PR	Rotation a	PR	Deferred EX	PR	EX	Early PR	Spring/Summer EX	PR
5249	0	0	1,274	1,274	0	0	0	0	0	0	0	0
5250	0	0	0	440	440	0	0	0	0	0	0	0
5251	0	0	6.771	6.771	0	0	0	0	0	0	0	0
5252	0	0	0	0	0	0	0	0	124	0	0	0
5254	0	0	7,029	7,029	0	0	0	0	0	0	0	0
9998		0	0	0	0	0	0	0	0	0	0	0
9999	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	291,089	4ao.942	341,696	593.725	121.164	5,755	35.329	0	65.191	0	116.393	0

[1] Acreages shown are for the existing situation and proposed action.

EX: existing PR: proposed

For alternative 1, compare existing and proposed acres under exclusion. If additional acres are shown under proposed compared to existing, these additional acres will not be excluded but managed along with the remainder of the allotment. For example: no acres are presently excluded in allotment 0020, but 8 acres are proposed. Under alternative 1 these acres would not be excluded but managed under rest rotation.

For alternative 2. the existing grazing systems are applicable.

For alternative 3. the existing grazing systems would remain except for those acres excluded for wildlife or watershed values. While acres of exclusion are not shown for this alternative, refer to Appendix B, Available Forage Allocation and Production, to gain an indication of how much of the allotment would be excluded by comparing livestock forage allocations for alternatives 2 and 3. For example, the livestock forage allocation for allotment 0020 is 684 AUMs under alternative 2 and 0 AUMs under alternative 3. This would Indicate that the entire allotment would be excluded under alternative 3.

No grazing would be allowed with alternative 4.

Allot.	Spring/Summer/Fall LX	PR	Spring/Fall EX	PR	Short Duration EX	PR	Winter EX	PR	Exclusion EX	PR	Rest EX	PR	Fenced Federal Range EX	PR
5249	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5250	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5251	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5252	0	0	0	0	0	124	0	0	0	0	0	0	0	0
5254	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9998	0	0	0	0	0	0	0	0	0	2	414	412	0	0
9999	0	0	0	0	0	0	0	0	0	0	11.260	11.280	0	0
TOTALS	12.907	0	9.511	0	0	37.144	17.299	14.478	1.371	2.003	18.586	13.530	16,539	0

APPENDIX D Proposed Action, Rangeland Improvements by Allotment

	RANGELAND IMPROVEMENTS							VEGETATION TREATMENT							
								Brush Control and Seed				Brush Control Only			
Allot.	Fence (miles)	Riparian Fence (miles)	Spring Develop. (No.)	Pipe-line (miles)	Wells (No.)	Resvrs (No.)	Water-holes (No.)	Spray (acres)	Burn (acres)	Chain (acres)	Plow (acres)	Spray (acres)	Burn (acres)	Chain (acres)	Juniper Control (acres)
0001	02	00	0	00	0	1	0	0	0	0	0	0	0	0	0
0003	00	00	0	140	0	0	2	0	0	0	1575	0	1,500	0	0
0004	07	00	0	00	0	1	0	0	0	0	0	200	0	0	0
0006	0.0	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0007	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0009	3.0	18	0	00	0	4	0	0	0	0	0	2.000	3 020	0	0
0012	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0013	02	00	1	00	0	1	0	0	0	0	0	0	0	0	0
0014	50	31	0	00	0	0	0	0	0	0	0	0	0	0	0
co16	45	59	0	00	0	0	0	0	0	0	0	0	0	0	0
0017	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0018	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0019	32	00	0	120	1	1	0	0	0	0	1.300	3 120	0	0	0
0020	1.7	5.1	0	50	1	0	0	0	0	0	0	2.815	0	0	0
0021	0.0	0.0	0	00	0	0	0	0	0	0	0	0	0	0	0
0022	12	00	0	00	0	1	0	0	0	0	0	880	0	0	0
0023	00	00	0	00	0	0	0	0	0	0	0	265	0	0	0
0024	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0025	00	00	0	65	1	0	0	0	0	0	0	0	2.550	0	0
0026	12.0	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0027	22	40	0	00	0	1	0	0	0	0	0	0	0	0	0
0028	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0029	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0033	30	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0034	30	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0035	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0036	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0037	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
CO38	72	26	0	00	0	1	0	0	0	0	0	709	0	0	0
0039	00	0.0	0	00	0	0	0	0	0	0	0	0	0	0	0
0041	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
W42	02	00	1	00	0	1	0	0	0	0	0	0	0	0	1 050
0043	02	00	0	00	0	1	0	0	0	0	0	0	1.726	0	0
0044	270	00	1	190	3	0	0	0	0	0	5 750	8.000	10.145	5.000	0
0045	20	0.0	1	00	0	0	0	0	0	0	0	873	0	0	0
0047	19	79	0	00	0	1	0	0	0	0	0	0	0	0	0
0048	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0049	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0050	95	0.0	0	00	0	2	0	0	0	0	0	0	0	0	0
0051	22	20	0	00	0		0	0	0	0	0	0	0	0	0
0052	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0053	122	12	1	CO	0	1	0	0	0	0	0	0	0	0	0
0054	02	00	0	00	0	1	0	0	0	0	0	0	0	0	0
CO56	05	31	0	00	0	2	0	0	0	0	0	1.260	0	0	0
CO58	02	00	0	00	0	1	0	0	0	0	0	893	0	0	0
0059	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0060	00	2.6	0	00	0	0	0	0	0	0	0	0	0	0	0
0062	20	31	0	00	0	0	0	0	0	0	0	0	0	0	0
0064	110	127	0	43	1	2	0	0	0	0	0	0	2.500	0	3 000
0066	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0070	47	00	0	00	0		0	0	0	0	0	3	0	0	0
0071	30	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0072	00	00	0	00	0	0	0	0	0	0	0	0	0	0	170
0075	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
0076	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5001	00	00	0	CO	0	0	0	0	0	0	0	0	0	0	0
5002	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5003	03	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5004	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5006	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5007	00	00	0	00	0	0	0	0	50	0	0	0	0	0	260
5010	00	00	0	00	0	0	0	0	20	0	0	0	0	0	20
5018	00	00	0	00	0	0	0	0	100	0	0	0	0	0	150
5022	00	00	0	00	0	0	0	0	40	0	0	0	0	0	100
5024	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5029	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5030	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5031	00	00	0	00	0	0	0	0	0	0	0	0	0	0	250
5032	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5050	00	00	0	00	0	0	0	0	175	0	0	0	0	0	200
5051	00	00	0	00	0	0	0	0	100	0	0	0	0	0	300
5052	00	00	0	00	0	0	0	0	25	0	0	0	0	0	75
5061	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5064	00	00	0	20	0	0	0	0	0	0	0	0	0	0	100
5065	60	00	0	60	0	0	0	0	400	0	0	0	0	0	1.200
5066	00	00	0	00	0	0	0	0	0	0	0	0	0	0	80
5067	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5068	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5069	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5070	70	00	0	40	0	0	0	0	225	0	0	0	0	0	700
5071	100	00	0	00	0	0	0	0	0	9	0	0	0	0	0
5072	50	00	0	20	0	0	0	0	40	0	0	0	0	0	300
5073	00	00	0	60	0	0	0	0	450	0	0	0	0	0	900
5074	70	00	0	40	0	0	0	0	225	0	0	0	0	0	700
5075	00	00	0	00	0	0	0	0	250	0	0	0	0	0	400
5078	00	00	0	30	0	0	0	0	200	0	0	0	0	0	750
5079	00	00	0	20	0	0	0	0	200	0	0	0	0	0	200
	20	00	0	30	0	0	0	0	260	0	0	0	0	0	500
5081	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5082	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0
5086	00	00	0	00	0	0	0	0	0	0	0	0	0	0	0

	RANGELAND IMPROVEMENTS							VEGETATION TREATMENT							
								Brush Control and Seed				Brush Control Only			
Allot.	Fence (miles)	Riparian Fence (miles)	Spring Develop. (No.)	Pipe-line (miles)	W I (No.)	Resvrs. (No.)	Water-holes (No.)	Spray (acres)	Burn (acres)	Chain (acres)	Plow (acres)	Spray (acres)	Burn (acres)	Chain (acres)	Juniper Control (acres)
5088	0 0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5089	0 0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	90
5090	0 0	0 . 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5092	0 0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	175
5093	0 0	0.0	0	0 0	0	0	0	0	30	0	0	0	0	0	60
5094	0 0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5096	0 0	0.0	0	0 0	0	0	0	0	25	0	0	0	0	0	25
5097	0 0	0.0	0	0 0	0	0	0	0	0	0	0	0	0	0	100
5107	0 0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5108	0.0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	300
5109	2.0	0 0	0	5.0	0	0	0	0	350	0	0	0	0	0	700
5110	0.0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5111	0.0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5112	0.0	0 0	0	0 0	0	0	0	0	500	0	0	0	0	0	750
5113	2.0	0 0	0	4 0	0	0	0	0	150	0	0	0	0	0	700
5114	1.5	0 0	0	3 0	0	0	0	0	100	0	0	0	0	0	250
5115	1.5	0 0	0	3 0	0	0	0	0	250	0	0	0	0	0	500
5116	0.0	0 0	0	5.0	0	0	0	0	200	0	0	0	0	0	700
5117	0.0	0.0	0	8 0	0	0	0	0	300	0	0	0	0	0	500
5118	1.5	0 0	0	6 0	0	0	0	0	400	0	0	0	0	0	1,000
5119	0.0	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
5120	0 0	0.0	0	3.0	0	0	0	0	250	0	0	0	0	0	500
5121	0 0	0 0	0	2.0	0	0	0	0	100	0	0	0	0	0	2 5 0
5122	0 0	0.0	0	0.0	0	0	0	0	150	0	0	0	0	0	200
5124	0.0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	500
5125	0.0	0.0	0	2.0	0	0	0	0	200	0	0	0	0	0	500
5127	3.0	0 0	0	11 0	0	0	0	0	500	0	0	0	0	0	1,600
5130	0.0	0.0	0	0 0	0	0	0	0	150	0	0	0	0	0	800
5131	0.0	0 0	0	0.0	0	0	0	0	0	0	0	0	0	0	350
5133	0 0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	300
5134	6.0	0.0	0	9.0	0	0	0	0	1,000	0	0	0	0	0	3.000
5135	0.0	0 0	0	0 0	0	0	0	0	300	0	0	0	0	0	4 . m
5136	4 0	15	0	0 0	0	0	0	0	250	0	0	0	0	0	2.000
5137	0 0	0.0	0	0 0	0	0	0	0	120	0	0	0	0	0	1,000
5138	5.0	0 0	0	8 0	0	0	0	0	200	0	0	0	0	0	1,000
5139	5.0	0 0	0	5.0	0	0	0	0	1.000	0	0	0	0	0	2.750
5140	5.0	7 6	8	100	0	0	0	0	800	0	0	0	0	0	2.500
5141	7 0	0 0	0	1.0	0	0	0	0	800	0	0	0	0	0	2,000
5142	2 5	0 0	0	0.0	0	0	0	0	400	0	0	0	0	0	120
5145	2.0	4.4	0	3.0	0	0	0	0	1,000	0	0	0	0	0	1,000
5149	0.0	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	300
5176	0.0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5177	0 0	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	300
5178	0.0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	325
5179	2.0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	33
5180	0 0	0 0	0	0 0	0	0	0	0	60	0	0	0	0	0	80
5182	0.0	0 0	0	0 0	0	0	0	0	160	0	0	0	0	0	300
5183	0.0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5198	0 0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5201	15	0 0	0	3 0	0	0	0	0	150	0	0	0	0	0	350
5204	0 0	0 0	0	0 0	0	0	0	0	100	0	0	0	0	0	400
5206	0 0	0 0	0	0 0	0	0	0	0	200	0	0	0	0	0	400
5207	3 0	0 0	0	10	0	0	0	0	250	0	0	0	0	0	750
5208	5 0	0 0	0	100	0	0	0	0	700	0	0	0	300	0	500
5209	7 0	0 0	0	90	0	0	0	0	600	0	0	0	400	0	1.000
5210	10	0 0	0	160	0	0	0	0	2.000	0	0	3,500	0	0	500
5211	0 0	0 0	0	3 0	0	0	0	1.000	500	0	0	MO	0	0	0
5212	6 0	0 0	0	350	0	0	0	0	2,300	0	0	500	0	0	3.000
5213	6 0	0 0	0	80	0	0	0	200	300	0	0	500	0	0	2,000
5214	0 0	0 0	0	7 0	0	0	0	400	600	0	0	0	0	0	1.500
5215	0 0	0 0	0	2 0	0	0	0	0	580	0	0	2 . m	420	0	400
5216	0 0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5229	0 0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	140
5231	0 0	0 0	0	4 0	0	0	0	0	1,000	0	0	1,000	0	0	9.000
5232	4 0	0.0	0	4 0	0	0	0	0	1.000	0	0	0	0	0	2.500
5233	2 0	15	0	2 0	0	0	0	0	300	0	0	200	0	0	2.500
5234	6 0	0 0	0	160	0	0	0	0	0	0	0	2.000	0	0	8.000
5235	170	0 0	0	190	0	0	0	0	3 . m	0	0	6.000	3 . m	0	0
5236	0 0	0 0	0	3 0	0	0	0	0	100	0	0	0	0	0	350
5237	0 0	0 0	0	190	0	0	0	0	1775	0	0	4.000	4,725	0	0
5238	180	0 0	0	740	0	0	0	0	4.000	0	0	8,000	13.000	0	5.000
5239	5 0	0 0	0	S0	0	0	0	0	1250	0	0	2,000	2.750	0	0
5240	4.5	0 0	0	2 0	0	0	0	0	700	0	0	300	0	0	0
5241	1 0	0 0	0	13.0	0	0	0	0	2,000	0	0	0	0	0	5.000
5242	6 0	0 0	0	4 0	0	0	0	0	400	0	0	0	0	0	1.000
5243	2 0	0 0	0	3 0	0	0	0	0	500	0	0	1,0000	500		
5244	3 0	0 0	0	7 0	0	0	0	1.600	1.700	0	0	2,000	0	0	0
5245	4 0	0.0	0	6 0	0	0	0	0	1 400	0	0	2.100	0	0	4,500
5246	0 0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	60
5247	2 0	0 0	0	2 0	0	0	0	0	300	0	0	0	600	0	1.500
5248	0 0	0.0	0	0 0	0	0	0	0	400	0	0	0	0	0	2.200
5249	0 0	0 0	0	0 0	0	0	0	0	250	0	0	0	0	0	1,000
5250	0 0	0 0	0	1 0	0	0	0	0	120	0	0	0	0	0	400
5251	2 0	0 0	0	5 0	0	0	0	0	700	0	0	0	0	0	5000
5252	0 0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5254	3 0	0 0	0	3 0	0	0	0	0	650	0	0	1.000	850	0	0
9998	0 0	0 8	0	0 0	0	0	0	0	0	0	0	0	0	0	0
9999	0 0	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	319.9	709	13	466.5	7	25	2	3.200	42.330	0	3,625	57635	47436	5.000	102.433

APPENDIX E Alternative 1, Rangeland Improvements by Allotment

	RANGELAND IMPROVEMENTS						VEGETATION TREATMENT							
							Brush Control and Seed				Brush Control Only			
Allot.	Spring Fence (miles)	Pipe-Develop. (No.)	line (miles)	Wells (No.)	Water-Resvrs. (No.)	holes (No.)	Spray (acres)	Bum (acres)	Chain (acres)	Plow (acres)	Spray (acres)	Bum (acres)	Chain (acres)	Juniper Control (acres)
0001	0.2	0	0.0	0	1	0	0	0	0	0	0	0	0	0
0003	0.0	0	140	0	0	2	0	0	0	3.150	1,000	4,500	1,000	0
0004	07	0	0.0	0	,	0	0	0	0	0	500	0	0	0
0006	0.0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
0007	0.0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
0009	30	0	0.0	0	4	0	0	0	0	0	5,000	6,000	0	0
0012	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0013	0.2	1	0 0	0	1	0	0	0	0	0	0	0	0	0
0014	50	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0016	45	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0017	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0018	00	0	0 0	0	0	0	0	0	0	0	1,000	0	0	0
0019	3.2	0	120	1	1	0	0	0	0	3,000	9,000	0	0	0
0020	1.7	0	5.0	1	0	0	0	0	0	0	7,000	0	0	0
0021	00	0	0.0	0	0	0	0	0	0	0	0	0	0	0
W22	1.2	0	0.0	0	1	0	0	0	0	0	5,000	0	0	0
W23	0.0	0	0.0	0	0	0	0	0	0	0	1,000	0	0	0
0024	00	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0025	00	0	65	1	0	0	0	0	0	0	0	5,100	0	0
0026	12.0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
0027	2.2	0	0.0	0	1	0	0	0	0	0	0	0	0	0
0028	00	0	0.0	0	0	0	0	0	0	0	0	0	0	0
w29	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0033	3.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0034	3.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0035	0.0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
0036	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
al37	00	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0038	72	0	0.0	0	1	0	0	0	0	0	2,000	0	0	0
0039	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0041	00	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0042	0.2	1	0.0	0	1	0	0	0	0	0	0	0	0	1,750
0043	0.2	0	0 0	0	1	0	0	0	0	0	0	4,000	0	0
co44	27 0	1	19.0	3	0	0	0	0	0	11,500	15,000	24,500	10,000	0
0045	2.0	1	0.0	0	0	0	0	0	0	0	2,000	0	0	0
0047	19	0	0 0	0	1	0	0	0	0	0	7,000	3,000	0	0
0048	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
0049	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0050	95	0	0.0	0	2	0	0	0	0	0	0	0	0	0
0051	2.2	0	0 0	0	1	0	0	0	0	0	0	0	0	0
0052	00	0	0 0	0	0	0	0	0	0	0	0	0	0	0
0053	12.2	1	0.0	0	1	0	0	0	0	0	0	0	0	0
0054	0.2	0	0 0	0	1	0	0	0	0	0	600	0	0	0
0056	0.5	0	0.0	0	2	0	0	0	0	0	3,200	0	0	0
0058	02	0	0.0	0	1	0	0	0	0	0	3,600	0	0	0
0059	00	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0060	00	0	0 0	0	0	0	0	0	0	0	0	0	0	0
0062	2.0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
0064	110	0	4.0	1	2	0	0	0	0	0	0	2,500	0	7,700
0066	0 0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0070	47	0	0.0	0	1	0	0	0	0	0	0	0	0	0
0071	30	0	0.0	0	0	0	0	0	0	0	0	0	0	0
0072	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	170
0075	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
0076	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5001	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5302	0.0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5003	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5004	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5006	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5007	0 0	0	0 0	0	0	0	0	100	0	0	0	0	0	280
5010	0 0	0	0 0	0	0	0	0	20	0	0	0	0	0	20
5018	0.0	0	0 0	0	0	0	0	100	0	0	0	0	0	150
5022	0 0	0	0 0	0	0	0	0	40	0	0	0	0	0	100
5024	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5029	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
M30	0 0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
5031	0 0	0	0.0	0	0	0	0	0	0	0	0	0	0	250
5032	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5050	0 0	0	0 0	0	0	0	0	175	0	0	0	0	0	200
5051	0 0	0	0.0	0	0	0	0	300	0	0	0	0	0	300
5052	0 0	0	0 0	0	0	0	0	25	0	0	0	0	0	75
5061	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5064	0 0	0	2.0	0	0	0	0	0	0	0	0	0	0	100
5065	60	0	60	0	0	0	0	600	0	0	0	0	0	1,200
5066	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	80
5067	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5068	0 0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
5069	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5070	70	0	40	0	0	0	0	225	0	0	0	0	0	700
5071	100	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5072	50	0	20	0	0	0	0	40	0	0	0	0	0	300
5073	0 0	0	60	0	0	0	0	450	0	0	0	0	0	900
5074	70	0	70	0	0	0	0	500	0	0	0	0	0	1,000
5075	0 0	0	0 0	0	0	0	0	250	0	0	0	0	0	400
5076	0 0	0	30	0	0	0	0	200	0	0	0	0	0	750
5079	0.0	0	20	0	0	0	0	200	0	0	0	0	0	200
5000	20	0	30	0	0	0	0	260	0	0	0	0	0	500
5001	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5062	0 0	0	0 0	0	0	0	0	40	0	0	0	0	0	50
5086	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0

