LAKE ELLEN ALLOTMENT

ENVIRONMENTAL ASSESSMENT REPORT AND

RANGE MANAGEMENT PLAN

Prepared by W. Bradley Reed Date 5/15/78
Range Conservationist

Prepared in
Consultation with Leonard A. Davidson Date 5/1/79
President, Lake Ellen Grazing Association

Approval
Recommended by Larry L. Smith Date 11/9/78
District Ranger

Approval
Recommended by Raymond J. Evans Date 12/26/78
Range, Wildlife, Watershed & Soils Staff

Approved by Robert B. Tenwell Date 1/3/79
Forest Supervisor

ENVIRONMENTAL ASSESSMENT REPORT

AND

RANGE MANAGEMENT PLAN

FOR

LAKE ELLEN CATTLE AND HORSE ALLOTMENT

KETTLE FALLS RANGER DISTRICT

COLVILLE NATIONAL FOREST

APRIL 1978

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The proposal of the Management Plan is to allocate 1110 A.U.M.'s of grazing capacity for use by cattle on the Lake Ellen Allotment, while allowing additional forage for wildlife.

The grazing system proposed for management of the allotment is a four-pasture rest-rotation system. The rest-rotation system combines the advantages of rotation, deferment, and periodic full seasons rest to stimulate range improvement and provide sustained grazing capacity.

This document on the Lake Ellen Allotment is a combination Environmental Analysis Report and Range Management Plan.

The Environmental Analysis sections of this document have been conducted in accordance with the requirements of the Multiple Use Sustained Yield Act and the National Environmental Policy Act.

Policies, objectives, and programs as related to the Range Management Plan defined here are more specifically stated in Sections 2210 and 2220 of the Forest Service Manual. Management defined in this plan is designed consistant with the Forest Service Region 6 and Colville National Forest goal of achieving quality range management by 1984.

The Range Management Plan centralizes information necessary for management of the allotment and sets down objectives for managing the impacts of domestic livestock grazing on the resources.

The Range Management Plan will be revised when the allotment is re-analyzed or when necessary.

II. ENVIRONMENTAL SETTING

Location

The Lake Ellen allotment lies in Township 35 North, Ranges 34, 35, and 36 East, Willamette Meridian, within the State of Washington, Ferry County. The area is within the Colville National Forest, Kettle Falls Ranger District. The allotment is bounded on the north and west by National Forest lands outside of the allotment, on the east by private lands of various ownerships, and on the south by the Colville Indian Reservation (see Appendix F, Range Allotment Map, for location and allotment boundaries). Land ownership of the allotment is entirely Forest Service.

Elevation on the allotment ranges from approximately 2200 feet above sea level to 6921 feet on White Mountain, the highest point. Average elevation is about 3500 feet.

The allotment is primarily within the Barnaby Creek drainage. Perennial streams include Barnaby Creek, Ledgerwood Creek, Doukhabor Creek, Cottonwood Creek, Stall Creek, and Sleepy Hollow Creek. These creeks are all tributaries to the Columbia River.

Aspect within the allotment is varied. However, the general aspect is east to southeast.

Geology of the allotment area consists primarily of volcanic rocks of andesite breccia with interbedded andesite and basalt flows. The majority of the area was glaciated by the latest advance of continental ice in the Wisconsin period, resulting in the deposit of glacial drift over nearly the entire area to one depth or another.

Approximately 53 soil mapping units, as described in "Soils of the Republic and Kettle Falls Ranger Districts, Colville National Forest", (USDA, Forest Service; R.C. McConnell; November, 1969), are found on the allotment. Major soil associations, as described in the report (pages 117-183) are: Togo-Growden (No. 1) and Nevine-Oxerine-Pepoon (No. 2).

The Togo-Growden association occupies the highest ridges and mountain slopes associated with granite bedrock. Vegetation on these soils is primarily forest, open forest, and mountain parks.

The Nevine-Oxerine-Pepoon association occupies ridges and mountain slopes except at high elevation. Vegetation on these soils is forest and open forest.

Climate of the area is dominated by western air flows originating in the Pacific Ocean. Warm summers and cold winters are characteristic. Average annual precipitation is from 20" at lower elevations to approximately 35" at higher areas. Most of this precipitation (60-70%) comes in the form of snow during the winter. Although summer showers are common, most of the moisture is ineffective for use by vegetation due to high evaporation rates caused by relatively high temperatures and low humidities.