	RANGELAND IMPROVEMENTS						VEGETATION TREATMENT							
							Brush Control and Seed				Brush Control Only			
Allot.	Spring Fence (miles)	Pipe-Develop. (No.)	line (miles)	Wells (No.)	water-Resvrs. (No.)	holes (No.)	Spray (acres)	Burn (acres)	Chain (acres)	Plow (acres)	Spray (acres)	Burn (acres)	Chain (acres)	Juniper Control (acres)
5088	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5089	0.0	0	0 0	0	0	0	0	0	0	0	0	0	0	90
5090	0 0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
5092	0 0	0	0.0	0	0	0	0	0	0	0	0	0	0	175
5093	0.0	0	0.0	0	0	0	0	30	0	0	0	0	0	60
5094	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
5096	0.0	0	0.0	0	0	0	0	25	0	0	0	0	0	25
5097	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	100
5107	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5108	0 0	0	0.0	0	0	0	0	0	0	0	0	0	0	300
5109	2.0	0	5.0	0	0	0	0	350	0	0	0	0	0	700
5110	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
5111	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5112	0 0	0	0.0	0	0	0	0	500	0	0	0	0	0	750
5113	2 0	0	4 0	0	0	0	0	150	0	0	0	0	0	700
5114	1 5	0	3.0	0	0	0	0	100	0	0	0	0	0	250
5115	1.5	0	3.0	0	0	0	0	250	0	0	0	0	0	500
5116	0 0	0	5.0	0	0	0	0	200	0	0	0	0	0	700
5117	0.0	0	8.0	0	0	0	0	300	0	0	0	0	0	500
5116	1 5	0	6.0	0	0	0	0	400	0	0	0	0	0	1,000
5119	0 0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
5120	0 0	0	3.0	0	0	0	0	250	0	0	0	0	0	500
5121	0.0	0	2.0	0	0	0	0	100	0	0	0	0	0	250
5122	0 0	0	0 0	0	0	0	0	150	0	0	0	0	0	200
5124	0 0	0	0.0	0	0	0	0	500	0	0	0	0	0	500
5125	0.0	0	2.0	0	0	0	0	200	0	0	0	0	0	500
5127	3 0	0	11.0	0	0	0	0	500	0	0	0	0	0	1,600
5130	0 0	0	0.0	0	0	0	0	200	0	0	0	0	0	800
5131	0 0	0	0.0	0	0	0	0	0	0	0	0	0	0	350
5133	0 0	0	0.0	0	0	0	0	0	0	0	0	0	0	300
5134	6.0	0	9 0	0	0	0	0	1.000	0	0	0	0	0	3,000
5135	0.0	0	0.0	0	0	0	0	1,000	0	0	0	0	0	4,000
5136	4 0	0	0.0	0	0	0	0	600	0	0	0	0	0	2.000
5137	0.0	0	0 0	0	0	0	0	200	0	0	0	0	0	2.000
5136	5.0	0	6.0	0	0	0	0	300	0	0	0	0	0	1,000
5139	5 0	0	5 0	0	0	0	1,250	1,000	0	0	0	0	0	2.750
5140	5.0	8	10.0	0	0	0	0	6,000	0	0	0	0	0	9,000
5141	7 0	0	1 0	0	0	0	0	2.000	0	0	0	0	0	5.000
5142	2.5	0	0.0	0	0	0	0	600	0	0	0	0	0	2 w
5145	2 0	0	3.0	0	0	0	0	3,000	0	0	0	0	0	4,000
5149	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	1,968
5176	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
5177	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	400
5178	0.0	0	0 0	0	0	0	0	0	0	0	0	0	0	325
5179	2.0	0	0 0	0	0	0	0	0	0	0	0	0	0	33
5180	0 0	0	0.0	0	0	0	0	60	0	0	0	0	0	80
5162	0.0	0	0.0	0	0	0	0	160	0	0	0	0	0	475
5163	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5196	0.0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5201	1 5	0	3.0	0	0	0	0	150	0	0	0	0	0	350
5204	0.0	0	0.0	0	0	0	0	400	0	0	0	0	0	400
5206	0 0	0	0 0	0	0	0	0	200	0	0	0	0	0	400
5207	3.0	0	1.0	0	0	0	0	250	0	0	0	0	0	750
520a	5 0	0	100	0	0	0	0	3,000	0	0	4,500	0	0	2,500
5209	7 0	0	9 0	0	0	0	0	800	0	0	0	1,000	0	1.000
5210	1 0	0	16.0	0	0	0	0	5,000	0	0	0	0	0	15,000
5211	0.0	0	3.0	0	0	0	3 . m	0	0	0	0	4,000	0	0
5212	6.0	0	350	0	0	0	2,000	3,000	0	0	0	17,000	0	3,000
5213	6 0	0	8.0	0	0	0	0	1.500	0	0	0	w o o	0	2,000
5214	0.0	0	7 0	0	0	0	0	1,000	0	0	0	1,000	0	1,500
5215	0 0	0	2 0	0	0	0	0	600	0	0	3,000	2,000	0	400
5216	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5223	0.0	0	0 0	0	0	0	0	0	0	0	0	0	0	140
5231	0 0	0	4 0	0	0	0	0	4,000	0	0	0	0	0	15,000
5232	4 0	0	4.0	0	0	0	0	4,000	0	0	0	0	0	8,000
5233	2 0	0	2.0	0	0	0	0	500	0	0	0	0	0	2.500
5234	6 0	0	16.0	0	0	0	0	2,000	0	0	5,000	5,000	0	5,000
5235	170	0	190	0	0	0	0	8,000	0	0	10,000	10,000	0	0
5236	0 0	0	3.0	0	0	0	0	300	0	0	0	0	0	1.756
5237	0 0	0	190	0	0	0	0	3 . m	0	0	9,000	6,000	0	0
5238	160	0	740	0	0	0	0	6.000	0	0	20,000	29,000	0	5.000
5239	5 0	0	5 0	0	0	0	0	3,000	0	0	15,000	0	0	0
5240	4 5	0	2 0	0	0	0	0	1.000	0	0	4,000	0	0	0
5241	1 0	0	130	0	0	0	0	6,000	0	0	0	0	0	10.030
5242	6.0	0	4 0	0	0	0	0	4,000	0	0	0	0	0	6,000
5243	2.0	0	3.0	0	0	0	0	1,000	0	0	1,000	2,000	0	500
5244	3 0	0	7 0	0	0	0	0	5.000	0	0	4,000	4,000	0	0
5245	4 0	0	6.0	0	0	0	0	2.000	0	0	1.000	2,000	0	5,000
5246	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	60
5241	2.0	0	2.0	0	0	0	0	500	0	0	0	1,500	0	1,500
5248	0 0	0	0 0	0	0	0	0	600	0	0	0	0	0	2.200
5249	0 0	0	0.0	0	0	0	0	400	0	0	0	0	0	1,000
5250	0 0	0	1 0	0	0	0	0	200	0	0	0	0	0	400
5251	2 0	0	5 0	0	0	0	0	1.000	0	0	0	0	0	5.000
5252	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
5254	3 0	0	3 0	0	0	0	0	1,000	0	0	4.000	0	0	0
9996	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
9999	0 0	0	0 0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	3199	13	469.5	7	25	2	6.250	93.050	0	17.650	143,400	135,100	11,000	160,612

APPENDIX F Alternative 3, Rangeland Improvements by Allotment

Allot.	Fence (miles)	Spring Develop. (No.)	Resvrs. (No.)	Water-holes (No.)	Brush Control (acres)	Juniper Control (acres)
0001	4.0	0	0	0	0	0
0003	0.2	0	0	0	1,500	0
0004	0.0	0	0	0	0	0
0006	3.5	0	0	0	0	0
0007	0.0	0	0	0	0	0
ooo9	2.0	0	0	0	2.500	0
0012	2.7	0	0	0	0	0
0013	1.4	0	0	0	0	0
0014	5.0	0	0	0	0	0
0016	0.0	0	0	0	0	0
0017	0.0	0	0	0	0	0
0018	0.0	0	0	0	0	0
0019	0.0	0	0	0	0	0
0020	0.0	0	0	0	0	0
0021	0.0	0	0	0	0	0
0022	0.0	0	0	0	880	0
0023	0.0	0	0	0	0	0
0024	0.0	0	0	0	0	0
0025	0.0	0	0	0	2,550	0
0026	7.5	0	0	0	0	0
0027	5.0	0	0	0	0	0
0028	0.0	0	0	0	0	0
0029	0.0	0	0	0	0	0
0033	4.0	0	0	0	0	0
0034	22.4	0	0	0	0	0
0035	0.0	0	0	0	0	0
0036	0.0	0	0	0	0	0
0037	0.0	0	0	0	0	0
0038	4.2	0	0	0	0	0
0039	0.0	0	0	0	0	0
0041	1.7	0	0	0	0	0
0042	0.0	0	0	0	0	1,050
0043	0.0	0	0	0	630	0
0044	81.0	0	8	5	19,575	0
0045	7.0	0	0	0	813	0
0047	11.0	0	0	0	0	0
0048	0.0	0	0	0	0	0
0049	0.0	0	0	0	0	0
0050	22.0	0	0	0	0	0
0051	5.0	0	1	0	0	0
0052	0.0	0	0	0	0	0
0053	5.0	0	0	0	0	0
0054	0.0	0	0	0	0	0
0056	0.0	0	0	0	0	0
0058	0.0	0	0	0	893	0
0059	0.0	0	0	0	0	0
0060	2.6	0	0	0	0	0
0062	3.0	0	0	0	0	0
0064	20.6	0	0	0	0	3 . m
0066	0.0	0	0	0	0	0
0070	0.6	0	0	0	0	0
0071	3.0	0	0	0	0	0
0072	0.0	0	0	0	0	170
0075	0.0	0	0	0	0	0
0076	0.0	0	0	0	0	0
5001	0.0	0	0	0	0	0
5002	0.4	0	0	0	0	0
5003	0.0	0	0	0	0	0
5004	0.0	0	0	0	0	0
5006	0.0	0	0	0	0	0
5007	0.0	0	0	0	0	0
5010	0.0	0	0	0	0	0
5018	0.0	0	0	0	0	0
5022	0.0	0	0	0	0	0
5024	0.0	0	0	0	0	0
5029	0.0	0	0	0	0	0
5030	4.0	0	0	0	0	0
5031	2.2	0	0	0	0	250

Allot.	Fence (miles)	Spring Develop. (No.)	Reservs. (No.)	Water-holes (No.)	Brush Control (acres)	Juniper Control (acres)
5032	0.0	0	0	0	0	0
5050	0.0	0	0	0	0	200
5051	0.0	0	0	0	0	300
5052	0.0	0	0	0	0	75
5061	2.0	0	0	0	0	0
5064	0.0	0	0	0	0	0
5065	0.0	0	0	0	0	0
5066	0.0	0	0	0	0	0
5067	0.0	0	0	0	0	0
5068	0.0	0	0	0	0	0
5069	0.0	0	0	0	0	0
5070	0.9	0	0	0	0	0
5071	6.0	0	0	0	0	0
5072	0.0	0	0	0	0	0
5073	0.0	0	0	0	0	0
5074	0.0	0	0	0	0	0
5075	0.0	0	0	0	0	0
5078	0.0	0	0	0	0	0
5079	0.0	0	0	0	0	0
5080	3.0	0	0	0	0	0
5081	0.0	0	0	0	0	0
5082	0.9	0	0	0	50	0
5066	0.0	0	0	0	0	0
5088	0.0	0	0	0	0	0
5089	0.0	0	0	0	0	0
5090	0.0	0	0	0	0	0
5092	0.0	0	0	0	0	175
5093	0.0	0	0	0	0	0
5094	3.0	0	0	0	0	0
5096	0.0	0	0	0	0	0
5097	0.0	0	0	0	0	100
5107	0.0	0	0	0	0	0
5108	0.3	0	0	0	0	0
5109	0.0	0	0	0	0	0
5110	0.0	0	0	0	0	0
5111	0.0	0	0	0	0	0
5112	0.0	0	0	0	0	0
5113	0.0	0	0	0	0	0
5114	0.0	0	0	0	0	0
5115	0.0	0	0	0	0	0
5116	0.0	0	0	0	0	0
5117	0.0	0	0	0	0	0
5118	0.0	0	0	0	0	0
5119	0.0	0	0	0	0	0
5120	0.0	0	0	0	0	0
5121	0.0	0	0	0	0	0
5122	0.0	0	0	0	0	0
5124	0.0	0	0	0	0	0
5125	0.0	0	0	0	0	0
5127	0.0	0	0	0	0	0
5130	0.0	0	0	0	0	800
5131	0.0	0	0	0	0	350
5133	1.7	0	0	0	0	300
5134	10.0	0	0	0	0	3,000
5135	0.0	0	0	0	0	4,000
5136	0.0	0	0	0	0	2,000
5137	0.0	0	0	0	0	1,000
5138	0.0	0	0	0	0	1,000
5139	4.0	1	0	0	0	2,750
5140	6.0	0	0	0	0	2,500
5141	0.0	0	0	0	0	2,000
5142	0.0	0	0	0	0	120
5145	0.0	0	0	0	0	1,000
5149	0.5	0	0	0	0	300
5176	0.0	0	0	0	0	0
5177	5.2	0	0	0	0	300
5178	0.0	0	0	0	0	325

APPENDIX F (continued)

Allot.	Fence (miles)	Spring Develop. (No.)	Rrwa (No.)	Water-holes (No.)	Brush Control (acres)	Juniper Control (acres)
5179	0.0	0	0	0	0	33
5180	0.0	0	0	0	0	80
5182	0.0	0	0	0	0	300
5183	0.0	0	0	0	0	0
5198	0.0	0	0	0	0	0
5201	0.0	0	0	0	0	0
5204	0.0	0	0	0	0	0
5206	0.0	0	0	0	0	0
5207	0.0	0	0	0	0	0
5208	0.0	0	0	0	0	0
5209	5.0	0	0	0	0	0
5210	8.5	0	0	0	2,000	0
5211	0.0	0	0	0	1,000	0
5212	4.5	0	0	0	0	0
5213	0.0	0	0	0	0	0
5214	2.0	0	0	0	0	1,500
5215	2.0	0	0	0	1,000	400
5216	0.0	0	0	0	0	0
5229	0.0	0	0	0	0	140
5231	2.5	0	0	0	0	9,000
5232	7.0	0	0	0	0	2,500
5233	3.0	0	0	0	0	2,500
5234	8.0	0	0	0	0	8,000
5235	7.0	0	0	0	6,000	0
5236	0.0	1	0	0	0	350
5237	0.0	0	0	0	5,000	0
5238	11.0	0	1	0	8,563	0
5239	1.0	0	0	0	0	0
5240	0.0	0	0	0	500	0
5241	5.0	0	0	0	0	5,000
5242	0.0	0	0	0	0	1,000
5243	3.0	1	0	0	500	0
5244	0.0	0	0	0	3,000	0
5245	0.7	0	0	0	0	0
5246	0.0	0	0	0	0	60
5247	0.0	0	0	0	0	1,500
5248	0.0	0	0	0	0	2,200
5249	1.1	0	0	0	0	1,000
5250	0.0	0	0	0	0	400
5251	0.0	0	0	0	0	5,000
5252	0.0	0	0	0	0	0
5254	0.0	0	0	0	1.250	0
9998	0.8	0	0	0	0	0
9999	2.8	0	0	0	0	0
TOTALS	349.4	3	10	5	58.204	66.028

APPENDIX G Methodology, Existing Available Forage Production and Future Ecological Condition and Trend

The existing available forage production was estimated for each allotment based on the following information when available or applicable:

1. Average livestock use in the allotment during the last five years.
2. Estimated big game use in the allotment.
3. Actual use studies.
4. Forage utilization studies showing average percent livestock use by pasture or grazing unit.
5. Utilization mapping showing livestock use patterns in each pasture or grazing unit.
6. Ecological trend study photos.
7. Climatic studies.
8. Range suitability studies showing areas which cannot or should not be used by livestock.
9. Existing ecological condition.
10. Other factors which affect livestock distribution such as rock fields.
11. The professional judgement of the area range conservationist and area manager in each area.

Since exact quantification of ecological condition by vegetation type by allotment was unavailable for analysis, assumptions were made for the EIS area as a whole. Annual variation in precipitation and soil moisture make precise quantification of impacts to vegetation impossible. Therefore, this analysis produced predictions which are useful as a relative comparison between alternatives.

To assess change in ecological types will respond to management or treatment, while others will not. Those not responding included greasewood, other brush, and conifer/mountain shrub, or about 3 percent of the total EIS area. In addition, it was assumed that these types are equally distributed throughout the EIS area.

For the purpose of this analysis, it was assumed that ecological condition classes are equally distributed within each vegetation type. For example, climax ecological condition can be found in 2.25 percent of the greasewood vegetation type as well as big sagebrush vegetation type.

The following analysis of ecological conditions in the Ibex Butte Allotment (0019) shows how the analysis was conducted and how predictions for long-term changes in ecological condition class were made.

The Ibex Butte Allotment is currently managed under a spring/summer grazing system. There are no exclosures and no riparian areas. Current ecological conditions are: climax - 0 acres; late-seral - 900 acres; mid-seral - 7,434 acres; early-seral - 3,785 acres: and other - 111 acres.

The following actions are proposed for the allotment under the proposed alternative:

Rest-rotation grazing on 12.230 acres;
Plowing and seeding 1,200 acres of big sagebrush;
Spraying 3,120 acres of big sagebrush;
No change in current livestock allocation or season of use:
Construction of 1 well, 12 miles of pipeline and troughs, and 1 reservoirconstruction about 3 miles of fence to protect proposed seeding.

About 1,200 acres of early-seral big sagebrush would be plowed and seeded, then classified as other. Of the 3,120 acres proposed for spraying, 2,340 acres would be on mid-seral big sagebrush going to late-seral, and 780 acres would be on early-seral big sagebrush going to mid-seral. Of the remaining 1,805 acres early-seral, 72 acres would stay early-seral due to unresponsive nature. This leaves 1,733 acres in early-seral, of which 50 percent, or about 867 acres would go to mid-seral through management. The rest of the early-seral would stay early-seral. The remaining 5,094 acres of mid-seral would be subject to management, of which 96 percent, or 4,890 acres would improve to late-seral, and 4 percent, or 204 acres, would stay in mid-seral, not responding to management. All existing late-seral and other condition classes will stay the same.

The predicted long-term ecological condition class acreages are climax - 0 acres; late-seral - 8,130 acres; mid-seral - 1,851 acres; early-seral - 938 acres; and other - 1,311 acres.

Based on the above analysis, trend would be upward on 8,877 acres (3,120 acres sprayed and 5,757 acres improving through management), static on 2,153 acres (early-seral and mid-seral not responding to management, all late-seral and existing other), and 1,200 acres would go to “other” through seeding.

APPENDIX H Soil Interpretations and Characteristics for Soil Map No. 5

Map Symbol [1]	Soil Series	Depth (inches) [2]	Perm-eability [3]	Runoff [4]	Limiting Layer		Erosion Hazard Potential[6]		Poten-tial Prod. #/ac drv wt.[7]	Avail. Water Capa-city [8]
					Kind	depth (inches) [5]	water	wind		
1	Borow	20 - 40	mod. rapid to mod. slow	very slow	weakly cemented hardpan bedrock	20 - 40 60	slight	severe	200-800	High
1	Swaler	60	very slow	very slow	flooding alkalin-ity	surface ponding o - w	slight	mod.	150-800	High
1	Willow-dale	60	moderate	slow	--		mod.	slight	200-5200	High
2	Canest	O-10	slow	rapid	cobbles pebbles bedrock	O-10 o- 10 5-10	mod.	slight	150-400	Very Low
2	Choptie	10 - 20	moderate	medium	bedrock	10-20	mod.	slight	150-1800	Low
3	Biayden	12 - 20	moderate	medium	duripan	12-20	mod.	slight	250-700	Very Low
3	Embal	60+	moderate	very siow			slight	mod.	500-l 500	High
3	Ratto	10 - 20	slow to very slow	slow	stones duripan	o - 5 20-48	slight	slight	250-800	Low
4	Ceschutes	20 - 40	mod. rapid	very slow	bedrock	20 - 40	slight	mod.	300-900	Low
4	Houstake	40+	rapid to very slow	very slow	weakly cemented hardpan bedrock	20 - 40 60	slight	severe	200-700	Mod.
4	Stat2	10 - 20	mod. rapid to very slow	very slow	duripan bedrock	10-20 20-40	slight	mod.	150-900	Mod.
5	Dester	20 - 40	mod. slow to very slow	slow	duripan bedrock	20 - 35 25-40	slight	mod.	200-900	Mod.
5	Gardone	40 - 60	rapid	slow	ashy sand	0 - 40+	slight	severe	400-1700	High
5	Stookey	20 - 40	rapid to moderate	slow	hardpan bedrock	14 - 20 20 - 40	slight	severe	200-950	Mod.
6	Anawalt	IO- 20	slow	siow	bedrock	10 - 20	slight	slight	200-l 100	Very Low
6	Bieber	10-20	siow	medium	duripan bedrock	10-20 60	mod.	slight	150-800	Very Low
6	Varco	10-20	slow	medium	duripan cobbles bedrock	12-20 o - 4 40 - 60	mod.	slight	150-1000	Low
7	Day	40 - 60	very slow	rapid	clay	0 - 60	severe	slight	200-1000	Low
7	Simas	60	slow	rapid	clay	16-40	severe	slight	200-1000	Mod.

Map Symbol [1]	Soil Series	Depth (inches) [2]	Perm-eability [3]	Runoff [4]	Limiting Layer Kind	Limiting Layer depth (inches) [5]	Erosion Hazard Potential [6] water	Erosion Hazard Potential [6] wind	Poten-tial Prod. #/ac dry wt. [7]	Avail. Water Cape-city inches [8]
8	Menbo	20 -40	slow	medium	pebbles stones cobbles bedrock	O-40 0 - 40 O-40 20 - 40	mod.	slight	250-l 700	Low
8	Westbutte	20 - 40	moderate	medium	stones cobbles	0 - 40	mod.	slight	200-l 200	Mod.
9	Lorella	10-20	slow	rapid	pebbles stones cobbles bedrock	0 - 20 0 - 20 0 - 20 10-20	severe	slight	250-900	Very Low
9	Redcliff	20 - 40	moderate	medium	stones cobbles bedrock	0 - 40 20 - 40	severe	slight	200-800	Low
9	Stukel	10 - 20	moderate	rapid	bedrock	10-20	severe	slight	1 SO-650	Very Low
2.7.8	Madeline	10 - 20	slow	medium	bedrock	12-20	mod.	slight	200-1000	Very Low

[1] Soil association symbol on Soil Map 5.
[2] Depth in inches of soil profile and/or depth to which plant root would penetrate soil profile.
[3] The rate at which water and air may move through the soil profile.
[4] Relative rate that water flows off soil surface.
[5] Kind: Type of restricting material.
Depth: Location of restricting material.
[6] Susceptibility of the soil to erode when no cover is present.
[7] (lbs/ac dry wt.) Estimates for unfavorable - favorable years.
[8] The soil profile's abiity to store water for plant *growth.*

APPENDIX I Watershed Conditions

Watersheds	Allotment #	Total Acres [1]	% BLM	Erosion Condition (SSF) [2]	Estimated Precipitation (in. mean annual)	Present Estimated Runoff (in. mean annual)
Alkali Creek	5140.5141	3,685	73	Moderate	12-18	o-5.4
Alkali Creek	0022, 0034, 0039, 0041, 0047	26,220	37	Slight	11-13	o-o.4
Ant Creek	5240, 5241, 5248, 5249	3,565	39	Moderate	12-16	o-3.4
Antelope Creek	5135.5142, 5145	4,385	62	Mod.-Critical	11-13	o-o.4
Bear Creek	5139, 5140, 5214.5232, 5233, 5234, 5236, 5240, 5241, 5248, 5249	53.480	53	Slight-Mod.	11-16	o-3.4
Beaver Creek	0026, 0028, 0029, 0038, 0039, 0048	6,810	34	Slight	11.6-16	o-3.4
N.F. Beaver Cr.	0026	8,280	32	Moderate	14-18.4	1.4-5.8
SF. Beaver Cr.	0004, 0026, 0054, 0058	17,680	55	Moderate	14-18.6	1.4-6.0
Beaver Dam Creek	0026	430	46	Slight	14-18.6	1.4-6.0
Bronco Creek	0026	170	100	Slight	14-18.0	1.4-5.4
Buck Creek	0023, 0024, 0035, 0044	26,490	48	Moderate	11-16	o-3.4
Buckhorn Canyon	5070, 5071	2,680	40	Slight	8-10	0
Burnt Log Spg. Cr.	0016.0051	40	100	Slight	14-16	1.4-3.8
Camp Creek 0009.	0013, 0045, 0050, 0056, 0059, 0062, 0064, 0066, 0070	22,305	77	Moderate	12-16	o-3.4
M.F. Camp Creek	0014, 5246, 5251	12,265	56	Moderate	12-16	O-3.4
S.F. Camp Creek	0009.0013.0042.0044, 0070, 5247.5254	24,705	46	Mod.-Critical	12-16	o-3.4
W.F. Camp Creek	0013, 0014, 0070, 5239, 5246, 5248	25,185	36	Moderate	12-16	o-3.4
Committee Creek	0053	380	72	Slight	14-18	1.4-5.4
Conant Creek	5149	1,270	36	Slight	12-18	o-5.4
Congleton Hollow	004	1,590	88	Moderate	12-14	o-1.4
Cottonwood Creek	0062	1,105	29	Moderate	12-18	o-5.4
Cow Creek	5242, 5248	3.650	8	Moderate	12-16.3	o-3.7
Lower Crooked Rv	0072.5016, 5021, 5022. 5029, 5031, 5032, 5033, 5050. 5051 , 5052, 5062, 5064, 5086. 5088.5089.5090.5092, 5094, 5110, 5111, 5112, 5113, 5115, 5117.5120.5121.5125. 5127, 5134, 5136, 5138, 5186, 5204. 5206, 5208, 5209, 5210, 5216	120,355	73	Stable-Slight	10-13	o-o.4
N F Crooked Rv	0029, 0045, 0050, 0051, 0053	15.690	66	Slight	12-22	o-9.4

Watersheds	Allotment #	Total Acres [1]	% BLM	Erosion Condition (SSF) [2]	Estimated Precipitation (inmean annual)	Present Estimated Runoff (in. mean annual)
SF. Crooked Rv.	0009, 0013, 0018, 0019, 0020, 0023, 0024, 0038, 0042, 0044, 0056, 0064, 0070	196,225	79	Moderate	10-18	o-5.4
Upper Crooked Rv	0001, 0007, 0039, 0045, 0049, 0050, 0053, 0059, 0060, 0064.0066.5029.5130.5131, 5133, 5135, 5136, 5137, 5138, 5139, 5140, 5141, 5142, 5149, 5214	42,075	35	Moderate	12-18	o-5.4
Davis Creek	0013, 0014, 0062	2,880	51	Moderate	12-18	o-5.4
Deep Canyon	5065, 5070, 5074, 5075, 5078	8,605	52	Slight	9-12	0
Deer Creek	5140.5141.5248	3,800	82	Moderate	13-19.5	0.4-6.9
Deschutes River	5001, 5002, 5003, 5004, 5006, 5007, 5010, 5012, 5016, 5018, 5024, 5062, 5064, 5070, 5071, 5072, 5073, 5074, 5078, 5079, 5080, 5116, 5118, 5119, 5120, 5122, 5124	71,900	72	Stable-Slight	9-14	o-1.4
Desert Creek	0003, 5247, 5254	5,995	13	Moderate	14-18	1.4-5.4
Dry Creek	5097, 5134, 5135, 5136, 5145	22,125	25	Moderate	10-14	o-1.4
Dry River	0042, 0044, 5002, 5015, 5017, 5031, 5070, 5089, 5092, 5093, 5094, 5108, 5109, 5110, 5112, 5113, 5115, 5117, 5125, 5127, 5134, 5209, 5210, 5211, 5212, 5213, 5214, 5215, 5234, 5235, 5239, 5240, 5241, 5243, 5346, 5247, 5251	267,980	59	Stable-Slight	9-14	o-1.4
Eagle Rock Creek (O'Neil)	5130, 5131, 5135, 5145	5,205	58	Moderate	12-14	o-1.4
Ferguson Creek	5248.5249	1,530	2	Moderate	14-20	1.4-7.4
Fox Canyon Creek	0050.0053	435	94	Stable	15-19	2.4-6.4
Fremont Canyon Cr	5066, 5067, 5068	3,450	20	Slight	9-12	0
Grindstone Creek	0021.0022. 0023.0039. 0042, 0054, 0058, 0071	18.130	38	Moderate	12-15	O-2.4
Heisler Creek	0026	170	100	Slight	14-18.8	1.4-6.2
High Desert	0003, 0044, 5235, 5237, 5230.5239.5243.5244.5245. 5247	293,635	77	Stable-Mod	9-13	o-o.4
Horse Heaven Cr	0001	1,130	0	--	12-18	o-5.4
Indian Creek	0016	880	100	Slight	14-16.4	1.4-3.8
Jake Hollow	0064.0047	2,485	36	Slight	12-14	o-1.4
Jep Creek	5086	35	100	--	9-14	o-1.4
Jones	0064	1.775	97	Moderate	12-18	o-5.4
Juniper Canyon	5240.5241.5249	3,225	48	Moderate	13-16	0.4-3.4
Kelly Cr. Canyon	0060.0064	5,115	99	Moderate	11-13	o-o.4

APPENDIX I (continued)

Watersheds	Allotment #	Total Acres [1]	% BLM	Erosion Condition (SSF) [2]	Estimated Precipitation (in. mean annual)	Present Estimated Runoff (inmean annual)
Klootchman Creek	5248	310	0	--	12-20	O-7.4
Little Bear Creek	5140, 5232, 5233, 5242, 5248.5250	11,615	17	Moderate	12-16	o-3.4
Lizard Creek	0003, 5254, 5247	3.600	27	Moderate	12-18	o-5.4
Long Hollow Cr.	5133	1,460	7	Moderate	12-14	o-1.4
Long Hollow Cr.	0024	3,165	27	Slight	12-16	o-3.4
Lost Creek	0001	4,665	9	Slight	12-18	o-5.4
Lytle Creek	5176, 5177, 5178, 5179 5180, 5182, 5183	9,555	19	Slight-Mod.	1 O-20	o-7.4
McKay Creek	5177, 5182, 5183, 5198	5.280	28	Moderate	1 o-22	o-9.4
McKenzie Canyon	5064, 5065, 5070, 5081	12.375	53	Slight	9-12	0
McVeen Creek	5178	10	0	--		
Morris Creek	0024	420	0	--		
Newhill Creek	5178, 5179	50	20	--		
Nicoll Creek	0024	70	0	--		--
Norman Canyon	5241, 5249	1,070	93	Moderate	12-14	o-1.4
Ochoco Creek (Combs Flat) (Juniper Canyon)	5030, 5097, 5130, 5134, 5135, 5145, 5177, 5198	17.315	21	Slight	11-20	o-7.4
Owl Creek	5142, 5145	1.390	64	Moderate	12-14	o-1.4
Paulina Creek	0016, 0027, 0028, 0029, 0033, 0039, 0048, 0050, 0051	24,160	37	Slight	12-17	o-4.4
Pine Creek	5050.5051, 5086, 5178	2,060	46	Slight	10-18	o-5.4
Pine Creek	0001, 0045	1.195	60	Moderate	12-18	o-5.4
Poison Creek	0045.0062	590	37	Moderate	12-18	o-5.4
Pole Creek	0014, 0042, 5251	3.215	57	Mod.-Critical	12-16	o-3.4
Powell Creek	0026	2,840	12	Slight	12-18	o-5.4
Rabbit Valley	0007, 0028, 0039, 0050,	29.600	59	Slight-Mod.	12-16	o-3.4
Roba Creek	0016.0027	890	100	Slight	12-17	o-4.4
Rocky Canyon	5134, 5138.5214	14.715	59	Moderate	10-13	o-o.4
Rough Canyon Cr.	0053	1.025	58	Slight	12-18	o-5.4
Sage Hollow	5139. 5215, 5231, 5232, 5233. 5234	28,985	73	Moderate	12-14	o-1.4
Salt Creek	5140. 5250	4,145	70	Moderate	12-14	O-l.4
Sand Creek	5133, 5141	915	48	Moderate	12-14	o-1.4
Sand Hollow Cr.	0009, 0056	19,960	99	Moderate	11-13	o-O.4
Sanford Creek	5133, 5140, 5141	5.530	31	Moderate	11-15.4	O-2.8

Watersheds	Allotment #	Total Acres [1]	% BLM	Erosion Condition (SSF) [2]	Estimated Precipitation (in. mean annual)	Present Estimated Runoff (in. mean annual)
Sheep Rock Cr.	0001.0053	2,645	59	Moderate	12-17	o-4.4
Soldier Creek	524695248.5249	5,350	1	--	13-18	0.4-5.4
Squaw Creek	5066.5067	2,140	15	Slight	10-14	o-1.4
Stevens Creek	5068	170	0	--	9-12	0
Stub Creek	0001	2,050	15	Slight	12-18	o-5.4
Swamp Creek	0044	2,615	50	Slight	12-15	O-2.4
Swartz Canyon	5031, 5127, 5134	4,460	29	Slight	10-13	o-o.4
Tracy Creek	5031, 5094, 5134	3.030	26	Moderate	10-14	o-1.4
Trout Creek	0052, 0058	3,055	24	Moderate	12-18	o-5.4
Twelvemile Cr.	0013, 0020, 0021, 0036, 0042, 0056, 0071	29,480	43	Moderate	12-15	O-2.4
White Butte Cr.	0058	445	50	--	12-15	O-2.4
Williamson Cr.	5109, 5110, 5213, 5214, 5232.5231	20.130	53	Moderate	12-15	O-2.4
Wolf Creek	0047.0048	1,980	8	--	13-18	0.4-5.4
N.F. Wolf Creek	0033, 0048	1,460	50	Slight	13-18	0.4-5.4

[1] Acres were rounded to nearest 5 acre and are only acres located within allotment boundaries.
[2] SSF: an expression of current erosion activity that corresponds to a numerical rating developed for each erosion condition category. These categories are: stable (O-20): slight (21-40); moderate (41-60); critical (61-80); and severe (81-100).

APPENDIX J Water Quality Measurements

Stream	River Mile	Temperature °F Air	Temperature °F Water	Coliform Count (Total)	Turb.	Spec. Cond.	Dis. O_2 mg/1	CO_2 pH	CO_2 mg/1	Total Alkallnity mg/1 Ca	Nitrate CO_2 mg/1
Crooked River	59.75	63	50	---	--	185	12	--	_	100	--
(lower)	65.0	60	50	- -	--	180	115	--	--	90	
	71.75	59	49	---	--	180	11.5	--	--	90	--
	65.0	81	59	--	2-3 ft.	--	16	8.5	4	--	0
	71.75	82	55	---	2-3 ft.	--	--	77	8	--	0
	65.0	--	--	8	--	--	--	--	--	--	--
	71.75	--	--	18	--		--	--	--	--	--
Bear Creek	--		(53-82) [2]	--	--	--	--	--	--	--	--
	4.25-8.0	--	(53-79)	---	--	--	--	--	--	--	--
	--		(65-82)	---	--	--	--	--	--	--	
	IO.-28.25	--	(59-82)	---	--	--	--	--	--	--	--
	--		(61-84)	---	--	--	--	--	--	--	--
	10.5	84	76	---	--	650	11	--	--	300	--
	12.0	69	66	---	--	640	15	--	--	310	--
	11.25	68	69	---	--	640	12	--	--	300	--
	10.5	68	67	---	--	660	14	--	--	300	--
	2.0	68	68	- -	--	640	13	--		320	--
	12.0	85	67	---	clear	--	--	8.1	4	--	0
	11.25	85	67	- -	clear	--	--	77	16	--	0
	10.5	85	62	---	clear	--	15	76	16	--	0
	2.0	90	64	---	clear		12	75	16	--	0
	2.0		--	11	--	--	--	--	--	--	--
	10.5	--	--	4	--	--	--	--	--	--	--
	11.25	--	--	22	--		--	--	--	--	--
	12.0		--	9		--	--	--	--	--	
Eagle Creek	0.5		72	---	--	600	--	--	--	--	--
	0.5	77	65	---	--	610	--	--		310	
	0.5	62	53	32	clear	--	5	74	28	--	0
Crooked River	124.7	70	69	---	--	700	12.5	--		350	--
(upper)	124.7	85	68	58	4-5	ft.	--	11	74	--	0
	114.0	85	68	36	4-5 ft.	--	10	7.9	24	370	0
	95.0	87	72	23	4-5 ft.		13	7.9	20	280	0
North Fork	6.0-8.5		(50-56)	---	clear	--	--	--	--	--	--
Crooked River	8.5-18.5	--	(46-74)	---	clear	--	--	--	--	--	--
above pool	13.0		73	---	clear	--	1	--	--	--	--
below riffle		--	73	---	clear	--	8	--	--	--	--
end of pool	13.0		70	--	clear	--	6	--	--	--	--
end of pool	18.0	--	64	---	clear	--	5-6	--	--	--	--
side of pool	--	--	--	---	clear	--	1	--	--	--	--
head of pool	18.0	--	64	- -	clear	--	1	--	--	--	--
end of pool	18.0	--	63	---	clear	--	8	--	--	--	--
	13.0	--	--	35	clear		--	--	--	--	--
	13.0	71	68	--	clear	170	12	--	--	100	--
	13.0	80	74	11	clear	--	11	7.5	8	--	0
	18.0	64	57	--	*clear*	--	12	7.8	--	--	0
	18.0	74	57	32	clear	160	--	--	100	--	--
Sheep Rock Creek	--	--	(45-50)	---	clear	--	--	--	--	--	--
	6.25	74	53	---	--	185	12	--	--	110	--
	6.25	76	46	--	--	--	13	78	--	--	0
	6.25		--	8	--	--	--	--	--	--	--
Committee Creek	O-2.0		(62-74)	---	clear	--	--	--	--	--	--
	2.5	73	64	---	--	230	12	--	--	140	--
	2.5	76	51	---	--	--	12	78	--	--	0
	2.5	--	--	48	--	--	--	--	--	--	--
Rough Canyon	o- 75	--	(49-50)	---	clear	--	--	--	--	--	--
Creek	0.75	77	63	---	--	215	6	6.8	--	120	0
	0.75	--	--	302	--	--	--	--	--	--	--
Hail Creek	25-.75		(44-46)	---	clear	--	--	--	--	--	--
	0.75	72	65		--	220	10	7.5	--	120	0
	0 75	--	--	27	--	--	--	--	--	--	--
Fox Canyon	25-.46		46	---	clear	--	--	--	--	--	--
Creek	1.25	62	60	- -	--	170	6	--	--	90	--
	1.25	81	59	28	--	--	10	7.2	16	--	0

Stream	River Mile	Temperature °F Air	Temperature °F Water	Coliform Count (Total)	Turb.	Spec. Cond.	Dis. O_2 mg/1	pH	CO_2 mg/1	Told Alkalinity mg/1 Ca	Nitrate CO_2 mg/1
Camp Creek	4.6	61	58	---	--	435	--		--	160	--
(main stem)	7.9	65	58	---	a-to ft.	440		--	--	190	--
	4.6	76	59	---	--	--	11	a.4	--	--	0
	7.9	75	54	---	--		16	8.1	--	--	0
	4.6	--	--	a9	--		--	--	--	--	--
	7.9	--		40	--		--	--	--	--	--
	10.1	52	54	63	4 NTU	600	12	a.5	20	250	--
Camp Creek	1.4	54	56	---	--	650	11	--		315	--
(west)	3.0	63	58	---	--	790	11	--	--	380	
	4.75	58	58	---	--	775	11	--		375	
	1.4	80	60	---	clear	--	13	7.6	10	--	0
	3.0	a2	62	- -	clear	--	13	7.6	16	--	0
	4.75	a4	63	- -	clear	--	13	77	20	--	0
	1.4		--	41		--			--	--	--
	3.0	--	--	158	--	--	--	--	--	--	
	4.75		--	118		--				--	--
South Fork	O-36.0		(60-70)	---	clear	--		--		--	--
Crooked River			(55-74)	---	--	--	--	--	--		--
	1.4	56	59	---	--	480	7	--	--	245	--
	11.6	60	64	---	--	560	10		--	245	--
	20.0	69	65	---	riffle-	460	11.5		--	270	
					pool-	600					
	1.4		--	a9	--	--	--	--	--		
	11.6		--	131		--	--		--		--
	20.0		--	25	--	--	--	--	--	--	--
	1.4		--	---	--	--	--	a.5	190	--	0
	11.8		--	---	--	--	--	8.1	190	--	0
	20.0		--	---	--	--	--	7.6	80	--	0
Paulina Creek	O-lo.65		(62-65)	---	clear	--					
		--	(63-67)	---			--	--		--	
	0.0		61	---		220		--	--	--	--
	0.0		61	---	--	220	--	--	--	--	--
	a.5	68	54	---	225	--	10		--	130	
	0.0	75	60	---		210	--	--	--	110	
	a.5	77	55	10	--	--	11	77	12		0
	0.0	a7	62	---	--	--	7	--	a		0
	0.0	73	60	83	--	--	--	8.0	--	--	
Roba Creek	20-36	--	(46-52)	---	--	--	--	--	--	--	
	3.16	68	54	- -	clear	--	10	77		100	--
	3.16		75	---	--	145	--	--	--	--	--
	3.16	--	57	---	--	170	a.5	--	--	80	
	3.16	a3	61	150	--	--	1.1	--	12	--	0
Indian Creek	25-2.0	76	(59-66)	---	clear	--	--	--	--	--	--
	0.25	--	64	- -	--	225	--	--	--	--	--
	0.25	66	59	---	--	240	5		--	130	--
	0.25	77	56	130	--	--	10	74	--	--	0
East Burnt Log	--		(59-70)	---	clear	--	--	--	--	--	--
Creek	0.25		66	---	--	205	--	--	--	--	
	025	78	62	200	--	--	10	76	12	--	0
	0.25	--	--	---	--	--	--	--	--	170	--
West Burnt Log	--		(62-79)	---	clear	--	--	--	--	--	--
	0.15	--	71	---	--	250	--	--	--	--	--
	0.25	78	55	240	--	--	12	79	16	--	0
	0.25	--	--	---	--	--	--	--	--	150	--
Beaver Creek	9.25-10.9	--	(62-73)	---	clear	--	--	--	--	--	--
	975		65	---	--	385	--	--	--	--	--
	975		66	---	--	320	--	--	--	--	--
	975	79	71		--	500	--	--	--	230	--
	9.75	--	62	---	--	205	--		--	--	
	9.75		65	---	--	255	--	--	--	--	--
	9.75	79	69	---	--	340	--	--	--	160	--
	9.75	73	62	212	--	--	10	75	10	--	0
NF Wolf Creek	4.25		62	---	--	--	--	--	--	--	--
	425	74	74	---	clear	120	--	--	--	70	--
	425	78	61	14	--	--	7	6.0	16	--	0

APPENDIX J (continued)

Stream	River Mile	Temperature °F Air	Temperature °F Water	Coliform count (Total)	Turb.	Spec. Cond. [1]	Dis. O_2 mg/1	pH	CO_2 mg/1	Total Alkalinity mg/1 Ca	Nitrate CO_2 mg/1
NF Beaver Creek	6.0	61	64	---	8-10 ft.	275	7			150	--
	6.0	84	62	---	8-10 ft.		11	7.2	20		0
	6.0			39							
Beaver Dam Creek	0.25	60	61	---		180	10		—	90	--
	0.25	84	74	---	clear		10	7.0	8		0
	0.25		--	20					--		--
Merwins Res., end of dike		61	60			230	12	9.5	0	50	
Lower Merwin Res., 300 yds from mouth		61	61	---	60 ntu	278	7	8.2	16	110	
Price Valley Res., end of plank		58	54	0	15 ntu	750	9	9.3	0	40	--
Marshy Res.. at willows along dam		83	58	---	10 ntu	130	12	9.7	0	40	
Forest Boundary Res., at big ponderosa pine		52	52	75	9 ntu	165	10	9.1	0	10	
Reynolds Pond. at small dam		42	52	1	15 ntu	62	9	9.3	0	10	

[1] Micromohs per centimeter.

[2] Numbers in parenthesis ( ) *are* range of temperatures recorded.