Air quality in the area is very high most of the year. The area is many miles from any industrial activity that may significantly affect air quality.

The quality of water produced from the allotment area, as measured in Barnaby Creek, is generally high, meeting or exceeding State of Washington standards for Class AA waters. However, three instances have been recorded where State Class AA standards have been exceeded. In 1974, the pH was measured at 8.7 which exceeds the State standard of 8.5. Total coliform counts exceeded the State Class AA standard of 20 per 100 milliliters of water twice in 1977 when readings of 22 per 100 ml. and 86 per 100 ml. were obtained.

Downstream water uses have been partially identified. All of the water that enters the Columbia River is used many times for power production. Other uses include irrigation, recreation, and domestic use. Water uses between the allotment boundary and the Columbia River have not been adequately inventoried. However, these uses are thought to include fisheries, and minor amounts for domestic and irrigation use.

The Streamside Management Unit Stream Classes of the creeks found within the Lake Ellen Allotment are as follows:

Barnaby Creek	*III QF
Cottonwood Creek	III Q
Doukhabor Creek	III Q
Ledgerwood Creek	III Q
Stall Creek	IV
Sleepy Hollow Creek	IV

*Water use classification criteria can be found in FSM 8223-3, Colville Supplement No. 1.

Vegetation types according to the habitat type system of classification of R. and J. Daubenmire include Douglas-fir/snowberry, Douglas-fir/pinegrass, Douglas-fir/ninebark, grand fir/pachistima, western red cedar/pachistima, western hemlock/pachistima, and subalpine fir/pachistima. (Refer to Daubenmire R. and Jean D. Daubenmire, 1968, Forest Vegetation of Eastern Washington and Northern Idaho, Washington Agricultural Experiment Station Technical Bulletin #60).

Most of the Lake Ellen allotment is forested. Tree species include ponderosa pine, Douglas-fir, grand fir, western larch, lodgepole pine, Engelmann spruce, western red cedar, western hemlock, and subalpine fir.

Principle forage species found on the allotment are pinegrass, Idaho fescue, bluebunch wheatgrass, and Kentucky bluegrass. Shrubs found in the area that furnish significant browse for livestock and wildlife are ninebark, serviceberry, willow and redstem ceanothus. No known threatened or endangered plant species are known to exist on the allotment.

Barnaby Creek is the only creek on the allotment that has been inventoried as providing fisheries habitat. This habitat is of low quality with low potential.

There is a large area of key deer winter range on the allotment. This encompasses the area west of the east allotment boundary and north of Barnaby Creek as far west as Cottonwood Creek. Browse production for use by deer as winter feed is of primary importance in this area (see Appendix H, Key Deer Winter Range Map).

Besides winter deer use, the allotment area provides spring, summer, and

fall habitat for big game species as well as a wide variety of small game and non-game species.

There are no threatened or endangered animal species known to inhabit the allotment area.

The allotment area was originally part of the north half of the Colville Indian Reservation, formed in 1872. In 1892, Congress passed a law to allow purchase of the north half, and in 1896, it was opened to mineral entry. The Colville Confederated Indian Tribes retain their hunting and fishing rights in this area to the present time.

Indian rock cairns have been located on the south end of the Kettle Range. These were apparently constructed as a part of the vision quest (guardian spirit) engaged in by the young Indians of the Columbia Plateau. Ten acres (including many cairns) atop White Mountain have been submitted to the National Register of Historic Places for consideration.

The only other known point on the allotment that may have cultural significance is an old cabin in the Dollar Mountain area. Investigation into its history will be made in the near future.

Uses - There are no developed campgrounds within the allotment. The Lake Ellen campground is located adjacent to the allotment on its east boundary. Cattle use is restricted in this area by fences and natural barriers.

A significant amount of recreation use occurs on the allotment in the form of picnicking, dispersed area camping, driving for pleasure, hunting,

and hiking. Several small undeveloped camps exist scattered throughout the allotment. These camps are used primarily by hunters during hunting season.

The trail between Onion Ridge and White Mountain is used moderately by hikers and hunters.

There are no special use permits on the allotment area.

Timber management has been and will continue to be one of the major resource activities on the allotment. Timber management activities that have occurred or are planned on the allotment include commercial harvest, precommercial thinning, planting, and insect and disease control. Past harvest methods have ranged from partial cut to clearcut.

The only active timber sale on the allotment at this time is the South Barnaby Sale. This sale is scheduled for completion in 1978. The sale consists of 11 cutting units over approximately 524 acres, including 399 acres of overstory removal, and 124 acres of clearcut. The estimated total volume to be taken of the sale is 4.18 MMBF of timber.

Proposed timber sales on the allotment within the next five years are the Dollar Timber Sale and the South Barnaby Skyline Timber Sale. The Dollar Timber Sale is to be sold in 1978. Total volume from this sale is estimated at 3.0 MMBF from approximately 712 acres. Silvicultural prescriptions include overstory removal and clearcut.

The proposed South Barnaby Skyline Timber Sale is scheduled to be sold

in Fiscal Year 1981. Total volume from this sale is estimated at 4.0 MMBF from approximately 324 acres. Silviculture prescriptions for this sale will be primarily for regeneration cutting.

There are several mining claims within the allotment area. However, none of these claims are in commercial production at this time. Exploration is still active in the area.

Allotment History and Current Status - Livestock grazing on the Lake Ellen Allotment has been permitted continuously since 1916 when six cattle were permitted for a seven month season for a permitted use of 42 A.U.M.'s. Livestock numbers have varied greatly in the years since then and the season of use has been shortened (see Appendix J, Actual Use Summary).

Two peaks in livestock use of the allotment occurred over the years. These apparently coincided with the large burns that covered much of the area which opened up the timber stands, allowing increased forage production. The peaks were 1921-22 and 1934-48. Some increase in allowable use was again apparent following logging in the early 1950's.

Prior to 1940, use on the allotment was by cattle and sheep; sheep utilizing the upper areas, and cattle using the lower areas. Sheep use was discontinued in 1940.

Allotment boundaries have changed over the years. The major changes were the separation of the Bangs Mountain unit out as the Bangs Mountain allotment in 1959, the addition of the Stall Creek/Sleepy Hollow area around 1968, and the deletion of the Barnaby Buttes area around 1970.

Present boundaries are as shown on the Range Allotment Map, Appendix F.

A number of permittees have held grazing permits on the Lake Ellen Grazing Allotment since grazing was first allowed in 1916. In 1970, the Lake Ellen Grazing Association was formed and a Grazing Agreement between the Association and the Forest Service was entered into for grazing use on the Lake Ellen Allotment. The Lake Ellen Grazing Association is the present permittee.

The Association is currently permitted 1500 A.U.M.'s of grazing use on the National Forest.

The Lake Ellen Grazing Association is made up of individuals with home farms near Mesa, Washington. The Association owns and leases 2,316 acres of land near the Lake Ellen Allotment which they use as a base of operations in this area. Normally the Association trucks their cattle up from the Mesa area in the late spring or early summer, utilizes their owned, leased, and permitted lands for early summer, summer and fall range, and trucks their cattle back to the Mesa area for winter and spring pasture. The Lake Ellen Allotment provides a significant portion of the yearly forage requirements for the cattle owned by the members of the Lake Ellen Grazing Association.

National Forest lands and Association deeded and leased lands are intimately associated in forming an integrated management unit to support needs of the Association member's cattle operations. In this context, management activities on the National Forest allotment directly influence management on the private and leased lands.

Allotment Management Plans were prepared for the Lake Ellen Allotment in 1959 and 1968. These plans called for season-long use with emphasis on good livestock distribution to obtain proper forage use. A Range Development Program was not begun until about 1963. Emphasis at this time was on allotment boundary fencing, water developments, and stock driveways. Boundary fences were needed to stop drift off of the allotment primarily onto the Colville Indian Reservation. Controls along this boundary were completed, for the most part, with the completion of the Stall Creek fence in 1976.

Water developments and stock driveways were constructed in an attempt to improve livestock distribution. These efforts were very effective in most cases.

In 1975, an Interim Allotment Management Plan was prepared for the Lake Ellen Allotment. An estimate of potential grazing capacity was made of 1950 A.U.M.'s. This estimate was based on: 1) 250-300 pounds air dry desirable forage produced per acre, 2) 50% of total acreage usable by livestock, 3) 900 pounds per month air dry forage consumed per A.U.M., and 4) 65% use of usable forage allowed under a pasture system.