APPENDIX K Stream Channel Stability and Fish Habitat and Estimated Trend [1]

Stream	Public Stream Miles	Allotments	Present Stream Channel Condition	Present Fish Habitat Condition	Est. Trend [2]	Species Present	comments
Alkali Creek	.75	5136	Poor	Poor	D	no fish	Low flows. high water temperature.
Bear Creek	9.10	5234.5232. 5241.5140. 5233	Fair	Poor		Rb,LpD,Bsu SpD,LnD	Low flow, siltation, high water temperature. exclosure improving habitat.
Bear Creek. Little	1.35	5249.5232	Poor	Poor	D	no fish	Low flow, siltation, high water temperature
Beaver Creak	1.70	0034	Good	Fair	S	Bsu,Sq,LpD, Cch,SpD	Siltation, limited gravel, high water temp.. irrigation wlthdrawal.
Beaver Creek (N. Fork)	2.04	0026	Fair	Good	S	Rb,Sq,Bsu, LpD	Good stream shade, low flow, good gravel.
Beaver Creek (S. Fork)	.25	0004	Fair	Fair	S	Rb,LpD,Bsu	Irrigation wtthdrawal. limited gravel, poor structure
Beaverdam Creek	1.53	0026	Fair	Fair	S	Rb,LpD,Bsu	Low flow to intermittent. siltation. logging debris.
Bronco Creek & tributary	1.50	0026	Good	Fair	S	Rb,LpD,Bsu	Low flow, limited pool area. high water temp.
Burnt Log Cr. (E & W Fk.)	1.06	0051	Fair	Fair	S	Rb,Sc,LpD	Low flows. good spawning gravel. debris jams.
Camp Creek (main stem)	3.46	0062,0064, 0045	Poor	Poor	D	LpD, UmD	Low flow, siltation, irrigation wtthdrawal. high water temperature.
Camp Creek (middle fork)	.30	0014	Poor	Pwr	D	no fish	Intermittent, siltation, poor bank and channel condition.
Camp Creek (south fork)	.50	0070, ooo9	Poor	Poor	S	no fish	Very low flow. poor bank and channel condition, siltation.
Camp Creek (west fork)	4.80	0013, 0014	Poor	Poor		UmD	Siltation, low flow, limited structure, high water temperature.
Committee Creek	3.50	0053	Fair	Fair		Rb	Low flow, logging damage. siltation, exclosure improving habitat.
Crooked River (lower)	6.75	5137, 5134	Excellent	Good	s	Rb,Bt,Wf, Brb. R	Siltation from Prineville Reservoir.
Crooked River (upper)	1.60	0045, 0007	Fair	Fair	s	Rb,Sb,Csu, Sq,LnD,LpD, SpD,Chc,Brb Bsu	Irrigation withdrawal, low flow. high water temperature, siltatton.
Crooked River (N. Fork)	10.70	0053, 0050	Good	Fair	S	Rb,Sq,LpD, Bsu,Sc	High water temperature, limited spawning gravel, stable banks.
Crooked River (S. Fork)	13.75	0038, 0064, 0009, 0056, 0047	Good	Fair	D	Sq,LpD,Bsu, Chc,SpD,LnD	Streamside cover scarce. abundant aquatic vegetation, siltation.
Davis Creek	2.34	0062, 0013, 0014	Fair	Fair	s	no fish	Low water temperature. siltation. logging damage.
Deschutes River	7.35	5002, 5005, 5070, 5080, 5071, 5062, 5021, 5082, 5001	Excellent	Good	s	Rb,Bt,Wf, Brb,R	Good streamside cover. irrigation withdrawal, good water quality.
Eagle Creek	2.20	5145	Fair	Pwr	S	Rb-spawning	Low flow, limited stream cover. siltation.
Fox Canyon Creek	1 75	0053	Good	Fair	S	Rb. LpD	Intergravel flow, bed-rock falls, good canopy
Hail Creek	.50	0053	Fair	Poor	S	Rb. LpD	Low flow, logging debris, poor stream cover, 30' falls.
Heisler Creak	146	0026	Good	Poor	S	Rb, LpD	Low flow and intermittency. good stream cover, high water temperature.
Higgins Creek	54	0033	Fair	Poor	S	Rb. LpD	Intermittent flow, limtted gravel. good shade cover.
Indian Creek	1 75	0016	Fair	Pwr	S	Rb,Bsu,LpD	Intermittent flow, siltation, limited gravel.
Meadow Reservoir Creek	1.16	0016, 0027	Good	Pwr	D	no fish	Intermittent flow, poor stream structure and habitat.
O'Neil Creek	25	5145	Poor	Poor	S	no fish	Low flow, siltation, poor bank condition, no structure.
Paulina Creek	1.70	0016, 0034, 0051	Fair	Poor	S	Rb,Sc,Cch, Sq,LpD,Bsu	Low flow, limited gravel
Pole Creek	50	0014	Poor	Poor	D	no fish	Siltatton. low flow. poor bank condition, no structure.
Roba Creek	1.60	W27	Fair	Poor	S	Rb	Intermittent low flow, siltation.

APPENDIX K (continued)

Stream	Public Stream Miles	Allotments	Present Sham Channel Condition	Present Fish Habitat Condition	[2] Est. Trend	[3] Species Present	Comments
Rough Canyon Creek	.75	0053	Fair	Poor	S	no fish	Intergravel flows, series of bedrock falls. 40' falls.
Sheep Rock Creek	.62	0053	Farr	Poor	S	Rb	Steep gradient, limited gravel, algae blooms.
Twelvemile Creek	3.75	0047, 0020	Fair	Poor	S	Sq, LpD	Intermittent flow, high water temperature.
Wolf Creek (mouth)	.14	0034	Poor	Poor	S	Bsu. LpD	Low flow, siltation, pwr banks, no shade cover.
Wolf Creek (north fork)	1.26	0033	Fair	Poor	D	Rb. LpD	Low flow, limited gravel limited pool area.

[1] Survey represents 100% of BLM perennial streams miles and 96% of Intermittent stream miles.
[2] I-Improving D-Declining S-Stable
[3] Rb-Rainbow trout. Bt-Brown trout, Wt-Mountain Whitefish, Sq-Northern squawfish. Bsu-Bridgelip sucker, Sb-Smallmouth bass. Csu-Coarsescale sucker, SpD-Speckled dace, Lnd-Longnose dace, LpD-Leopard dace, Cch-Chiselmouth chub, UmD-Umatilla dace, Sc-Sculpin, Brb-Brown Bullhead. R-Roach. Ct-Cutthroat trout, Lb-Largemouth bass.

APPENDIX L. Ecological Condition by Allotment

Allot	Climax	Late-seral	Mid-seral	Early-seral	Other
0001	0	0	765	1,407	0
0003	0	5,403	23.916	17,782	10,337
0004	0	1,892	698	318	0
0006	0	0	1,076	0	164
0007	0	0		140	0
0009	0	1,148	29.2	3.987	2,974
0012	0	920		0	0
0013	0	1,496	2.57:	0	1,714
0014	0	0	1,678	0	1.372
0016	0	235	1.472	124	0
0017	0	0	0	1,436	0
0018	0	765	860		0
0019	0	900	7,434	3.78:	111
0020	0	483	8,829	410	0
0021	0	1.774			0
0022	0	4,583	2.4:	55:	39
0023	0	463	666	0	388
0024	0	2.281	4.195	515	0
0025	0	0	5,558	292	0
0026	732	1,363	2.805	36	0
0027	0	0	4,535	318	0
0028	0	0	315	131	0
0029	0	0	865	0	0
0033	0	112	1.101	915	0
0034	0	0	0	1,968	
0035	0	0	420	0	2.14:
0036	0	80	0	0	0
0037	0	0	160	0	0
0038	0	0	2,687	348	0
0039	0	0	612	1,030	0
0041	0	157	782	479	0
Oil42	0	0	4.038	351	0
0043	0	0	4,267	43	840
0044	0	10,257	85,511	27.081	8,829
0045	0	80	4,712	341	0
0047	0	11,231	13,473	2,310	160
0048	0	0	0	324	0
0049	0	0	163		0
0050	0	2,218	9.165	3.25:	522
0051	0	351	2.271	0	0
0052	0	120		0	0
0053	100	1,346	7.56;	1.738	248
0054	83	797	0	0	0
0056	174	1,539	6,302	1.877	1,509
0058	0	2,267	2,151	0	0
0059	0	0	454	146	10
0060	0	0	249	1.457	0
0062	0	291	578	392	53
0064	0	1,730	12.617	678	2,836
0066	0	0	0	80	0
0070	0	432	5,391	695	1,499
0071	0	4,134	0	132	0
0072	0	0	1,025	95	0
0075	0	0	160	0	0
0076	0	0	481	0	0
5001	0	0	120	0	0
5002	0	0	0	40	0
5003	0	0	0	15	0
5004	0	0	0	18	45
5006	0	0	107	0	0
5007	0	138	368	0	0
5010	0	0	80	0	0
5018	0	892	0	0	0
5022	0	0	597	0	0
5024	0	138	453	0	177
5029	0	0	0	80	0
5030	0	221	75	0	0
5031	0	50	1,330	129	0
5032	0	0	238	0	0
5050	0	423	386	0	0
5051	0	68	796	0	253
5052	0	0	174		0
5061	0	0	2,623	3.35:	86
5064	0		763	0	0
5065	0	2.25;	2,547	724	0
5066	0	0	358	0	0
5067	0	149	54	186	0
5068	0	59	163	63	0
5069	0	63	129	0	0

APPENDIX L. (continued)

Allot	Climax	Late-seral	Mid-seral	Early-seral	Other
5070	0	317	2,944	132	402
5071	0	1.545	1,334	892	98
5072	0	0	2,294	0	0
5073	0	220	2,855	828	519
5074	0	48	5,815	384	747
5075	0	25	1,560	200	162
5078	0	0	3,502	184	145
5079	0	0	'997		0
5080	0	0	561	2.8;:	0
5081	0	0	71	81	0
5082	0	0	116	0	0
5086	0	0	0	120	0
5088	0	0	160	0	0
5089	0	0	185	0	0
5090	0	0	344	0	0
5092	0	717	0	0	0
5093	0	290	0	31	0
5094	0	323	0	170	0
5096	0	0	200	0	0
5097	0	112	80	85	0
5107	0		114	0	0
5108	0	8	1.124	104	0
5109	0	0	281	4.815	0
5110	0		0	126	0
5111	0	8	24	1,836	0
5112	0	0	2,945	113	0
5113	0	0	0	4,019	0
5114	0	0	2,542	109	0
5115	0	0	3,538	16	0
5116	0	0	4,453	1,014	0
5117	0	0	7.305	525	397
5118	0	0	7,267	0	0
5119	0	0	254	0	0
5120	0	0	3,454	73	1,291
5121	0	0	2,629	0	0
5122	0	0	631	763	0
5124	0	0	755	0	0
5125	0	0	2.275	2,274	0
5127	0	871	4,831	7,456	0
5130	0	82	1,151	161	0
5131	0	37	824	0	0
5133	0	0	300	0	0
5134	0	673	5,261	10,939	1,534
5135	0	1,833	3,085	2,137	0
5136	0	30	3,445	109	0
5137	79	14	3,786	46	0
5138	26	29	3.813	1,609	0
5139	138	1.163	3.477	1,350	0
5140	246	65	7,155	2.231	421
5141	0	0	4,449	2.475	0
5142	0	242	495	392	0
5145	0	850	2.735	1,070	111
5149	0	163	805	0	0
5176	0	270	0	80	0
5177	0	988	467	383	0
5178	0	346	38	206	111
5179	0	0	40	80	0
5180	0	0	42	155	0
5182	0	0	294	733	0
5183	0	0	89	26	0
5198	0	55	393	81	0
5201	0	0	2,436	0	0
5204	0	0		630	0
5206	0	0	2.56:	230	0
5207	0	0	1,004	5,349	0
5208	0	6.626	2.465	10	0
5209	0	0	1.261	15.093	0
5210	523	9,064	8,652	3.218	635
5211	0	673	3.807	663	180
5212	252	14,087	13.355	4.398	468
5213	0	290	8.511	7,160	36
5214	0	1.008	8.690	2,606	601
5215	0	2.609	5,641	1.233	111
5216	0	0	84	0	0
5229	0	140	70	0	0
5231	0	6,381	4.577	428	0
5232	57	2,055	5,018	1.497	0
5233	891	295	3.380	19	40
5234	176	9,166	8,537	558	0

Allot	Climax	Late-seral	Mid-seral	Early-seral	Other
5235	714	19,047	9,774	249	722
5236	0	258	1,492	0	0
5237	1.859	20.477	5,238	891	0
5238	497	30,230	43,221	2,295	255
5239	10,333	13,606	1,581	27	154
5240	2,097	3.041	1,147	0	0
5241	0	1.823	6,168	0	0
5242	325	4.316	1.435	169	0
5243	320	5,223	726		0
5244	0	1.764	7.744	2.82:	0
5245	0	114	9,913	208	0
5246	0	42	80	0	0
5247	0	13	2,988	262	0
5248	43	363	1,813	235	0
5249	0	200	1,074	0	0
5250	0	0	398	42	0
5251	0	3,184	3,195	29	363
5252	0	0	0	124	0
5254	4.345	1,955	729	0	0
9998	0	0	0	0	414
9999	0	0	0	0	11,260
TOTALS	24,010	234,657	565,928	185.499	57,483

APPENDIX - M Wildlife Habitat Interrelationships

Common Name	Realt. Abundance	1 Juni- Per. Grass	2 Wet Meadow	3 Bunch Grass	4 Crestd Wheat- grass	5 Big Sage Grass	6 Low Sage Grass	7 Other Brush	9 Junip. Bitter -brush	9 Junip. Big Sage	10 Junip. Low Sage	11 Aspen Shrub Grass	12 Riper- ian	13 Mtn. Mahog- any	14 Pond. Pine	15 Fir- Pine Mixed	16 Intermt Lake Beds	17 Grease -wood Gnu
LIFE FORM 1. Reproduces in water and feeds in water (23 species).																		
BLACK CRAPPIE	U												RFXP					
BLUEGILL	C												RFXP					
BRIDGELIP SUCKER	C												RFXP					
BROWN BULLHEAD	C												RFXP					
BROWN TROUT	R												RFXP					
CARP	U												RFXP					
CHANNEL CATFISH	R												RFXP					
CHISELMOUTH CHUB	c												RFXP					
CUTTHROAT TROUT	U												RFXP					
KAMLOOP TROUT	R												RFXP					
LARGE SCALE SUCKER	C												RFXP					
LARGEMOUTH BASS	C												RFXP					
LEOPARD DACE	C												RFXP					
LONGNOSE DACE	U												RFXP					
NORTHERN SQUAWFISH	C												RFXP					
PIUTE SCULPIN	U												RFXP					
PUMPKINSEED	R												RFXP					
RAINBOW TROUT	v												RFXP					
SMALLMOUTH BASS	C												RFXP					
SPECKLED DACE	C												RFXP					
UMATILLA DACE	R												RFXP					
WHITE CRAPPIE	U												RFXP					
BULLFROG	U												RFXP					
LIFE FORM 2. Reproduces in water and feeds on the ground, in bushes, and/or in trees (5 species).																		
GREAT BASIN SPADEFOOT	U			RFXP		RFXP		RFLP										FLO
NORTHERN LONG-TOED SALAMANDER	R		RFXP	RFLO				RFLO	RFLO			RFXP		RFXO	RFXO			
PACIFIC TREE FROG	C		RFXP	RFLO		RFXO		RFXO	RFLO	RFLO		RFXP	RFXP	RFLO	RFXP	RFXP		RFLO
SPOTTED FROG	C					RFXO			RFLO	RFLO		RFXP	RFXP		RFLO	RFLO		
WESTERN TOAD	U		RFXP	RFLO		RFXO		RFXP	RFLO	RFLO		RFXP	RFXP	RFLO	RFLO	RFLO		FLO
LIFE FORM 3. Reproduces on the ground around water (or in emergent vegetation, or on floating vegetation) and feeds on the ground, and in bushes. trees and water (61 species).																		
COMMON GARTER SNAKE	C	RFYO	RFLO	RFXO		RFXP		RFXP				RFXP	RFXP		RFXO	RFXO		
WESTERN SKINK	U	RFLO				RFLO		RFLO	RFLO	RFLO		RFXP	RFXP	RFLO	RFXP	RFLP		RFLP
AMERICAN AVOCET	U		RFLP	RLO									RFXP				RFLP	
AMERICAN BITTERN	R		RFLO										RFXP					
AMERICAN COOT	C		FXO				FXO						RFXP				RFXP	
AMERICAN DIPPER	R												RFXP					
AMERICAN WIGEON	U		RFLP	FLO								RFXP				RFXP	FLO	
BAIRDS SANDPIPER	E		RFLP										RFLP			RFLP		
BLACK TERN	U		FLO	RLP									FLP				FLP	
BLACK-BELLIED PLOVER	E		FLO										FLP				FLO	
BLACK-NECKED STILT	R		RFLO										RFLP				RFLP	
BLUE-WINGED TEAL	U		RFLP	RFLO									RFXP				RFXP	RFLO
CACKLING GOOSE	U		RFXP										RFXP				FLO	
CALIFORNIA GULL	U		FLO	RLP									RFXP				FXO	
CANADA GOOSE	C		RFXP										RFXP				FXO	
CANVASBACK	R												FXP					
CINNAMON TEAL	R		RFLO	RFLO									RFXP				RFXP	RFLO
COMMON LOON	R												FXP					
COMMON PINTAIL	C		RFXP	RFLO									RFXP				RFXP	
COMMON SNIPE	R		RFXP										RFXP					
COMMON YELLOWTHROAT	R		RFLO										RFXP				FLO	
DOUBLE-CRESTED CORMORANT	E												RFXP					
EARED GREBE	R												RFXP					
EUROPEAN WIGEON	E		FLO										FLP				FLP	RFXO
FORSTERS TERN	R		FLO	RLP									RFLP		FLO			
FRANKLINS GULL	E		FLO	RLP									RFLP		FLO			
GADWALL	R		RFLP	RFLO									RFXP				RFXP	RFXO
GREATER SCAUP	U												RFXP					
GREATER YELLOWLEGS	U		RFLP										RFLP				RFLP	
GREEN-WINGED TEAL	C		RFXP	RFLO									RFXP				RFXP	RFXO
GREEN-WINGED TEAL	C		RFXP	RFLO									RFXP				RFXP	RFXO
HARLEQUIN DUCK	E												FLP					
HORNED GREBE	E												RFXP					
KILLDEER	C		RFXP										RFXP				RFXP	
LEAST SANDPIPER	R		RFLP										RFLP				RFLP	
LESSER SCAUP	C												RFXP					
LESSER SNOW GOOSE	R		FXP										FXP				FLO	
LESSER YELLOWLEGS	U		RFLP										RFLP				RFLP	
LONG-BILLED CURLEW	R		FXP	RFXP									FXP				FXP	
LONG-BILLED DOWITCHER	C		RFLO										RFXP				RFXP	
MALLARD	V		RFXP	RFXO									RFXP				RFXP	RFXO
MARBLED GODWIT	E		RFLP	RLP									RFLP				RFLP	
MARSH WREN	R		RFLO										RFXP				FLO	
NORTHERN SHOVELER	U		RFLP	RFXO									RFXP				RFXP	FLO
PIED-BILLED GREBE	U												RFXP					
REDHEAD	U												RFXP					
RING-BILLED GULL	U		FLO	RLP										RFLP		FLO		
RING-NECKED DUCK	U												RFXP				FLO	
RUDDY DUCK	U												RFXP					
SANDERLING	R		RFLO										RFLP				RFLP	
SANDHILL CRANE	R		RFXP	RFLO			FLO						RFXP				FXO	
SMALL CANADA GOOSE	U		RFXP										RFXP				FLO	

Common Name	Realt. Abundance	1 Juniper Grass	2 Wet Meadow	3 Bunch Grass	4 Cmtd Wheatgrass	5 Big Sagebrush	6 Low Sagebrush	7 Other Grass Brush	8 Juniper Bitterbrush	9 Juniper Big Sage	10 Juniper Low Sage	11 Aspen Shrub	12 Riparian	13 Mtn. Mahogany	14 Pond. Pine	15 Fir-Mixed	16 Intermt Pine Lake Beds	17 Grease-wood
SPOTTED SANDPIPER	C		RFXO										RFXP				RFXP	
TRUMPETER SWAN	E		FXP										FXP					
WESTERN GREBE	R												RFXP					
WESTERN SANDPIPER	R		AFLP										RFLP				RFLP	
WHISTLING SWAN	U		RFXP										RFXP					
WHITE PELICAN	R												FXP					
WHITE-FRONTED GOOSE	R		FXP										FXP				FLO	
WILLET	U		RFXP										RFXP				RFXP	
WINTER WREN	U												FXO		RFXP	RFXP		
WESTERN JUMPING MOUSE	U		RFLP	RFLO								RFLP	RFLP		RFLP	RFLP		

LIFE FORM 4. Reproduces In cliffs, caves, rimrock, and/or talus and feeds on the ground or in the air (24 species).

SIDE-BLOTCHED LIZARD	C	RFLP	RFLO	RFXP	RFLO	RFXP	RFXP	RFXO	RFLO	RFXP	RFXP		RFLO					RFLO
BARN SWALLOW	U		FLP	FLO		RFLP			FLO	RFLO		RFLP	RFLP	FLO			FLO	FLO
CANYON WREN	U			RFXP		RFLO	RFLP	FLO	FLO				RFXP	FLO				RFLP
CHUKAR	C			RFXO		RFXP	FLO	RFXP	RFLO				FXP					FLO
CLIFF SWALLOW	C		FLP	FLO		RFLP	FLO	FLO	FLP	FLP	FLO		RFLP	FLO				FLO
COMMON RAVEN	V	RFXP	RFXP	RFXP	FXO	RFXP	RFXP	RFXP	RFXP	RFXP	RFXP	RFXP	RFXP	RFXP	RFXP	RFXP	RFXP	RFXP
FERRUGINOUS HAWK	C	RFLO	FXP	RFLP	FLO	FLO		FLO	RFLO	RFLO	RFLO		RFXO	RFXO	RFLO	FXP		
GOLDEN EAGLE	C	RFXO	FXP	FXP	FLO	FXP	FLO	FLO	RFXO	RFXO	RFLO	FLO	RFXP	FLO	RFXO	RFXO	FXP	RFLP
PEREGRINE FALCON	E	FLO	FLP	FLO		FLO	FLO	FLO	FLO	FLO	FLO	FLO	FXP	FLO	FLO	FLO	FLP	FLO
PRAIRIE FALCON	U	RFLO	FLO	RFXP	FLO	RFXP	RFXO	RFXO	RFXO	RFXO	RFXO	FLO	FXP	FLO	RFLO	FLO	RFXP	FXP
ROCK DOVE	C		FLO	RFXP	FLO	R LP	RFLP						RFLP					
ROCK WREN	U			FLO		RFLP	RFLP	RFLO					RFLP	FLO				RFLP
SAYS PHOEBE	U	RFLP				FLP	FLO		FLP	RFLP	RFLP	RFLO	RFLP	FLP	RFLP			FLO
TURKEY VULTURE	C	FXO	FLO	FXP	FLO	RFXP	FXO	FXO	RFXP	RFXP	RFXP	FLO	FXP	FLP	RFXO	RFXO	RFLO	FXO
BOBCAT	U	RFXP	FLP	FLP	FLO	RFXP	RFLP	RFXP	RFLP	RFLP	RFLP	RFLP	RFXP	RFLP	RFXO	RFLO	RFLP	RFLP
BUSHY-TAILED WOODRAT	C	RFXP		FXO		FXP	FXO	FLO	RFXP	RFXP	RFXO		FLO			RFXO		FLP
CANYON MOUSE	U	RFLO		RFLP		RFXP			RFLO	RFLO			RFLO					
MOUNTAIN LION	E		FLO	FLP		FXO		FLO			FLO	FLP	FXP	RFXP	RFXP	RFXP		
PALLID BAT	R	FLO	FLO			RFLP	FLO		RFLP	RFLP	FLO	FLO	RFLP					
PINON MOUSE	C					RFXO		RFLO	RFLO	RFXP	RFLO			RFLO				
SMALL-FOOTED MYOTIS	R					RFLP	FLO						RFLP					
TOWNSEND BIG-EARED BAT	R	RFXP	RFXO	RFLP		RFXP	RFLO	RFXP	RFXO	RFXP	RFLO	RFLP	RFXP					
WESTERN PIPISTRELLE	U					RFLP		RFLO		FLO			RFLP					
YELLOW-BELLIED MARMOT	C	RFLO	RFXP	RFXP	RFLO	RFXP	RFLO	RFXP	RFLO	RFXP	RFLO	RFXP	FXP	RFLO	RFXO			

LIFE FORM 5. Reproduces on the ground without specific water, cliff. rimrock or talus association and feeds on the ground (37 species).