This plan proposed several management alternatives based on improved management systems, and identified needed range improvements.

The goal of management on the allotment was defined as "continue to try to implement a fenced pasture system," while, "at the same time, prepare a management plan assuming season-long use and adjust stocking as necessary by the use standards of the plan." No management system

was ever selected from the alternatives presented, thus no pasture system was implemented. The interim plan recognized that range conditions were less than satisfactory and that improved management systems were necessary to improve conditions and maintain current stocking levels.

Problems identified in the Interim Management plan are as follows:

1. Poor communications with the Association due to the distance of the member's home ranches from the area.

2. Lack of an adequate management program on the Association deeded and leased lands.

3. Failure to implement a pasture system of management.

4. Lack of a management plan based on Range Environmental Analysis.

5. Difficulty in removing cattle from the allotment by the established off date.

6. Inadequate maintenance of range improvements and failure to install improvements as planned.

Several range improvements were identified as needed by the Interim Management Plan. These are as follows:

1. Fencing along Cedar Ridge to prevent cattle drift off of the allotment into South Sherman Creek.

2. Corrals near the junction of South and North Forks of Barnaby Creek and near Stall Creek to facilitate livestock management.

3. Water developments where needed to help distribution and keep cattle away from surface water sources.

4. Pasture fences as necessary to facilitate implementation of an improved grazing system.

III. EVALUATION CRITERIA

In analyzing the environmental impacts of the proposed action and defining criteria for management, a group of evaluation criteria has been defined to aid in evaluation. These criteria are based on the present condition of the allotment, needs for the area, and socio-economic considerations, as well as applicable laws and regulations.

Evaluation criteria for the proposed action are:

1. Utilize the range resource consistant with other resource values, such as soil, watershed, wildlife, recreation, and timber.

2. Maintain a sustained yield of forage for domestic livestock and wildlife.

3. Reverse the downward trend in the ecological condition of the vegetation cover for maintaining and managing soil stability for the watershed.

4. Coordinate the grazing of livestock with the other resources.

5. Promote stability of family ranches and farms affected.

6. Secure management and appropriate treatment where the vegetation and soil conditions are ecologically poor.

7. Achieve and maintain stable stream channels to maintain a high quality of water production from the watershed.

The impacts analyzed in the Environmental Analysis Report are related to the impacts of grazing on the vegetation, soil, watershed, wildlife, timber, recreation, aesthetics, and the socio-economic effect on the local community and permittees involved.

Further objectives of the Range Management Plan as related to allotment management are:

1. Provide local leadership in range conservation and utilization.

2. Establish a proper season of use and stocking plan based upon subsequent production and utilization studies.

3. Evaluate the adopted management plan.

4. Design and construct range improvements needed for intensive range management.

IV. RANGE CONDITION AND CAPACITY

Range condition and apparent trend on the allotment were measured during preliminary range environmental analysis field work done in the summer of 1977. Evaluation was made according to standard condition guides developed for Region 6. (See Kettle Falls Ranger District 2210 Range Analysis and Plans file for field data sheets.) Findings indicate that vegetative condition on the Lake Ellen Allotment is generally poor to fair with apparent trend approximately equally divided between upward, downward, and static classes (see Appendix C, Vegetative and Soil Condition and Trend Summary). The vegetative condition and trend illustrates that past management has been ineffective in maintaining or improving range condition.

Indicated grazing capacity has been based on acres of primary range by range type and condition class. Five general suitable range types have been identified on the allotment, these being: (1) grassland, 1; (2) mountain meadow, 2; (3) browse or brushland, 5; (4) timbered range, 6; and (5) transitory, 7. (See Vegetative Type Map legend, Appendix E, for further explanation of range types.) Grassland, mountain meadow, browse or brushland, and timbered range are permanent range types. Transitory range is range that has been created by some cultural or natural disturbance, such as logging or wildfire, and as a result, is capable of providing grazing on a temporary basis. Grazing capacity allocated for transitory range on this allotment is that amount felt to be the long-term average of the amount of transitory range available for grazing.

Productivity by range type and condition class was measured during the 1977 Preliminary Range Analysis. This data has been used in computing the indicated capacity estimate. Because productivity within range types may vary from year to year, subsequent production studies will need to be established and maintained in order to verify the capacity estimate.