DESERT NIGHTSNAKE	E		FLO	RFLP	FLO	RFLP	RFLP	FLO						FLO			RFLP	
GOPHER SNAKE	C	RFXP	RFXP	RFXO		RFXP	RFLO	RFXP	AFXP	RFXP	RFXO		RFXP					RFLP
NORTHERN PACIFIC RATTLESNAKE	C	RFXP	FXO	RFXP	RFXO	RFXP	RFXO	RFXP	RFXO	RFXP	RFXO	FLO	RFXP	RFXO	RFXO	FLO	RFXP	RFXP
PIGMY HORNED LIZARD	U	RFLO		RFLO		RFLP	RFLP		RFLO	RFXP								RFLO RFLO
SAGEBRUSH LIZARD	C	PFXP		RFLO		RFXP	RFLO	RFLO	RFLP	RFLP	RFLO			RFLO			RFLO	RFLP
STRIPED WHIPSNAKE	R	RFLO		FLO		RFXP	RFLP	RFLO	RFLP	RFLO		RFXP						
WANDERING GARTER SNAKE	U		RFLP	RFLP		RFLO		RFLP	RFLO	RFLO	RFLO	FLO	RFXP					
WESTERN FENCE LIZARD	C	RFXP		RFXP	RFLO	RFXP	RFXP	RFLO	RFLO	RFLO	RFXP			RFLO	RFLO		RFLO	RFLP
WESTERN YELLOW-BELLIED RACER	C		FLO	RFLP		RFLP	RFLP		RFLO	RFLP	RFLO		RFLP					
BOBOLINK	R		RFLP										RFLP				RFLO	FLO
CALIFORNIA QUAIL	C	RFLO				RFXP		RFXP	RFLO	RFXP	FLO		RFXP					FLP
GRAY PARTRIDGE	E		RFLO	RFXP				RFXP					RFLO					FLO
HERMIT THRUSH	R												FXO		RFLO	RFXP		
HORNED LARK	C			RFXP	FXO		RFXP										FLO	RFLO
LARK SPARROW	C	RFLO	FLP	FLO		RFXP	RFLO			FLO	FLO		RFLP					
MARSH HAWK	C	FLO	RFXP	RFXP	FLO	FXP		RFLP					RFLP				FLP	FXO
MOUNTAIN QUAIL	R							RFXP					RFXP		RFXP	RFXP		
NORTHERN JUNCO	C		RFLP			RFXP	RFLO	RFXP	RFLP	RFLP	RFLO	RFLP	RFLP	FLO				RFLO
RING-NECKED PHEASANT	U			RFXP		RFXP		RFXP					RFXP					
RUFFED GROUSE	R							RFXP				RFXP	RFXP		RFXO	RFXP		
SAGE GROUSE	U		FXP	FXP	FXO	RFXP	FLO	FLO		FLO	FLO		FLP					FLP
SAVANNAH SPARROW	C	FLO	FLO	RFXP		RFLO	RFXP			FLP	FLO	FLO	FLO				FLO	
SHORT-EARED OWL	R		RFLO	FXP	FLO	FLP	FLO	FLO	RFLO	RFXP			RFXP				FLO	FLO
TURKEY	R		FXP	FLO				RFXP				RFXP	FLP		RFXP	RFLO		
VEERY	R		FLO									RFLO	RFLP	FLO				
VESPER SPARROW	C	FLP	FL	RFLP		RFLO	RFLP	FLO		FLO			FLO				FLO	
WATER PIPIT	R		FLO										FLO				FLO	FLO
WESTERN MEADOWLARK	C	RFXO	FXP	RFXP	FLO	RFXO	RFXP	RFLO	RFXO	RFLO	RFXO	RFLO	FLP					RFLO
WILSONS WARBLER	R		FLO			FLO		FLO				RFLP	RFLP					
BLACK-TAILED JACKRABBIT	C	RFXO	FLP	RFXO	FLO	RFXP	RFXP	RFLO	RFXO	RFXO	RFLO		FLP				FXP	FXP
FERAL HORSE	A		FXP	RFLP	FLO	RFXP	FLO	RFLP	RFLP	RFLP	RFLO		FXP		RFXP	RFXP	RFXO	FLP
FERAL HOUSE CAT	R	RFLP	FLP	RFLP		RFXP		RFLO	RFLP	RFLP		FLP	RFLP					RFLP
PRONGHORN ANTELOPE	C	RFXO	FXP	FXO	FXP	RFXP	RFXP		FXP	RFXP	RFXP			FLO	FLO		RFXP	FXP
ROCKY MOUNTAIN ELK	U		FLP			FLO	FLO	RFLO				RFXP	RFXP	FLO	RFXP	RFXP		
ROCKY MOUNTAIN MULE DEER	V	RFXP	FXP	RFXO	FXP	RFXP	FXP	RFXP	RFXP	RFXP	FXO	RFXP	FXP	FLO	RFXP	RFXP	FLO	FXO
SNOWSHOE HARE	R												FLO			RFLP		
WHITE-TAILED JACKRABBIT	E	RFLO		RFXP		RFLO		FLO	FLO	FLO	FLO		FLP				FLO	

LIFE FORM 6. Reproduce1 on the ground and feeds In bushes. trees. or the air (6 species).

COMMON NIGHTHAWK	U	RFLP	FXP	FLP		RFLP	RFLP		RFLO	RFLP	RFLO	RFLP	FLP	RFLO				FLP
COMMON POOR-WILL	R	FLP	FLP	FLP		RFLP	RFLP		FLO	FLO	FLO	FLO	FLP					FLP
LINCOLNS SPARROW	C					RFXP	FLO	RFXP					RFXP					
NASHVILLE WARBLER	E											RFLP	RFLP			RFLP		
ORANGE-CROWNED WARBLER	R											RFLP	RFLP					
SNOW BUNTING	E		FLO															
TOWNSEND'S SOLITAIRE	C	RFXP		FLO		RFXP			RFXO	RFXP		RFXP	FXP					FLO
PORCUPINE	C	RFXP	FLO			RFXO		RFLO	RFXO	RFXO			RFXO	RFXO	RFXP	RFXP		

APPENDIX - M (continued)

Common Name	Resit. Abundance	1 Juniper Gnu	2 Wet Meadow	3 Bunch Grass	4 Crested Wheatgrass	5 Big Sage	6 LOW Sage	7 Other Brush	8 Juniper Bitterbrush	9 Juniper Big Sage	10 Juniper Low Sage	11 Aspen Shrub	12 Riparian Grass	13 Mtn. Mahogany	14 Pond. Pine	15 Fir-Pine Mixed	16 Intermt Lake Beds	17 Greasewood Grass
LIFE FORM 7. Reproduces In bushes and feeds on the ground, in water or the air (30 species).																		
AMERICAN ROBIN	V	FXP	FXO	FXO		RFXO		RFXP	RFXP	RFXP		RFXP	RFXP		FLO	FLO		
BLACK-BILLED MAGPIE	C	FXP	FXO	FXO	FXO	RFXP	FXO	RFXP	RFXP	RFXP	RFXO	RFXP	RFXP	RFXO	FLO	FLO	FLO	FLP
BLACK-CROWNED NIGHT HERON	R		FLO										RFXP					
BLACK-THROATED SPARROW	E	FLO	FLO	FLO		RFLP		RFLP		RFLO		RFLO	RFLO				RFLO	
BREWERS BLACKBIRD	V	FLO	RFXP	FLO		RFXO	FLO	FLO		FLO		RFXP	RFXP		FLO		RFXP	FLP
BREWERS SPARROW	U			FLO		RFXP	FLO	RFLP	RFLO	RFLP	FXO		FLO					FLO
BROAD-TAILED HUMMINGBIRD	R		FLP					RFLO				RFLP	RFLP					
BROWN-HEADED COWBIRD	C		RFXP	FLO		RFLO		FLO		RFXO			RFXP		RFXO	RFXO	RFXO	FLP
CALLIOPE HUMMINGBIRD	R		FLP	FLO						RFLP		RFLP	RFLP		FLO	RFLO		
CHIPPING SPARROW	U	FLO	FLO	FLO		RFLP		RFLO	RFLO	RFLP	RFLO		RFLP	RFLO	RFLO	RFLO	FLO	FLO
COMMON REDPOLL	R	FLO								FLP					FLP	FLP		
EASTERN KINGBIRD	U	FLP		FXP		RFXP			RFXP	RFXP	RFXO	RFLP	RFLP					FLO
FOX SPARROW	U							FLO				FLO	RFLP	FLO	RFXP	RFXP		
GRAY FLYCATCHER	R			FLO		RFXP	FLO	RFLO	RFLP	RFXP	FLO	RFLP	RFLP	FLO	FLO			FLP
GREEN-TAILED TOWHEE	R					RFLP			RFLP	RFXP		RFLO	FLO		FLO			FLP
LAZULI BUNTING	R							RFLO		FLO		RFLP	RFLP					
LESSER GOLDFINCH	R							REXO				RFLP	RFXP					
LOGGERHEAD SHRIKE	C	FLO	FLO	FLO	FLO	RFLP	RFLO		RFLO	RFLP	RFLO	FLO	FLO	FLO	FLO			RFLP
MACGILLIVRAYS WARBLER	U							RFLO				RFXP	RFXP					
NORTHERN SHRIKE	C	FLO	FLO	FXP	FXO	FXP	FLO	FLP	FLO	FLP	FXO	FLO	FLO	FLO	FLO	FLO	FLO	RFXP
RED-WINGED BLACKBIRD	V		RFXP										RFXP				RFXP	
RUFOUS-SIDED TOWHEE	R					RFLP		RFLO		RFLO			RFXP			RFLO		FLO
SAGE SPARROW	U				RFXP	RFXO	RFLO	RFLO	RFLP	RFXO							FLO	
SAGE THRASHER	U			FLO	FLO	RFXP	FLP	RFLO	RFLP	RFLP	FXO	RFLO	RFLP	FLO			RFLO	FLP
SONG SPARROW	C	FLO	FLO			RFXP	RFLP		RFXP	RFXP		FLO	RFLP			FLO		FLP
SWAINSONS HAWK	C	RFXP	FXP	FXP		FLO	FLP	FLO	RFLO	RFXP		RFLP	RFXP		RFLO	RFLO		FLO
SWAINSONS THRUSH	R					FLO		FLO				RFLP	RFXP		RFLP	RFLP		FLO
TREE SPARROW	E		FLO	FLO		RFLP		RFLO					RFLO					
WHITE-CROWNED SPARROW	C	FLO				RFXP		RFXP		FXP	FXO		RFLO				RFLO	FLO
YELLOW-HEADED BLACKBIRD	C		FXO										RFXP				RFXO	
LIFE FORM 8. Reproduces in bushes and feeds in trees, bushes, or the air (5 species).																		
AMERICAN GOLDFINCH	U			FLO				RFLO	FLO	FLO		RFLP	RFXP		RFXO			FLO
BUSHTIT	R							FLO	RFLO	RFLP		RFLP	RFLP		FLO			FLP
DUSKY FLYCATCHER	U			FLO				RFLO	RFLP	RFLP	RFLO		FLO		FLO	RFLO		FLO
YELLOW WARBLER	C					FLO			FLP	FLP		RFXP	RFXP					FLO
YELLOW-BREASTED CHAT	R					FLP		RFLO				FLO	RFLP			FLO		FLP
LIFE FORM g. Reproduces primarily in deciduous trees *and* feeds in trees, bushes, or the air (5 species).																		
AMERICAN REDSTART	E											RFLP	RFXP					
BOHEMIAN WAXWING	R								FLO	FXP	FLO	FLP	FLP		FLP	FLO		
CEDAR WAXWING	U							RFLP	FLO	FXP	FLO	RFLP	RFLP					
HOUSE FINCH	C							RFLP		FLP		RFLP	RFLP		FLO	FLO		FLO
NORTHERN ORIOLE	R									RFLO	FLO	RFXP	RFXP		FLO	FLO		
LIFE FORM 10. Reproduces primarily in conifers and feeds in trees, bushes, or the air (12 Species).																		
BLACK-THROATED GRAY WARBLER	R	RFLO						RFLP		RFLP		RFLO				RFLP	RFLO	
CLARKS NUTCRACKER	E					FXO									RFXP	RFXP		
GOLDEN-CROWNED KINGLET	R											FLO			FLP	RFLP		
OLIVE-SIDED FLYCATCHER	R											FLO	FLP		RFLP	RFLP		
PINYON JAY	U					FXO			RFXP	RFXP	RFLO	FLO	FXP		FLO			FLO
RED CROSSBILL	R														FLP	RFXP		
RUBY-CROWNED KINGLET	R											FLO			FLP	RFXP		
TOWNSENDS WARBLER	U												RFLO		FLP	RFLP		
WESTERN FLYCATCHER	R												RFXP		RFLP	RFLP		FLO
WESTERN TANAGER	U								FLO	FLO		RFXP	RFXP		RFXP	RFXP		
YELLOW-RUMPED WARBLER	U											FLO	RFXP		FLO	RFXP		
DOUGLAS SQUIRREL	C												FLO		RFXP	RFXP		
LIFE FORM 11. Reproduces in conifers or deciduous trees and feeds in trees, in *bushes. on* the ground. or in the air (13 species).																		
BLACK-HEADED GROSBEAK	U											RFLP	RFLP		RFLP	RFLP		
CASSINS FINCH	R								RFLO	RFLO		FLO	RFLP		RFLP	RFLP	FLO	
COMMON CROW	U		FLO	FLO				FLO	RFLO	RFXO	FLO	FLP	RFXP		RFXP	RFXP		RFLO
COOPER'S HAWK	R								FLO	FLO	FLO	FXP	RFXP	FLO	RFXP	RFXP		
EVENING GROSBEAK	C								FLO	FXO	FLO	FLP	RFXP		RFXP	RFLP		
GOSHAWK	R								FLO	FLO	FLO	RFXP	FXP		RFXP	RFXP		
GRAY JAY	U									FLO		FLO	FLO		RFXP	RFXP		
HAMMONDS FLYCATCHER	U	FLO		FLO						FLO	FLO	RFLP	FLP		RFXP	RFLP		
LONG-EARED OWL	R	RFXP	FLO	RFXP					RFLO	RFXP		RFXP	RFXP		FLO	RFLO		
MERLIN	E		FLO	FXP						FLO		FLO	FLP	FLO	FLP	RFLP		FLO
MOURNING DOVE	V	RFXP	FLO	FXP	FLO			FLO	RFXP	RFXP	RFLO	RXP	RXP		RFLO			RFXO
PINE GROSBEAK	E		FLO									FLO	RFLP		RFXP	RFXP		
PINE SISKIN	R			FLO								FLO	FLP		RFLP	RFLP		
PURPLE FINCH	U		FLO						RFLO	RFXO		FLO	RFLP		RFLP	RFLP		FLO
RED-EYED VIREO	E							FLO				RFLP	RFLP		FLO			
RUFOUS HUMMINGBIRD	U		FLO	FLO								RFXP	FLP		RFXP	RFLP		
SHARP-SHINNED HAWK	R								FLO	FLO	FLO	FXP	FXP	FLO	RFXP	RFXP		
SOLITARY VIREO	U											FLP	FLP		FLP	RFLP		
STELLERS JAY	C								FLO	FXO	FXO	FLO	RFLO		RFXP	RFXP		
VARIED THRUSH	U											FLP		FLP	RFXP			
WARBLING VIREO	U							FLO				RFLP	RFLP		FLO			
WESTERN KINGBIRD	U					RFXP	FLO	RFLO	RFLO	RFXP	RFXO	RFXP	RFXP					FLO
WESTERN WOOD PEEWEE	U			FLO						FLO	FLO	RFXP	RFXP		RFLP	RFLP		FLO
WILLOW FLYCATCHER	U	FLO		FLO						FLO	FLO	RFLP	FLP		RFLP	RFLP		
HOARY BAT	E								RFLO	RFLO	RFLO	RFLP	RFLP		RFLP	RFLP		FLO