Indicated grazing capacity is based on productivity and estimated proper use of key forage species. Proper use is determined by the amount of utilization that can be made of a plant while maintaining its vigor and capability to reproduce itself. Furthermore, proper use is governed by management objectives. Generally, range in less than good condition is managed for improvement, which requires somewhat lower proper use standards than if the objective of management were to simply maintain range condition. Therefore, range condition influences the setting of proper use standards. Guidelines used for setting proper use standards on the Lake Ellen Allotment are as follows:

Condition Class	Proper Use
Good to excellent	40 to 50%
Fair	25 to 40%
Poor	10 to 25%
Very poor	0 to 10%

The system of grazing management governs the amount of use allowed within the proper use guidelines. Guidelines used on the Lake Ellen Allotment are:

Management System	Utilization
Season-Long	Mid-point of recommended for condition class.
Deferred, rotation, deferred-rotation, and alternating.	High end of use recommended for condition class.
Rest-Rotation	Sixty-six percent of available forage on primary range or 30% of available forage on the entire range.

Indicated grazing capacity on the Lake Ellen allotment based on the above proper use criteria and 1977 productivity measurements are as follows:

Season-Long Grazing System

Range Type and Condition Class		Acres	Production Pounds/Ac.	Pounds of Available Forage	Proper Use	Animal Unit Months Available*
P1B	F	114	160	18,240	33%	6.0
P1B	P	132	117	15,444	18%	2.8
P2D	P	16	1,274	20,384	18%	3.7
P5S	F	287	415	119,105	33%	39.3
P6AC	G	277	545	150,965	45%	67.9
P6AC	F	454	330	149,820	33%	49.4
P6AC	P	323	140	45,220	18%	8.1
P6S	G	99	240	23,760	45%	10.7
P6S	F	1,315	476	625,940	33%	206.6
P6S	P	352	260	91,520	18%	16.5
P6N	F	917	530	486,010	33%	160.4
P6N	P	1,084	210	227,640	18%	41.0
P6N	VP	849	50	42,450	5%	2.1
P6AP	F	751	190	142,690	33%	47.1
P6AP	P	50	270	13,500	18%	2.4
T7CP	S	127	1,385	175,895	45%	79.2
T7AP	S	447	300	134,100	45%	60.3
	TOTAL	7,594 Acres				803.5*

* Based on a cow with calf required 1,000 pounds of forage per animal month. This requirement will be considered through this analysis.

** 723 Animal Unit Months are available to allocate to livestock, allowing 10% of the grazing capacity for use by wildlife. This allocation will be considered throughout this analysis.

Deferred, Rotation, Deferred-Rotation, or Alternating Grazing System

Range Type and Condition Class		Acres	Production Pounds/Ac.	Pounds of Available Forage	Proper Use	Animal Uni Months Available
P1B	F	114	160	18,240	40%	7.3
P1B	P	132	117	15,444	25%	3.9
P2D	P	16	1,274	20,384	25%	5.1
P55	F	287	415	119,105	40%	47.6
P6AL	G	277	545	150,965	50%	75.5
P6AC	F	454	330	149,820	40%	59.9
P6AC	P	323	140	45,220	25%	11.3
P6S	G	99	240	23,760	50%	11.9
P6S	F	1,315	476	625,940	40%	250.4
P6S	P	352	260	91,520	25%	22.9
P6N	F	917	530	486,010	40%	194.4
P6N	P	1,084	210	227,640	25%	56.9
P6N	VP	849	50	42,450	10%	4.2
P6AP	F	751	190	142,690	40%	57.1
P6AP	P	50	270	13,500	25%	3.4
T7CP	S	127	1,385	175,895	50%	88.0
T7CP	S	447	300	134,100	50%	67.0
	TOTAL	7,594 acres				966.8*

*870 A.U.M.'s available to livestock.