Common Name		Realt. Abundance	1 Juniper Gnu	2 Wet Meadow	3 Bunch Grass	4 Crestd grass	5 Big Wheat- Grass	6 Low Sage Grass	7 Sage Brush	8 Junip. Other -brush	9 Junip. Bitter Sage	10 Junip. Big Low G	11 Aspen Shrub n	12 Ripar- u ian	13 Mtn. Mahog- , %	14 Pond. Pine	15 Fir- Pine Mixed	16 Intermt Lake Beds	17 Grease -wood Grass
LIFE FORM 12. Reproduces on very thick branches and feeds on the ground or in water (10 species).																			
BALD EAGLE	R	FXO	FXP	FXP							FXP		FLO	FXP		FLO	FLO		FLO
COMMON EGRET	E		FLP											FLP				FLO	
GOLDEN EAGLE	C	RFXO	FXP	FXP	FLO	FXP	FLO	FLO	RFXO	RFXO	RFLO	FLO	RFXP	FLO	RFXO	RFXO		FXP	RFLP
GREAT BLUE HERON	U		FXP									RLP	RFXP					FLO	FLO
GREAT HORNED OWL	C	RFXO	FLO	FLP	FLO	FLP	FLO	FLO	RFLO	RFXO	FLO	RFXP	RFXP	FXO	RFXP	RFXP		FLO	RFLP
GREEN HERON	E		FLP										FLP					FLO	
OSPREY	R												AFXP		RXP	RLO			
RED-TAILED HAWK	C	RFXP	FXO	FXP	FXO	FXP	FXO	FLO	RFXP	RFXP	RFXO	RFXP	RFXP	FLO	RFXO	RFXO		FXP	FXP
ROUGHLEGGED HAWK	C	FLO	FLP	FLP		FLO						FLO	FLP		FLO	FLO		FLO	FLO
SNOWY EGRET	E		FLP										FLP						
LIFE FORM 13. Reproduces in own hole excavated in tree and feeds In trees, in bushes, on the ground, or in the air (13 species).																			
ELACKBACKEDTHREETOED WOODPECKER	R															FLP	RFXP		
COMMON FLICKER	C	RFXP		FXO		FXO	FXO	FXO	RFXP	RFXP	RFXP	RFXP	RFXP	FLO	RFXP	RFXO		FLO	FLP
DOWNY WOODPECKER	U									RFLO		RFXP	RFXP		FLO				
HAIRY WOODPECKER	R											RFXO	RFXO		RFXP	RFLP			
LEWIS WOODPECKER	U	RFLO							RFLO	RFXO		RFXP	RFXP		RFXP	RFXP			
NORTHERN THREETOED WOODPECKER	R														FLO	RFXP			
PILEATED WOODPECKER	E														RFXP	RFXP			
PYGMY NUTHATCH	R											FLP			RFXP	RFXP			
RED-BREASTEDNUTHATCH	R														FXP	RFXP			
RED-NAPPED SAPSUCKER	C											RFXP	RFXP		RFXP	RFXP			
WHITE-BREASTED NUTHATCH	R														RFXP	RFXP			
WHITE-HEADED WOODPECKER	R											RLP			RFXP	RFXP			
WILLIAMSONS SAPSUCKER	R											RFLO	RFXO		RFLP	RFLP			
LIFE FORM 14. Reproduces in a hole made by another species or In a natural hole and feeds on the ground, in water, or the air (36 species).																			
AMERICAN KESTREL	V	RFXP	FXO	FXP	FXO	FXP	FXO	FXP	RFXP	RFXP	RFXO	RFXO	RFXP	FLO	RFXO	RLO		FXP	
ASH-THROATEO FLYCATCHER	U			FLO					RFLP	AFXP		RFLP	RFLP		RFLO				FLO
BARN OWL	U	RFLO	FLP	FLO	FLO			FLO	RFLO	RFLP	RFLO		RFXP		RFLO	RFLO		FLO	
BARROWS GOLDENEYE	R											RFLP			RLO				
BLACK-CAPPED CHICKADEE	R					FLO		FLO		RFLO		RFXP	RFXP		RFXO				
BROWN CREEPER	U											RFXO	RFLO		RFXP	RFXP			
BUFFLEHEAD	U															RLO			
COMMON GOLCENEYE													RFXP	RLO					
COMMON MERGANSER													RFXP						
FLAMMULATED OWL	E														RFXP	RFLP			
HOODED MERGANSER	R												RFXP		RLO	RLO			
HOUSE SPARROW		RFXP		FLO		RFLP			RFXP	RFXP	RFXO	RFXP	RFXP						FLO
HOUSE WREN	C							FXP				RFXP	RFXP		RFXP	RFLP			
MOUNTAIN BLUEBIRD	C	RFXP	FXP	FXP	FXO	FXP	FLO	FLO	RFXP	RFXP	RFXO	RFXP	RFXP	FXO	RFXO	RLO			FL?
MOUNTAIN CHICKADEE	C							FLO		FXO	FLO	RFXP	RFXP		RFXP	RFXP			
PIGMY OWL	R	RFLP	FL3					FLO		RFLP	RFLO	RFLP	RFLP		RFLP	RFLP			
RED-BREASTED MERGANSER	A												RFXP						
SAW-WHET OWL	R											RFLP	RFLP		RFXP	RFLP			
SCREECH OWL	R	RFXP	FLP	FLP			FLP	FLP	RFLO	RFXP	RFLP	FLP	RFLP		FLO				
STARLING	V	RFXP	FXP	FXO					RFXP	RFXP	RFLO	RFXP	RFXP						FLO
TREE SWALLOW	C	RFLO	FXP						RFXO	RFXP	FLO	RFXP	RFXP		RFXO	RFXO			
VAUXS SWIFT	U		FLP									RFLO	RFLP		RFLP	RFLP			FLO
VIOLET-GREEN SWALLOW	C		FXP									RFXP	RFXP		RFXO		FLO		
WESTERN BLUEBIRD	U	RFLP	FLP	FLP	FLO	FXP	FLO	FLO	RFLP	RFXP	RFLO	RFXP	RFXP	FLO	RFLO	RLO			FLP
WOODDUCK	R											RLO	RFXP		RLO	RFLO			
BIG BROWN BAT	R	RFLO	FLP						RFLO	RFLO	RFLO	FLP	FLP		RFLP	RFLP	FLO		FLP
CALIFORNIA MYOTIS	R	FLO	FLP							FLO	FLO	FLP	FLP		RFLP	RFLP	FLO		FLP
FRINGED MYOTIS	R	RFLO							RFLO	RFLO	RFLO		FLP	RFLP		RFLP	FLO		FLP
LITTLE BROWN MYOTIS	R	RFXP								RFLP	RFLO	FLP	FLP	FLO	RFLP	RFLP	FLO		FLP
LONG-EARED MYOTIS	R	FLP							FLP	FLP	FLO	FLP	FLP		RFLP	RFLP	FLO		FLP
LONG-LEGGED MYOTIS	R	FLP	FLP						FLP	FLP	FLO	FLP	FLP		RFLP	RFLP	FLO		FLP
MARTEN	E																RFXP		
NORTHERN FLYING SQUIRREL	R														RFXP	RFXP			FLO
RACCOON	U		FLO									RFXP	RFXP			RFXP			
SILVER-HAIRED BAT	R	FLO	FLP						FLO	FLO	FLO	FLP	FLP		RFLP	RFLP	FLO		FLP
YUMA MYOTIS	R	FLP	FCP			FLP				FLP	FLO		RFLP	FLO			FLO		FLP
LIFE FORM 15. Reproduces In a burrow underground and feeds on the ground or under it (33 species).																			
RUBBER BOA	R		RFLP			RFLO							AFLP		FLO	RFLP			
BURROWING OWL	U	RFLO		RFXP	RFXO	FLO	RFXO	FLO	FLO	FLO	FLO	RFLO							FLP
BADGER	C	RFXP	RFXO	RFXP	RFXO	FXO	FXO	RFXP	RFXP	RFXP	RFXO	RFXP	FXP		RFXO	RFXO	FLO		FLO
BELDING GROUND SQUIRREL	V	RFXO	RFXP	RFXO	RFXO	RFXO					RFXO		RFXP	RFXP					
BLACK BEAR	R		FLO					FLO					FLP	FLP		RFLP	RFXP		
COAST MOLE	E		RFLP	RFLP									RFLP	RFXP		RFLP	RFLP		
COYOTE	V	FXO	FXP	FXP	FXO	RFXP	RFXO	RFXP	RFXP	RFXP	RFXP	RFXO	RFXP	RFXP	RFXO	RFXP	RFXP	RFXO	RFXP
DARK KANGAROO MOUSE	E					RFLP					RFLP								
DEER MOUSE	V	RFXP	RFXP	RFXP	RFXO	RFXP	RFXO	RFXP	RFXP	RFXP	RFXP	RFXO	RFXP	RFXP	RFXO	RFXP	RFXO	RFXO	RFXP
GOLDEN MANTLED GROUND SQUIRREL	C			RFXP		FXO	FLO		RFXP	RFXP	RFXP	RFXO	RFLO	RFXO	RFXP	RFXP			
GREAT BASIN POCKET MOUSE	C	RFXP				RFXP	RFXO		RFXP	RFXP	RFXO								RFLP
HEATHERVOLE	E																	RFLP	
HOUSE MOUSE	C		RFXP					RFCP					RFLP						
LEAST CHIPMUNK	U	RFLO				RFXP	RFLO		RFLO	RFLP	RFLO								RFXP
LONG-TAILED VOLE	E	RFLO	RFLP	RFLO									RFLP	RFLP		RFLO	RFLO		RFLO
LONGTAIL WEASEL	U	RFLP	RFLO	RFLO	FLO	RFLP	FLO	RFLP	RFLP	RFLP	RFLO	RFXP	RFLP			RFLO	RFLO	FLO	FLO
MERRIAM SHREW	E					RFLP		RFLO											

APPENDIX - M (continued)

Common Name	Realt. Abundance	1 Juni-par Grass	2 Wet Meadow	3 Bunch Grass	4 Crestd Wheat-grass	5 Big Sage Grass	6 LOW Sage Grass	7 Other Brush	6 Junip. Bitter	9 Junlp. Big -brush	10 Junip. Low Sage	11 Aspen Shrub Sage	12 Riparian Grass	13 Mtn. Mahog-	14 Pond. Pine	15 Fir-Pine Mixed	16 Intermt Lake Beds	17 Grease -wood Grass
MONTANE VOLE	C		RFXP	RFXP		RFXO			RFLO	RFLO		RFXO	RFXP					RFLO
MOUNTAIN COTTONTAIL	C	RFXP	FXP	FXP	FLO	RFXP	RFXO	RFXP	RFXP	RFXP	RFXO	RFXP	RFXP	FLO				RFXO
NORTHERN GRASSHOPPER MOUSE	U					RFLP				RFLP	RFLP							
NORTHERN POCKET GOPHER	V	RFXP	RFXP	RFXP	RFXO	RFXP	RFXO	RFXO	RFXP	RFXP	RFXO	RFXP	RFXP	RFXO	RFXP	RFXP	RFXO	RFLO
ORD KANGAROO RAT	C	RFXO			RFXO	RFXP			RFXO	RFXP								RFXP
PINON MOUSE	C					RFXO		RFLO	RFLO	RFXP	RFLO			RFLO				
PYGMY RABBIT	E					RFLP												
SAGEBRUSH VOLE	U			RFLP		RFLP			RFLO	RFLP	RFLO							
SHORTTAIL WEASEL	U											RFXO	RFLP		RFXP	RFXP		RFLO
SOUTHERN RED-BACKED MOUSE	R														RFLO	RFLP		
SPOTTEDSKUNK	R							RFLP				RFLP	RFLP		RFLO	RFLO		
STRIPED SKUNK	U		RFXP					RFLP					RFXP					
TOWNSEND GROUND SQUIRREL	C	RFXP	RFXO	RFXP	RFXO	RFXP	RFXO		RFXP	RFXP	RFXO		RFXO					RFLO
VAGRANT SHREW	U		RFXP									RFLP	RFLP					
WESTERN HARVEST MOUSE	U			RFXP		RFXP		RFLP	RFLO	RFXP			RFXP					RFXP
YELLOW-PINE CHIPMUNK	C	RFXP				RFXP	FLO		RFXP	RFXP	RFXO	RFXO	RFXP	RFLO	RFXP	RFXP		
LIFE FORM 16. Reproduces in a burrow underground and feeds in the air or in water (9 species).																		
BANK SWALLOW	C												RFXP					FLO
BELTED KINGFISHER	U												RFXP					
ROUGH-WINGED SWALLOW	C												RFXP					FLO
BEAVER	C	FXO	FXO			FXO			FXO	FXO		FXP	RFXP					
MINK	C												RFXP					
MUSKRAT	C												RFXP					
RIVER OTTER	R												RFXP					
WATER SHREW	E							FLO					RFLP					
WATER VOLE	E												RFLP					

Relative Abundance

V	Common in this area.
C	Common in this area.
U	Uncommon I" this area
R	Rare in this area
E	Extremely rare in this area

Species Orientation

R	Species reproduces in this type of habitat
F	Species feeds in this type of habitat.
L	Species orientation determined from literature
X	Species orientation determined from observation
P	Species prefers this type of habitat.
0	Species occasionally uses this type of habitat

APPENDIX N

VICTOR ATIYEH
GOVERNOR

Department of Transportation

STATE HISTORIC PRESERVATION OFFICE

Parks and Recreation Division

525 TRADE STREET S.E., SALEM, OREGON 97310

January 29, 1982

In Reply Refer to
File No

PAUL W ARRASMITH
PRINEVILLE BUREAU OF LAND MANAGEMENT
PO BOX 550
PRINEVILLE OR 97754

Dear Mr. Arrasmith:

RE: Brothers Grazing EIS
Inventory Adeqaucy
Memorandum of Agreement

We have a copy of the Brothers Cultural Resource Overview (Class 1 Inventory) by Toepel and Beckham. The report adequately gives an overview of the existing history of archeology and cultural resources. We do not have a copy of the Joanne Mack Glass Butte Survey (that I can find) so we cannot comment on the adequacy of the inventory.

The Prineville BLM is one of the few districts sending the State Historic Preservation Office Class 3 negative reports. These are valuable documents for evaluating site densities and distributions for our site file and we appreciate the effort.

The two percent sample, derived from project-related CRM surveys, is not adequate for making predictive statements for large land areas. Based on the data available, predictive models for site densities and distribution or patterns would necessarily be at a gross level, with wide confidence intervals.

This is not a criticism of the CRM program for the Prineville BLM, merely a fact derived from limited manpower, funding and capabilities of CRM within the legal and regulatory system. Predictive models are necessarily based on systematic sampling and a cultural resource program is necessarily responsive to the demands of ground disturbing activities rather than systematic research. My best guess on site densities, based on an overview distribution map for sites with permanent site file numbers, would be five to six plus or minus three sites per square mile in the basin and range province, and two to three plus or minus three sites per square mile in the high lava plains province. This is a guess based on limited data from the entire region, and may be wrong by orders of magnitude.

Sincerely,

Leland Gilsen
SHPO Staff Archeologist

LG:kc

APPENDIX 0 Species List

Common Name	Scientific Name
American pillwort	Pilularia americana
alder	Alnus spp.
alkali muhly	Muhlenbergia richardsonis
antelope bitterbrush	Purshia tridentata
aspen	Populus tremuloides
aster	Aster spp.
basin big sagebrush	Artemisia tridentata ssp. tridentata
basin wild ryegrass	Elymus cinereus
big sagebrush	Artemisia tridentata
biscuitroot	Lomatium spp.
bitterbrush	Purshia tridentata
black greasewood	Sarcobatus vermiculatus
bluebunch wheatgrass	Agropyron spicatum
bluegrass	Poa spp.
bracken fern	Pteridium aquilinum
buckwheat	Eriogonum spp.
Columbia cress	Rorippa calcyna var. columbiae
cattail	Typha spp.
cheatgrass	Bromus tectorum
chokecherry	Prunus spp.
cleftleaf sagebrush	Artemisia arbuscula ssp. thermopola
cottonwood	Populus trichocarpa
crested wheatgrass	Agropyron cristatum
curlleaf mountain mahogany	Cercocarpus ledifolius
Douglas fir	Pseudotsuga menziesii
Douglas' wormwood	Artemisia ludoviciana ssp. nova
early low sagebrush	Artemisia longiloba
elk sedge	Carex geyerii
erigeron	Erigeron spp.
fescue	Festuca spp.
giant wildrye	Elymus cinereus
gooseberry	Ribes spp.
greasewood	Sarcobatus vermiculatus
green rabbitbrush	Chrysothamnus viscidiflorus
green-tinged Indian paintbrush	Castilleja chlorotica
horsetail	Equisetum spp.
Idaho fescue	Festuca idahoensis
intermediate wheatgrass	Agropyron intermedium
junegrass	Koeleria cristata
juniper	Juniperus occidentalis
Kentucky bluegrass	Poa pratensis
long-bearded mariposa lily	Calochortus longebarbatus var. peckii
low sagebrush	Artemisia arbuscula
lupine	Lupinus spp.
mahogany	Cercocarpus spp.
mountain big sagebrush	Artemisia tridentata ssp. vaseyana
mountain brome	Bromus inermis
muhlenbergia	Muhlenbergia spp.
needle and thread grass	Stipa comata
needlegrass	Stipa spp.
nomad alfalfa	Medicago sativa
Oregongrape	Berberis repens
Palmer's onion	Allium bisceptrum
Peck's milkvetch	Astragalus peckii
Peck's penstemon	Penstemon peckii
paintbrush	Castilleja spp.
phlox	Phlox spp.
pinegrass	Calamagrostis rubescens

ponderosa pine	Pinus ponderosa
rabbitbrush	Chrysothamnus spp.
rabbitsfoot grass	Polypogon monspeliensis
rush	Juncus spp.
rye grass	Elymus spp.
Sandberg's bluegrass	Poa sandbergii
sagebrush lily	Calochortus spp.
sagegrush	Artemisia spp.
saltgrass	Distichlis stricta
sedge	Carex spp.
serviceberry	Amelanchier spp.
silver sagebrush	Artemisia cana
snowberry	Symphoricarpos spp.
squirreltail grass	Sitanion hystrix
stiff sagebrush	Artemisia rigida
Thurber's needlegrass	Stipa thurberiana
thickspike wheatgrass	Agropyron dasytachyum
threadleaf sedge	Carex filifolia
timothy	Phleum spp.
vetch	Vicia spp.
Wyoming big sagebrush	Artemisia tridendata ssp. wyomingensis
wax currant	Ribes cereum
western juniper	Juniperus occidentalis
wheatgrass	Agropyron spp.
whiplash willow	Salix caudata
white fire	Abies concolor
willow	Salix spp.
wire rush	Juncus spp.

FISH

01 BLACK CRAPPIE	POMOXIS NIGROMACULATUS
01 BLUEGILL	LEPOMIS MACROCHIRUS
01 BRIDGELIP SUCKER	CATOSTOMUS COLUMBIANUS
01 BROWN BULLHEAD	ICTALURUS NEBULOSUS
01 BROWN TROUT	SALMO TRUTTA
01 CARP	CYPRINUS CARPIO
01 CHANNEL CATFISH	ICTALURUS PUNCTATUS
01 CHISELMOUTH CHUB	ACROCHEILUS ALUTACEUS
01 CUTTHROAT TROUT	SALMO CLARKI
01 KAMLOOP TROUT	SALMO GAIRDNERI KAMLOOPS
01 LARGE SCALE SUCKER	CATOSTOMUS MACROCHEILUS
01 LARGEMOUTH BASS	MICROPTERUS SALMOIDES
01 LEOPARD DACE	RHINICHTHYS FALCATUS
01 LONGNOSE DACE	RHINICHTHYS CATARACTAE
01 NORTHERN SQUAWFISH	PTYCHOCHEILUS OREGONENSIS
01 PIUTE SCULPIN	CO-I-I-US BELDINGI
01 PUMPKINSEED	LEPOMIS GIBBOSUS
01 RAINBOW TROUT	SALMO GAIRDNERI GAIRDNERI
01 SMALLMOUTH BASS	MICROPTERUS DOLOMIEUI
01 SPECKLED DACE	RHINICHTHYS OSCULUS
01 UMATILLA DACE	RHINICHTHYS OSCULUS UMATILLA
01 WHITE CRAPPIE	POMOXIS ANNULARIS

AMPHIBIANS

01 BULLFROG	RANA CATESBEIANA
02 BREAT BASIN SPADEFOOT	SCHAPHIOPUS INTERMONTANUS
02 NORTHERN LONG-TOED SALAMANDER	AMBYSTOMA
02 PACIFIC TREE FROG	HYLA REGILLA
02 SPOTTED FROG	RANA PRETIOSA
02 WESTERN TOAD	BUFO BOREAS

REPTILES

03 COMMON GARTER SNAKE	THAMNOPHIS SIRTALIS
05 DESERT NIGHTSNAKE	HYPSIGLENA TORQUATA DESERTICOLA
05 GOPHER SNAKE	PITUOPHIS MELANOLEUCUS
05 NORTHERN PACIFIC RATTLESNAKE	CROTALUS VIRIDIS OREGANUS
05 PIGMY HORNED LIZARD	PHRYNOSOMA DOUGLASSI DOUGLASSI
15 RUBBER BOA	CHARINA BOTTAE
05 SAGEBRUSH LIZARD	SCELOPORUS GRACIOSUS
04 SIDE-BLOTCHED LIZARD	UTA STANSBURIANA
05 STRIPED WHIPSNAKE	MASTICOPHIS TAENIATUS
05 WANDERING GARTER SNAKE	THAMNOPHIS ELEGANS VAGRANS
05 WESTERN FENCE LIZARD	SCELOPORUS OCCIDENTALIS
03 WESTERN SKINK	EUMECES SKILTONIANUS
05 WESTERN YELLOW-BELLIED RACER	COLUBER CONSTRICTOR MORMON

BIRDS

03 AMERICAN AVOCET	RECURVIROSTRA AMERICANA
03 AMERICAN BITTERN	BOTAURUS LENTIGINOSUS
03 AMERICAN COOT	FULICA AMERICANA
03 AMERICAN DIPPER	CINCLUS MEXICANUS
08 AMERICAN GOLDFINCH	CARDUELIS TRISTIS
14 AMERICAN KESTREL	FALCO SPARVERIUS
09 AMERICAN REDSTART	SETOPHAGA RUTICILLA
07 AMERICAN ROBIN	TURDUS MIGRATORIUS
03 AMERICAN WIGEON	ANAS AMERICANA
14 ASH-THROATED FLYCATCHER	MYIARCHUS CINERASCENS
03 BAIRDS SANDPIPER	CALIDRIS BAIRDII
12 BALD EAGLE	HALIAEETUS LEUCOCEPHALUS
16 BANK SWALLOW	RIPARIA RIPARIA
14 BARN OWL	TYTO ALBA
04 BARN SWALLOW	HIRUNDO RUSTICA
14 BARROWS GOLDENEYE	BUCEPHALA ISLANDICA
16 BELTED KINGFISHER	MEGACERYLE ALCYON
03 BLACK TERN	CHLIDONIAS NIGER
03 BLACK-BELLIED PLOVER	SQUATAROLA SQUATAROLA
07 BLACK-BILLED MAGPIE	PICA PICA
14 BLACK-CAPPED CHICKADEE	PARUS ATRICAPILLUS
07 BLACK-CROWNED NIGHT HERON	NYCTICORAX NYCTICORAX
11 BLACK-HEADED GROSBEAK	PHEUCTICUS MELANOCEPHALUS
03 BLACK-NECKED STILT	HIMANTOPUS MEXICANUS
10 BLACK-THROATED GRAY WARBLER	DENDROICA NIGRESCENS
07 BLACK-THROATED SPARROW	AMPHISPIZA BILINEATA
13 BLACKBACKED THREETOED WOODPECKER	PICOIDES ARCTICUS

03	BLUE-WINGED TEAL	ANAS DISCORS
05	BOBOLINK	DOLICHONYX ORYZIVORUS
09	BOHEMIAN WAXWING	BOMBYCILLA GARRULUS
07	BREWERS BLACKBIRD	EUPHAGUS CYANOCEPHALUS
		SPIZELLA BREWERI
07 07	BREWERS BROAD-TAILED SPARROW HUMMINGBIRD	SELAPHORUS PLATYCERCUS
		CERTHIA FAMILIARIS
07 14	BROWN-HEADED BROWN CREEPER COWBIRD	MOLOTHRUS ATER
14	BUFFLEHEAD	BUCEPHALA ALBEOLA
15	BURROWING OWL	ATHENE CUNICULARIA
08	BUSHTIT	PSALTRIPARUS MINIMUS
03	CACKLING GOOSE	BRANTA CANADENSIS MINIMA
03	CALIFORNIA GULL	LARUS CALIFORNICUS
05	CALIFORNIA QUAIL	LOPHORTYX CALIFORNICUS
07	CALLIOPE HUMMINGBIRD	STELLULA CALLIOPE
03	CANADA GOOSE	BRANTA CANADENSIS
03	CANVASBACK	AYTHYA VALISINERIA
04	CANYON WREN	CATHERPES MEXICANUS
11	CASSINS FINCH	CARPODACUS CASSINII
09	CEDAR WAXWING	BOMBYCILLA CEDRORUM
07	CHIPPING SPARROW	SPIZELLA PASSERINA
04	CHUKAR	ALECTORIS CHUKAR
03	CINNAMON TEAL	ANAS CYANOPTERA
04 10	CLARKSCLIFFSWALLOWNUTCRACKER	NUCIFRAGA COLUMBIANA
		PETROCHELIDON PYRRHONOTA
11	COMMON CROW	CORVUS BRACHYRHYNCHOS
12	COMMON EGRET	CASMERODIUS ALBUS
13	COMMON FLICKER	COLAPTES AURATUS
		BUCEPHALA CLANGULA
03 14	COMMON COMMON GOLDENEYE LOON	GAVIA IMMER
14	COMMON MERGANSER	MERGUS MERGANSER
06	COMMON NIGHTHAWK	CHORDELES MINOR
03	COMMON PINTAIL	ANAS ACUTA
06	COMMON POOR-WILL	PHALAENOPTILUS NUTTALLII
04	COMMON RAVEN	CORVUS CORAX
07	COMMON REDPOLL	CARDUELIS FLAMMEA
03	COMMON SNIPE	CAPELLA GALLINAGO
03	COMMON YELLOWTHROAT	GEOTHLYPIS TRICHAS
11	COOPER'S HAWK	ACCIPITER COOPERII
03	DOUBLE-CRESTED CORMORANT	PHALACROCORAX AURITUS
13	DOWNY WOODPECKER	PICOIDES PUBESCENS
08	DUSKY FLYCATCHER	EMPIDONAX OBERHOLSERI
03	EARED GREBE	PODICEPS NIGRICOLLIS
07	EASTERN KINGBIRD	TYRANNUS TYRANNUS
03	EUROPEAN WIGEON	ANAS PENELOPE
11	EVENING GROSBEAK	HESPERIPHONA VESPERTINA
04	FERRUGINOUS HAWK	BUTEO REGALIS
14	FLAMMULATED OWL	OTUS FLAMMEOLUS
03	FORSTERS TERN	STERNA FORSTERI
07	FOX SPARROW	PASSERELLA ILIACA
03	FRANKLINS GULL	LARUS PIPIXCAN
03	GADWALL	ANAS STREPERA
04	GOLDEN EAGLE	AQUILA CHRYSAETOS
12	GOLDEN EAGLE	AQUILA CHRYSAETOS

10	GOLDEN-CROWNED KINGLET	REGULUS SATRAPA
11	GOSHAWK	ACCIPITER GENTILIS
07	GRAY FLYCATCHER	EMPIDONAX WRIGHTII
11	GRAY JAY	PERISOREUS CANADENSIS
05	GRAY PARTRIDGE	PERDIX PERDIX
12	GREAT BLUE HERON	ARDEA HERODIAS
12	GREAT HORNED OWL	BUBO VIRGINIANUS
03	GREATER SCAUP	AYTHYA MARILA
03	GREATER YELLOWLEGS	TRINGA MELANOLEUCA
12	GREEN HERON	BUTORIDES STRIATUS
07	GREEN-TAILED TOWHEE	PIPILO CHLORURA
03	GREEN-WINGED TEAL	ANAS CRECCA
13	HAIRY WOODPECKER	PICOIDES VILLOSUS
11	HAMMONDS FLYCATCHER	EMPIDONAX HAMMONDII
03	HARLEQUIN DUCK	HISTRIONICUS HISTRIONICUS
05	HERMIT THRUSH	CATHARUSGUTTATUS
14	HOODED MERGANSER	LOPHODYTES CUCLLATUS
03	HORNED GREBE	PODICEPS AURITUS
05	HORNED LARK	EREMPOPHILA ALPESTRIS
09	HOUSE FINCH	CARPODACUS MEXICANUS
14	HOUSE SPARROW	PASSER DOMESTICUS
14	HOUSE WREN	TROGLODYTES AEDON
03	KILLDEER	CHARADRIUS VOCIFERUS
05	LARK SPARROW	CHONDESTES GRAMMACUS
07	LAZULI BUNTING	PASSERINA AMOENA
03	LEAST SANDPIPER	CALIDRIS MINUTILLA
07	LESSER GOLDFINCH	CARDUELIS PSALTRIA
03	LESSER SCAUP	AYTHYA AFFINIS
03	LESSER SNOW GOOSE	CHEN CAERULESCENS CAERULESCENS
03	LESSER YELLOWLEGS	TRINGA FLAVIPES
13	LEWIS WOODPECKER	MELANERPES LEWIS
06	LINCOLNS SPARROW	MELOSPIZA LINCOLNII
07	LOGGERHEAD SHRIKE	LANIUS LUDOVICIANUS
03	LONG-BILLED CURLEW	NUMENIUS AMERICANUS
03	LONG-BILLED DOWITCHER	LIMNODROMUS SCOLOPACEUS
11	LONG-EARED OWL	ASIO OTUS
07	MACGILLIVRAYS WARBLER	OPORORNIS TOLMIEI
03	MALLARD	ANAS PLATYRHYNCHOS
03	MARBLED GODWIT	LIMOSA FEDOA
05	MARSH HAWK	CIRCUS CYANEUS
03	MARSH WREN	CISTOTHORUS PALUSTRIS
11	MERLIN	FALCO COLUMBARIUS
14	MOUNTAIN BLUEBIRD	SIALIA CURRUCOIDES
14	MOUNTAIN CHICKADEE	PARUS GAMBELI
05	MOUNTAIN QUAIL	OREORTYX PICTUS
11	MOURNING DOVE	ZENAIDA MACROURA
06	NASHVILLE WARBLER	VERMIVORA RUFICAPILLA
05	NORTHERN JUNCO	JUNCO HYEMALIS
09	NORTHERN ORIOLE	ICTERUS GALBULA
03	NORTHERN SHOVELER	ANAS CLY PEATA
07	NORTHERN SHRIKE	LANIUS EXCUBITOR
13	NORTHERN THREETOED WOODPECKER	PICOIDES TRIDACTYLUS
10	OLIVE-SIDED FLYCATCHER	NUTTALLORNIS BOREALIS
06	ORANGE-CROWNED WARBLER	VERMIVORA CELATA

12	OSPREY	PANDION HALIAETUS
04	PEREGRINE FALCON	FALCO PEREGRINUS
03	PIED-BILLED GREBE	PODILYMBUS PODICEPS
14	PIGMY OWL	GLAUCIDIUM GNOMA
13	PILEATED WOODPECKER	DRYOCOPUS PILEATUS
11	PINE GROSBEAK	PINICOLA ENUCLEATOR
11	PINE SISKIN	CARDUELIS PINUS
10	PINYON JAY	GYMNORHINUS CYANOCEPHALUS
04	PRAIRIE FALCON	FALCO MEXICANUS
11	PURPLE FINCH	CARPODACUS PURPUREUS
13	PYGMY NUTHATCH	SITTA PYGMAEA
10	RED CROSSBILL	LOXIA CURVIROSTRA
14	RED-BREASTED MERGANSER	MERGUS SERRATOR
13	RED-BREASTED NUTHATCH	SITTA CANADENSIS
11	RED-EYED VIREO	VIREO OLIVACEUS
13	RED-NAPPED SAPSUCKER	SPHYRAPICUS VARIUS
12	RED-TAILED HAWK	BUTEO JAMAICENSIS
07	RED-WINGED BLACKBIRD	AGELAIUS PHOENICEUS
03	REDHEAD	AYTHYA AMERICANA
03	RING-BILLED GULL	LARUS DELAWARENSIS
03	RING-NECKED DUCK	AYTHYA COLLARIS
05	RING-NECKED PHEASANT	PHASIANUS COLCHICUS
04	ROCK DOVE	COLUMBA LIVIA
04	ROCK WREN	SALPINCTES OBSOLETUS
16	ROUGH-WINGED SWALLOW	STELGIDOPTERYX RUFICOLLIS
12	ROUGHLEGGED HAWK	BUTEO LAGOPUS
10	RUBY-CROWNED KINGLET	REGULUS CALENDULA
03	RUDDY DUCK	OXYURA JAMAICENSIS
05	RUFFED GROUSE	BONASA UMBELLUS
11	RUFOUS HUMMINGBIRD	SELASPHORUS RUFUS
07	RUFOUS-SIDED TOWHEE	PIPILO ERYTHROPHTHALMUS
05	SAGE GROUSE	CENTROCERCUS UROPHASIANUS
07	SAGE SPARROW	AMPHISPIZA BELLI
07	SAGE THRASHER	OREOSCOPTES MONTANUS
03	SANDERLING	CALIDRIS ALBA
03	SANDHILL CRANE	GRUS CANADENSIS
05	SAVANNAH SPARROW	PASSERCULUS SANDWICHENSIS
14	SAW-WHET OWL	AEGOLIUS ACADICUS
04	SAYS PHOEBE	SAYORNIS SAYA
14	SCREECH OWL	OTUS ASIO
11	SHARP-SHINNED HAWK	ACCIPITER STRIATUS
05	SHORT-EARED OWL	ASIO FLAMMEUS
03	SMALL CANADA GOOSE	BRANTA CANADENSIS LEUCOPAREIA
06	SNOW BUNTING	PLECTROPHENAX NIVALIS
12	SNOWY EGRET	EGRETTA THULA
11	SOLITARY VIREO	VIREO SOLITARIUS
07	SONG SPARROW	MELOSPIZA MELODIA
03	SPOTTED SANDPIPER	ACTITIS MACULARIA
14	STARLING	STURNUS VULGARIS
11	STELLERS JAY	CYANOCITTA STELLERI
07	SWAINSONS HAWK	BUTEO SWAINSONI
07	SWAINSONS THRUSH	CATHARUS USTULATUS
06	TOWNSEND'S SOLITAIRE	MYADESTES TOWNSENDI
10	TOWNSENDS WARBLER	DENDROICA TOWNSENDI

07	TREE SPARROW	SPIZELLA ARBOREA
14	TREE SWALLOW	IRIDOPROCNE BICOLOR
03	TRUMPETER SWAN	OLOR BUCCINATOR
05	TURKEY	MELEAGRIS GALLOPAVO
04	TURKEY VULTURE	CAJHARTES AURA
11	VARIED THRUSH	IXOREUS NAEVIUS
14	VAUXS SWIFT	CHAETURA VAUXI
05	VEERY	CAJHARUS FUSCESCENS
05	VESPER SPARROW	POOECETES GRAMINEUS
14	VIOLET-GREEN SWALLOW	TACHYCINETA THALASSINA
11	WARBLING VIREO	VIREO GILVUS
05	WATER PIPIT	ANTHUS SPINOLETTA
14	WESTERN BLUEBIRD	SIALIA MEXICANA
10	WESTERN FLYCATCHER	EMPIDONAX DIFFICILIS
03	WESTERN GREBE	AECHMOPHORUS OCCIDENTALIS
11	WESTERN KINGBIRD	TYRANNUS VERTICALIS
05	WESTERN MEADOWLARK	STURNELLA NEGLECTA
03	WESTERN SANDPIPER	CALIDRIS MAURI
10	WESTERN TANAGER	PIRANGA LUDOVICIANA
11	WESTERN WOOD PEEWEE	CONTOPUS SORDIDULUS
03	WHISTLING SWAN	OLOR COLUMBIANUS
03	WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS
13	WHITE-BREASTED NUTHATCH	SITTA CAROLINENSIS
07	WHITE-CROWNED SPARROW	ZONOTRICHIA LEUCOPHRYS
03	WHITE-FRONTED GOOSE	ANSER ALBIFRONS
13	WHITE-HEADED WOODPECKER	PICOIDES ALBOLARVATUS
03	WILLET	CATOPTROPHORUS SEMIPALMATUS
13	WILLIAMSONS SAPSUCKER	SPHYRAPICUS THYROIDEUS
11	WILLOW FLYCATCHER	EMPIDONAX TRAILLII
05	WILSONS WARBLER	WILSONIA PUSILLA
03	WINTER WREN	TROGLODYTES TROGLODYTES
14	WOODDUCK	AIX SPONSA
08	YELLOW WARBLER	DENDROICA PETECHIA
08	YELLOW-BREASTED CHAT	ICTERIA VIRENS
07	YELLOW-HEADED BLACKBIRD	XANTHOCEPHALUS XANTHOCEPHALUS
10	YELLOW-RUMPED WARBLER	DENDROICA CORONATA

MAMMALS

15	BADGER	TAXIDAE TAXUS
16	BEAVER	CASTOR CANADENSIS
15	BELDING GROUND SQUIRREL	SPERMOPHILUS BELDINGI
14	BIG BROWN BAT	EPTESICUS FUSCUS
15	BLACK BEAR	URSUS AMERICANUS
05	BLACK-TAILED JACKRABBIT	LEPUS CALIFORNICUS
04	BOBCAT	LYNX RUFUS
04	BUSHY-TAILED WOODRAT	NEOTOMA CINEREA
14	CALIFORNIA MYOTIS	MYOTIS CALIFORNICUS
04	CANYON MOUSE	PEROMYSCUS CRINITUS
15	COAST MOLE	SCAPANUS ORARIUS
15	COYOTE	CANIS LATRANS
15	DARK KANGAROO MOUSE	MICRODIPODOPS MEGACEPHALUS
15	DEER MOUSE	PEROMYSCUS MANICULATUS
10	DOUGLAS SQUIRREL	TAMIASCIURUS DOUGLASII

05	FERAL HORSE	EQUUS SPP
05	FERAL HOUSE CAT	FELIS SPP
14	FRINGED MYOTIS	MYOTIS THYSANODES
15	GOLDEN MANTLED GROUND SQUIRREL	SPERMOPHILUS LATERALIS
15	GREAT BASIN POCKET MOUSE	PEROGNATHUS PARVUS
15	HEATHER VOLE	PHENACOMYS INTERMEDIUS
11	HOARY BAT	LASIURUS CINEREUS
15	HOUSE MOUSE	MUS MUSCULUS
15	LEAST CHIPMUNK	EUTAMIAS MINIMUS
14	LITTLE BROWN MYOTIS	MYOTIS LUCIFUGUS
14	LONG-EARED MYOTIS	MYOTIS EVOTIS
14	LONG-LEGGED MYOTIS	MYOTIS VOLANS
15	LONG-TAILED VOLE	MICROTUS LONGICAUDUS
15	LONGTAIL WEASEL	MUSTELA FRENATA
14	MARTEN	MARTES AMERICANA
15	MERRIAM SHREW	SOREX MERRIAMI
16	MINK	MUSTELA VISON
15	MONTANE VOLE	MICROTUS MONTANUS
15	MOUNTAIN COTTONTAIL	SYLVILAGUS NUTTALLI
04	MOUNTAIN LION	FELIS CONCOLOR
16	MUSKRAT	ONDATRA ZIBETHICUS
14	NORTHERN FLYING SQUIRREL	GLAUCOMYS SABRINUS
15	NORTHERN GRASSHOPPER MOUSE	ONYCHOMYS LEUCOGASTER
15	NORTHERN POCKET GOPHER	THOMOMYS TALPOIDES
15	ORD KANGAROO RAT	DIPODOMYS ORDI
04	PALLID BAT	ANTROZOUS PALLIDUS
04	PINON MOUSE	PEROMYSCUS TRUEI
15	PINON MOUSE	PEROMYSCUS TRUEI
06	PORCUPINE	ERETHIZON DORSATUM
05	PRONGHORN ANTELOPE	ANTILOCAPRA AMERICANA
15	PYGMY RABBIT	SYLVILAGUS IDAHOENSIS
14	RACCOON	PROCYON LOTOR
16	RIVER OTTER	LUTRA CANADENSIS
05	ROCKY MOUNTAIN ELK	CERVUS ELAPHUS NELSONI
05	ROCKY MOUNTAIN MULE DEER	ODOCOILEUS HEMIONUS HEMIONUS
15	SAGEBRUSH VOLE	LAGURUS CURTATUS
15	SHORTTAIL WEASEL	MUSTELA ERMINEA
14	SILVER-HAIRED BAT	LASIONYCTERIS NOCTIVAGANS
04	SMALL-FOOTED MYOTIS	MYOTIS LEIBI
05	SNOWSHOE HARE	LEPUS AMERICANUS
15	SOUTHERN RED-BACKED MOUSE	CLETHIONOMYS GAPPERI
15	SPOTTED SKUNK	SPILOGALE PUTORIUS
15	STRIPED SKUNK	MEPHITIS MEPHITIS
04	TOWNSEND BIG-EARED BAT	PLECOTUS TOWNSENDI
15	TOWNSEND GROUND SQUIRREL	SPERMOPHILUS TOWNSENDI
15	VAGRANT SHRES	SOREX VAGRANS
16	WATER SHREW	SOREX PALUSTRIS
16	WATER VOLE	MICROTUS RICHARDSON1
15	WESTERN HARVEST MOUSE	REITHRODONTOMYS MEGALOTIS
03	WESTERN JUMPING MOUSE	ZAPUS PRINCEPS
04	WESTERN PIPISTRELLE	PIPISTRELLUS HESPERUS
05	WHITE-TAILED JACKRABBIT	LEPUS TOWNSENDI
04	YELLOW-BELLIED MARMOT	MARMOTA FLAVIVENTRIS
15	YELLOW-PINE CHIPMUNK	EUTAMIAS AMOENUS
14	YUMA MYOTIS	MYOTIS YUMANENSIS

APPENDIX P Ranch Budgets: Linear Programming Process

A survey of ranchers using BLM-produced forage in Crook and Deschutes Counties was conducted by the USDA Economics and Statistics Service, with assistance by Tom Bunch of the Cooperative Extension Service. Representative budgets were constructed for cattle-calf operations based on typical feed-buying patterns, use of BLM-produced forage, pasture and hay use, use of supplemental protein, fuel, hired labor, and other factors of production (Gee, 1982). The value of sales was based on average price in each sales category for the 1978-80 period. Cost estimates were based on local data when available. A simulated profit maximization operation linear program model was constructed based on budget data.

The model -optimizes the return above cash cost for the rancher, taking into account physical limitations of the operation and price constraints. The model incorporates influence of seasonal variations in public forage and feed or rangeland availability.

Table P-2 shows the ranch budgets developed for each herd size class. Table P-l shows the results of the linear program analysis.

Table P-l Major Elements of Ranch Budgets for Proposed Action and Alternative Actions'

		Proposed Action		Alternative 1			
	Existing Condition2	Short Term	Long Term	Short Term	Long Term	AH. 33	AH. 43
LESS THAN 100 ANIMALS							
Gross income	$15,234	$15,860	$17,044	$15,860	$19,018	$15,333	$13,441
Total cash costs	8,150	8,499	9,176	8,499	10,304	8,249	7,718
Value of family labor	3,200	3,331	3.580	3,331	3,994	3,239	2,823
Depreciation	1.967	1,985	2,017	1,985	2,071	1,972	1,918
Interest on investment other than land	5,057	5,220	5,528	5,220	6,042	5,105	4,590
Return above cash costs	7,084	7,361	7,868	7,361	8,714	7,084	5,723
100 to 399 ANIMALS							
Gross income	$63,364	$66,133	$73,596	$66,143	$85,038	$62,787	$53,814
Total cash costs	36,327	37,994	42,488	37,999	49,377	35,980	30,576
Value of family labor	8,040	8,391	9,338	8,392	10,790	7,967	6,828
Depreciation	6,768	6,859	7,109	6,861	7,486	6.749	6,451
Interest on investment other than land	21,124	21,912	24,034	21,914	27,289	20,960	18,408
Return above cash costs	27,037	28,139	31,108	28,144	35,661	26,807	23,238

Table P-I Major Elements of Ranch Budgets for Proposed Action and Alternative Actions'

	Existing Condition[2]	Proposed Action Short Term	Proposed Action Long Term	Alternative 1 Short Term	Alternative 1 Long Term	Alt. 33	Alt. 43
400 to 999 ANIMALS							
Gross income	$186,253	$193,927	$216,651	$194,194	$258,656	$182,035	$159,826
Total cash costs	113,350	118,144	132,344	118,311	158,592	110,713	96,836
Value of family labor	19,489	20,292	22,670	20,320	27,065	19,047	16,724
Depreciation	18,413	18,673	19,441	18,682	20,962	18,271	17,519
Interest on investment other than land	62,689	64,937	71,594	65,015	83,898	61,453	54,950
Return above cash costs	**72,903**	75,783	84,307	75,883	100,064	71,322	62,990
1,000 OR MORE ANIMALS							
Gross income	$870,270	$892,417	**$950,363**	$893,067	$1,000,501	$853,998	$805,154
Total cash costs	557,256	572,213	611,345	572,652	645,205	546,267	513,282
Value of family labor	30,855	31,641	33,695	31,664	35,473	30,279	28,547
Depreciation	87,077	87,894	90,034	87,918	91,885	86,476	84,673
Interest on investment other than land	313,547	320.583	338,990	320,789	354,917	308,378	292,863
Return above cash costs	313,014	320,204	339,019	320.415	355,296	307,731	291,872

[1] Dr Kerry Gee, U S. Dept of Agriculture, Economics and Statistics Service, Linear Program Analysis for Brothers EIS Area, 1982.
[2] No action condition (Alternative 2) considered same as existing condition.
[3] Short and long term conditions are the same for this alternative.

Table P-2 Costs and Returns for Livestock Operators by Herd Size[1]

	Under 100 Cows[2]		100-399 Cows[3]		400-999 COWS'[4]		1,000 or More Cows[5]	
Livestock Sales Quantity	**Number**	**Av. Weight**	**Number**	**Av. Weight**	**Number**	**Av. Weight**	**Number**	**Av. Weight**
Steer calves	3	425	38	425	150	410	484	410
Heifer calves	3	375	23	375	68	360	419	360
Yearling steers	16	745	47	745	1 0 8	730	725	730
Yearling heifers	9	625	26	625	81	680	241	680
Cull cows	6	975	30	975	91	950	428	950
Livestock Sales Value	**Price/Cwt.**	**Value**	**Price/Cwt.**	**Value**	**Price/Cwt.**	**Value**	**Price/Cwt.**	**Value**
Steer calves	80.67	1,029	80.67	13.028	80.67	49,612	80.67	160,082
Heifer calves	66.33	746	66.33	5,721	66.33	16.238	66.33	loo.052
Yearling steers	63.58	7,579	63.58	22,263	63.58	50.126	63.58	336.497
Yearling heifers	59.75	3.361	59.75	9.709	59.75	32,910	5975	97.918
Cull cows	43.22	2,528	43.22	12,642	43.22	37,364	43.22	175,733
Total		15,243		63,363		186,250		570.282
Total/cow		346.43		318.41		308.87		284.87
Cash Costs	**Total Amt.**	**Amt./Cow**	**Total Amt.**	**Amt./Cow**	**Total Amt.**	**Amt./Cow**	**Total Amt.**	**Amt./Cow**
BLM grazing fee	179	4.08	727	3.65	2.058	3.41	5.581	183
Forest grazing fee	36	.82	145	.73	925	1.53	11.433	3.74
Private range lease/rent			1.056	531	3,280	5.44	14.428	4.72
State lease	--		--		--	--	--	--
Hay (produce)	2,302	52.32	7.491	37.64	25,196	4178	130,754	42.80
Hay (purchase)		--	4.027	20.24	11.894	1972	53.536	17.52
Protein supplement	534	12.13	575	2.89	4,227	7.01	15.575	5 10
Irrigated pasture	419	9.51	936	470	421	70	2.094	.69
Salt and mineral	a6	1.97	393	1.97	1,170	1.94	6.020	1.97
Concentrate feeds			--	--	--	--	--	--
Veterinary and medicine	317	7.20	1,761	8.85	3,618	6.00	17.108	5.60
Hired trucking	76	1.72	100	.50	603	1.00	6.415	2.10
Marketing	88	2.01	66	.33	1,507	2.50	6.813	223
Fuel and lubricants	607	13.80	2,386	11.99	7,947	13.18	48.045	15.73
Repairs	625	14.20	2.175	10.93	6.612	10.96	32,792	10.73
Taxes	1,600	36.37	5,900	29.65	15.191	2519	64,293	21.05
Insurance	291	6.62	1.132	594	3.575	5.93	17,641	5.77
Inierest on operating capital	546	12.41	2.316	11.64	7,112	11.79	33.516	10.97
General farm overhead	430	9.77	1,859	9.34	6.030	10.00	16,986	5.56
Other cash costs		--	--	--		--	--	--
Hired labor		--	3,216	16.16	12.059	20.00	74.053	24.24
Total cash costs	8,136	184.91	36.311	182.47	113.425	188.10	557.083	182.35
Other costs:								
Family labor	3,200	72.72	a.040	40.40	19,489	32.32	30.853	10.10
Depreciation	1.967	4471	6.768	34.01	18,413	3054	87.077	28.50
Interest on investment other than land	5.057	114.93	21,124	106.15	62.689	10396	313.548	102.63
Interest on land	15,715	357.17	58.531	294.13	150.176	249.05	633,818	20747
Total other costs	25,939	589.52	94,463	474.69	250,767	41587	1.065296	348.71
Total all costs	34,075	774.43	130.774	657.16	364.192	603.97	1.622.379	531.06
Return above cash costs	7,107	161.52	27,052	135.94	72.825	120.77	313.199	102.52
Return above cash costs and family labor	3.907	88.80	19.012	95.54	53.336	8845	282.346	9242
Return to total investment	1,940	44.09	12.243	6153	34,923	5792	195.269	6392
Return to land	-3,117	-70.84	-8,880	-44.62	-27.766	-46.05	-118,279	-38.72

[1] Kerry Gee. U.S. Department of Agriculture, Ranch Budgets for Brothers EIS Area. 1962

[2] Average nerd 44 cows. 92% calf crop based on Jan. 1 bred cow Inventory. 5% calf loss birth to weaning. 3% annual cow loss. 20% replacement rate cattle and ourchased hav, prices 1978-80 averaaes. all other prices 1980 annual feed sources 12% BLM. 2% Forest Serwce. 34% deeded range 15% irrigated pasture, 9% crop residue. 27% produced hay, 1% protein supplement. real estate valued on an AU basis

[3] Average herd 199 cows. 90% calf crop base on Jan. 1 bred cow Inventory. 5% calf loss birth lo weaning 3% annual cow loss. 20% replacement rate. cattle and ourchased hav, prices 1978-80 averaoes. all other cost 1980. annual feed sources 11% BLM. 2% Forest Serwce 41% deeded range 4% private lease, 6% irrigated pasture, 8% crop residue, 21% hay produced, 5% hay purchased, real estae valued on an AU basis

[4] Average herd 603 cows. 90% calf crop based on Jan 1 bred cow inventory. 5% calf loss birth lo weaning. 3% annual cow loss 20% replacement rate. 20 cows per bull. cattle and purchased hay prices 1978-80 averages, all other costs 1960. annual feed sources 10% BLM. 4% Forest Serwce 45% deeded range, 4% private lease. 1% irrigated pasture, 7% crop residue, 23% produced hay. 5% purchased hay. 1% protein supplement. real estate valued on an AU basis.

[5] Average herd 3.055 cows. 66% calf crop based on Jan 1 bred cow Inventory. 10% calf loss birth lo weaning. 4% annual cow loss. 20% replacement rate 20 cows per bull. cattle and purchased hay price 1978-80 averages all other costs 1980 annual feed sources 6% BLM 1% Forest Service 45% deeded range, 4% private lease, 1% irrigated pasture, 4% crop residue, 23% produced hay. 5% purchased hay. 1% protein supplement real estate valued on an AU basis.

APPENDIX Q Estimates of Gross Sales, Personal Income, and Employment

These measures were estimated by use of an interindustry computer model developed by the U.S. Forest Service, representing the economy of Crook and Deschutes Counties.

An interindustry (or input-output) model is a summary of all the transactions occurring in an area during a one-year period, showing for each industry or economic sector the amount of its purchases from each industry (inputs) and the amount of its sales to each 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 relationships between these end results and the initial changes in sales or gross margins are shown in Table Q-l as ratios of the initial amount. Also shown are the estimated values of physical units such as AUMs, board-feet, and activity-days by which the physical quantities were converted to economic terms.

Table Q-l Economic Relationships

Nature of Activity	Physical Measure	Initial Values Per Physical Unit: Gross Sales[2]	Initial Values Per Physical Unit: Gross Margins[3]	Direct Personal Income	Direct Employment	Total Gross Sales	Total Personal Income	Total Employment
Livestock production	AUM	$25.50	$ 25.50	.2287	.0464	2.406	.7683	.1100
Timber production	1,000 b.f.	273.86	273.86	.2844	.0189	1.872	.6322	.0472
Big game hunting	Hunterday	17.62	a.36	.7571	.1215	2.114	1.2665	.1711
Waterfowl hunting	Hunter-day	12.92	6 46	.7403	.1134	2.044	1.2182	.1598
Upland game hunting	Hunter-day	12.17	6.40	.7462	.1153	2.059	1.2312	1624
Warm water fishing	Angler-day	10.90	6.21	7389	.1171	NA	1.3012	.1676
Cold water fishing	Angler-day	10.93	5.14	7385	.1349	2.225	1.3488	.1895
Recreational day use	Visitor-day	9.94	4.80	.7424	.0983	1.905	1.1562	1386
Camping	Visitor-day	5.35	2.99	.7428	.0935	1.861	1.1366	.1318

[1] Derived from inter-industry model for Crook and Deschutes Counties
[2] Livestock sales value dewed from ranch budget study as total gross income (in 1978-80 average prices) divided by total forage requirements. Timber value obtamed from Forest Service RARE II study (1977 data). Sales Per day estimates for recreational activities derived from BLM Brothers Planning Area Resource Industry Analysis and adjusted to 1978 price levels.
[3] Gross margins represent the portion of gross sales remaining after deducting the cost of goods sold from sales by retail trade industries. Estimates of Industry gross margins were obtamed from the Survey of Current Business. Feb. 1974. pp 30-32, and applied to estimates of expenditures by Industry for each recreational activity as contained in the Brothers Planning Area Analysis

APPENDIX R Effect of Change in Forage Availability on Ranch Value

The amount of forage available to a ranch operation is an important component of ranch value. Table R-1 shows by size of change in ranch value, the number of operators affected for the proposed action and alternatives 1 and 3. Table R-2 shows the same information for alternative 4.

Table R-l Number of Operators with Change in Ranch Value (Changes based on assumed value of $45 per AUM active preference)

Change in Ranch Value	Proposed Action		Alternative 1		Alt. 3
	Short Term	Long Term	Short Term	Long Term	
HERD SIZE - UNDER 100 ANIMAL UNITS					
Loss over $5,000					1
-$1,000 to -$4,900	2	1	2		5
Change under ± $1,000	35	22	34	20	32
Gail under $5,000	7	16	8	15	6
+$5,000 to +9,900	2	4	2	4	2
+$10,000 to +$19,900		3		3	
+20,000 to +$49,900				3	
+50,000 or more					
HERD SIZE - 100 to 399 ANIMAL UNITS					
Loss over $10,000					4
-$5,000 to $9,900	1				3
-$1,000 to -$4,900	1		1		9
Change under ± $1,000	21	8	22	6	16
Gain under $5,000	8	11	8	6	2
+$5,000 to +9,900	23	6	3	9	2
+$10,000 to +$19,900	5	5	5	3	3
+20,000 to +$49,900		7		9	
+50,000 to +$99,900		1		2	
+$100,000 to +$199,900		1		4	
+$200,000 or more					
HERD SIZE - 400 to 999 ANIMAL UNITS					
Loss over $10,000				-	3
-$5,000 to $9,900	1				4
-$1,000 to -$4,900	3	1	3	1	9
Change under ± $1,000	5	5	5	-	4
Gain under $5,000	4		5	3	3
+$5,000 to +9,900	3	2	3	3	1
+$10,000 to +$19,900	4	8	4	6	-
+20,000 to +$49,900	3	3	3	4	1
+50,000 to +$99,900	2	2	2	-	
+$100,000 to +$499,900		4		6	-
+$500,000 to +$999,000				2	-
+$1 million or more					

HERD SIZE - 1,000 OR MORE ANIMAL UNITS

Loss over $50,000	-	-	-	-	1
-$20,000 to -$49,900	-	-	-	-	2
-$10,000 to -$19,900	-	-	-	-	1
-$5,000 to -$9,900		-	-	-	2
-$1,000 to -$4,900	-		-		1
Change under ± $1,000	3	1	2	-	1
Gain under +$5,000	-		-	1	-
+$5,000 to +9,900	-	1	1	-	-
+$10,000 to +$19,900	3	-	3	1	-
+20,000 to +$49,900	1	2	1	1	1
+50,000 to +$99,900	1	2	1	-	-
+$100,000 to +$499,900	1	3	1	5	-
+$500,000 to +$999,000		-	-	1	-
+$1 million or more-	-	-		-	

[1] Effects of alternative 3 are same for both short and long term.

Table R-2 Number of Operators with Loss in Ranch Value under Alternative 4 - Eliminate Livestock (Calculated on assumed value of $45 per AUM active preference)

Implied Loss in Ranch Value	Under 100 Animals	100-399 Animals	400-999 Animals	1,000 or More Animals	Total
Under $1000	18	2	1	0	21
$ 1,000 - 4,900	17	7	5	0	29
$ 5,000 - 9,900	6	5	3	1	15
$ 10,000 - 19,900	3	9	1	1	14
$ 20,000 - 29,900	2	13	2	1	18
$ 30,000 - 39,900	0	2	4	0	6
$ 40,000 - 49,900	0	0	2	0	2
$ 50,000 - 99,900	0	1	3	0	4
$100.000 - 199,000	0	0	4	4	8
$200,000 - 299,000	0	0	0	0	0
$300,000 - 399,000	0	0	0	1	1
$400,000 - 499,000	0	0	0	1	1
Total	46	39	25	9	119

GLOSSARY

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

ACTIVE GRAZING PREFERENCE. That portion of the total grazing preference for which grazing use may be authorized.

ACTUAL USE. The use made of forage on any area by livestock and/or wildlife without reference to permitted or recommended use. It is usually expressed in terms of animal-unit months or animal-units.

ADVERSE IMPACT. Conditions would decline relative to existing situation.

ALLOTMENT. An area of land where one or more livestock operators graze their livestock. Generally consists of public land but may include parcels of private or state lands. 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 period of use, the number of livestock to be permitted on the range and the range improvements needed.

ALLUVIAL SOIL. A soil developing from recently deposited alluvium and showing essentially no development of layers or modification of the recently deposited materials.

ANIMAL UNIT MONTH (AUM). The amount of forage required to sustain one cow with one calf, or their equivalent for one month (800 pounds of forage).

ANNUAL VEGETATIVE GROWTH. The total amount of vegetative matter produced during one growing season

ANNUAL FORAGE PRODUCTION. That portion of the current year's palatable vegetative growth which is available to be utilized by grazing animals.

AVAILABLE FORAGE. That portion of the total forage, usually consisting of grasses and forbs. available for use by livestock and wildlife.

AVAILABLE SOIL MOISTURE. The portion of water in a soil that can be absorbed by plant roots, commonly defined as the difference between the amount of water at field capacity and the amount at wilting point. Commonly expressed as inches of water per inch of soil.

BENEFICIAL IMPACT. Conditions would improve relative to existing situation.

CHANNEL STABILITY RATING. The relative capacity of a stream to resist erosion. The rating includes the evaluation of the upper banks, lower banks, and stream bottom.

CHARACTERISTIC LANDSCAPE. The established landscape within an area being viewed This does not necessarily mean a natural character. It could refer to a farming community. an urban landscape, or a primarily natural environment.

CLIMAX. The final or stable biotic community in a successional series; it is usually self perpetuating and in equilibrium with the physical habitat (Artz, 1980). This corresponds to 76 to 100 percent of the plant composition found in the potential natural plant community. Synonomous with excellent range condition.

COMPOSITION. The proportion of various species in relation to the total for a given area.

CRITICAL GROWING PERIOD. The portion of a plant's growing season, generally between flowering and seed dissemination, when food reserves are being stored and seeds produced.

CRITICAL WATERSHED. Those watersheds whose water is utilized for other than livestock use. Also watersheds contributing excessive amounts of sediment.

CRITICAL WILDLIFE HABITAT. The area of land, water and airspace required for the normal needs and survival of an endangered species.

CRUCIAL WILDLIFE HABITAT. Parts of the habitat necessary to sustain a wildlife population at critical periods of its life cycle. This is often a limiting factor on the population, such as breeding habitat, winter habitat, etc.

CULTURAL RESOURCES. Includes resources of archaeologic or historic significance which are fragile, limited, and non-renewable.

EARLY-SERAL. Ecological condition class corresponding to 0 to 25 percent of the plant composition found in the potential natural plant community. Synonomous with poor range condition.

ECOLOGICAL CONDITION. The present state of vegetation of a range site in relation to the potential nature of the plant community for the site. It is an expression of the relative degree to which the kinds, proportions and/or amounts of plants in a plant community resemble that of the climax plant community.

ECOSYSTEM. An ecological community together with its physical environment. Its functioning involves the circulation of matter and energy between organisms and their environment.

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

EXCLOSURE. An area fenced to exclude livestock

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).

FORB. Any non grasslike herbaceous plant

GRAZING SYSTEM. As used in this document, the manipulation of livestock grazing to accomplish a desired result.

GROUNDWATER. Subsurface water that is in the zone of saturation.

HABITAT. A specific set of physical conditions that surround a species. group of species or a large community. In wildlife management, the major constituents of habitat are considered to be food, water, cover and living space.

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

HABITAT TYPE. The collective area which one plant association occupies or will come to occupy as succession advances. The habitat type is defined and described on the basis of the vegetation and associated environment. (Artz, 1980)

HERBACEOUS. Relating to the non-persistent, non-woody growth of plants.

IMPACT. A change in the environment caused by the proposed action or alternatives.

INFILTRATION. The gradual downward flow of water from the surface into the soil profile.

LAND TREATMENT. All methods of artificial range improvement and soil stabilization such as reseeding, brush control (chemical fire, and mechanical), pitting, furrowing, waterspreading, etc.

LATE-SERAL. Ecological condition class corresponding to 51 to 75 percent of the plant composition found in the potential natural plant community. Synonymous with good range condition.

LIFE FORM. A group of wildlife species whose requirements for habitat are satisfied by similiar successional stages within given plant communities.

LITTER. A surface layer of loose, organic debris, consistingof freshly fallen or slightly decomposed organic materials.

LONG TERM. Ten to fifteen years following implementatron of features of proposed action or alternatives.

MANAGEMENT ACTIVITY. An activity of man placed or undertakenon the landscape for the purpose of harvesting, traversing, transporting, protecting, changing or replenishing natural resources.

MANAGEMENT FRAMEWORK PLAN (MFP). A BLM planning decision document that establishes, for a given planning area, land use allocations coordination guidelines for multiple use, and management objectives to be achieved for each class of land use protection.

(BLM 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.)

MID-SERAL. Ecological condition class corresponding tc 25 to 50 percent of the composition found in the potential natural plant community. Synonymous with fair range condition.

MULTIPLE USE. The management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people. This Includes but is not limited to recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic. scientific and historical values.

NON-CONSUMPTIVE USE. A use of vegetation which does not consume. alter, or destroy that resource: i.e., sightseeing, photography, hiking, soil protection.

PALEONTOLOGY. Science dealing with the life of past geologic 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.

PERCHED WATERTABLE. A perched water-table is a saturated area below the surface and above the major aquifer.

PERENNIAL STREAM. A stream or portion of a stream that flows year long. It receives water from precipitation. springs. melting snow and/or ground-water.

PERIOD OF USE. The time of livestock grazing on a range area.

PERMIT (GRAZING). An authorization that permits the grazing of a specified number and kind of livestock on a designated area of BLM lands for a period of time. usually not more than one year.

PLANT DIVERSITY. The relative number of dissimilar plants in a given area. A monoculture, such as a seeding, would have low plant diversity, while a native sagebrush-bunchgrass community in mid-seral ecological condition would be said to have high plant diversity due to the large number of dissimilar plants.

PLANT SUCCESSION. The process of vegetative development whereby an area becomes successively occupied by different plant communities of higher ecological orders.

PROTECTIVE GROUND COVER. See watershed cover.

RANGELAND IMPROVEMENT. A structure, action or practice that increases forage production. improves watershed and ecological condition or facilitates management of the range or the livestock grazing on it.

REPRESENTATIVE AREA. An area within a pasture used to determine livestock utilization. In pastures where utilization is consistently uniform the representative area may include most of the pasture. In pastures where utilization vanes considerably; the representative area may be many smaller areas scattered throughout, which are indicative of average utilization. These areas would be established prior to AMP development and would be tailored to each allotment.

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 floristic 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 cover that remains after livestock grazing.

RIPARIAN. Related to wet areas associated with streams, springs, seeps, meadows and reservoirs.

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. Soil, rock particles and organic or other debris carried from one place to another by wind, water or gravity.

SENSITIVE SOIL. Soils whose physical properties and geographic location are such that they are potentially highly erodible or very productive.

SERAL COMMUNITY. A successional community.

SERAL STAGE. See early-seral. mid-seral. late-seral, or climax.

SHORT TERM. The one to two year period following implementation of features of proposed action or alternatives.

SOIL. The unconsolidated mineral material on the immediate surface of the earth that serves as a natural medium for the growth of land plants,

SOIL MOISTURE. Water held in the root zone by capillary action. Part of the soil moisture is available to plants, part is held too tightly by capillary or molecular forces to be removed by plants.

SOIL PRODUCTIVITY. Capacity of a soil, in its noraml environment. for producing specified plants under specified management systems.

SOIL SERIES. The basic unit of soil classification, being a subdivision of a family and consisting of soil which are essentially alike in all major profile characteristics except in the texture of the "A" horizon (or surface layer).

SOIL SURFACE FACTOR (SSF). An expression of current erosion activity. Seven categories of surface features are considered in the examination of the area with both wind and water being considered for each category. The categories are: soil movement, surface litter, surface rock, pedestaling, rills, flow patterns and gullies. Numerical values are assigned to each category, and these are totaled to determine the SSF. This value determines the erosion condition class of the area.

THERMAL COVER. Vegetation or topography that prevents wildlife raditation heat loss, reduces wind chill during cold weather, and intercepts solar radiation during warm weather.

TOTAL SUSPENDED PARTICULATE (TSP). Air borne suspended solid and liquid particles of soot, dust aerosols and fumes averaging about 2 microns in size (1 micron = 1/2 540").

UNALLOTTED LANDS. Public lands which currently have no authorized livestock grazing.

UNALLOCATED FORAGE. Available forage which has not been allocated to livestock or wildlife, but could be.

UNIT RESOURCE ANALYSIS (URA). A BLM planning document of physical resource data and an analysis of the current use, production, condition and trend of the resources and the potentials and opportunities within a BLM planning unit. including a profile of ecological values.

UPLAND. All rangelands other than riparian or wetland areas

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: slight (0-20%), light (21-40%), moderate (41-66%), heavy (61-80%), and severe (81-100%).

VEGETATIVE POTENTIAL. Plant composition and vegetative production which would occur on a given soil if the vegetation were in climax condition.

VEGETATION ALLOCATION. In reference to forage, the distribution of the available forage production to the various resource needs such as wildlife, livestock, wildhorses, and non-consumptive uses.

VEGETATION (GROUND) COVER. The percent of land surface covered by all living vegetation (and remnant vegetation yet to decompose) within 20 feet of the ground.

VEGETATION MANIPULATION. As used in this statement, refers to seeding, brush control and juniper control range improvements.

VEGETATIVE STRUCTURE. The form or appearance of a plant community; the arrangement of the canopy: the volume of vegetation in tiers or layers.

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 RESOURCE. The land, water, vegetative, animal and other features that are visible on all public lands.

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.

WATERHOLE. An artifical catchment for livestock/wildlife water, developed in naturally occuring, intermittent lakebeds. Usually a pit is excavated in the center of the lakebed which fills in early spring. A waterhole differs from a reservoir in that reservoirs impede the flow of water down a channel. Synonyms include pit reservoir, charco pit, charco.

WATER QUALITY. The chemical, physical and biological characteristics of water with respect to its suitability for a particular use.

WATERSHED. All lands which are enclosed by a continuous hydrologic drainage divide and lie upslope from a specified point on a stream.

WATERSHED COVER. The material (vegetation, litter, rock) covering the soil and providing protection from, or resistance to, the impact of raindrops and the energy of overland flow, and expressed in percent of the area covered.

WATER YIELD. The quantity of water derived from a unit area of watershed.

WETLANDS. Permanently wet or intermittently flooded areas where the water table (fresh, saline or brackish) is at. near or above the soil surface for extended intervals, where hydric wet soil conditions are normally exhibited and where water depths generally do not exceed two meters.

WILDERNESS STUDY AREA. A roadless area or island that has been inventoried and found to have 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.

WOLF PLANT. (1) A plant that, though of a species generally considered palatable, is not grazed by livestock. (2) An isolated plant growing to extraordinary size, usually from lack of competition.

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