Rest-Rotation Grazing System

Range Type and Condition Class		Acres	Production Pounds/Ac.	Pounds of Available Forage	Proper Use	Animal Unit Months Available
P1B	F	114	160	18,240	66%	12.0
P1B	P	132	117	15,444	66%	10.2
P2D	P	16	1,274	20,384	66%	13.4
P5S	F	287	415	119,105	66%	78.6
P6AC	G	277	545	150,965	66%	99.6
P6AC	F	454	330	149,820	66%	98.9
P6AC	P	323	140	45,220	66%	29.8
P6S	G	99	240	23,760	66%	15.7
P6S	F	1,315	476	625,940	66%	413.1
P6S	P	352	260	91,520	66%	62.4
P6N	F	917	530	486,010	66%	320.8
P6N	P	1,084	210	227,640	66%	150.2
P6N	VP	849	50	42,450	66%	28.0
P6AP	F	751	190	142,690	66%	94.2
P6AP	P	50	270	13,500	66%	8.9
T7CP	S	127	1,385	175,895	66%	116.1
T7AP	S	447	300	134,100	66%	88.5
	TOTAL	7,594 acres				1,640.4*

* 1,476 A.U.M.'s available to livestock.**

** Actual capacity will be determined by the design of the grazing system. Under this management system, one pasture a season is completely rested and no capacity can be allowed for rested pastures.

Actual allowable use for various pasture systems are:

3-pasture rest-rotation, 1,476 A.U.M.'s x .66 (2 out of 3 pastures used) = 974 A.U.M.'s

4-pasture rest-rotation 1,476 A.U.M.'s x .75 (3 out of 4 pastures) = 1,107 A.U.M.'s

5-pasture rest-rotation 1,476 A.U.M.'s x .80 = 1,181 A.U.M.'s

The current permitted use on the allotment is 1500 A.U.M.'s. This indicates that permitted numbers exceed indicated grazing capacity by 52% for a season-long grazing system, and 42% for a deferred, rotation, deferred-rotation, or alternating grazing system. The indicated grazing capacity for a rest-rotation grazing system is approximately 65 to 79 percent of the current permitted grazing use.

As range condition improves, it is expected that productivity will increase. Correspondingly, vegetation in high condition can withstand greater utilization under season-long and deferred, rotation, deferred-rotation, and alternating grazing systems. As vegetative condition improves to a good or better condition class, it is estimated that allotment capacity will increase to 1,636 A.U.M.'s for a season-long grazing system, 1,817 A.U.M.'s for a deferred, rotation, deferred-rotation, or alternating grazing system, and between 1,583 and 1,919 A.U.M.'s for a rest-rotation grazing system.

Assuming an upward shift of one condition class on 50% of the primary acres, utilizing a four-pasture rest-rotation grazing system, a figure which is considered realistically obtained in 5 to 10 years on the allotment, grazing capacity would increase from 1,110 A.U.M.'s to approximately 1,400 A.U.M.'s.

Also affecting allotment capacity is the effectiveness of management systems and proposed range improvements on improving livestock distribution and increasing range productivity. As secondary range is brought into use by these practices, the allotment capacity will increase. No estimate

as to the capacity increases resulting from these practices can be made at this time. However, the potential on this allotment appears to be moderately good.

V. RANGE IMPROVEMENTS

Existing structural range improvements on the Lake Ellen Allotment include eight water developments, five cattleguards, approximately 7.5 miles of allotment boundary fence, approximately 2.1 miles of interior pasture fence, and approximately 1.5 miles of stock trail. These improvements were inventoried and their condition was checked in 1977. Generally, the water developments are in need of maintenance. Two water developments have been identified as needing reconstruction. The fences are in fair to good condition, however, annual maintenance is needed to keep them that way.

All improvement maintenance is the responsibility of the permittees, with the exception of cattleguards, which are to be maintained by the Forest Service.

Several range improvements have been identified for construction. These include approximately 1.5 miles of allotment boundary fence, four water developments, approximately .5 miles of interior pasture fence, and one optional corral. These improvements are designed to control cattle drift off of the allotment, improve livestock distribution, and to complete controls needed for implementation of a four-pasture rest-rotation grazing system. A summary of existing and proposed range improvements is found in Appendix D1 and D2. The proposed construction schedule is contained in Appendix D2.

VI. DIRECTION DERIVED FROM LAND MANAGEMENT PLANS OR OTHER AUTHORITY.

The Colville National Forest Multiple Use Plan of 1972 provides management direction for the area which encompasses the Lake Ellen Allotment. This plan states that "range management systems will be used which avoid continuous season-long use of a particular area and which provide for the need of the resources, the livestock, and the operator."

Also, this plan states that "livestock management and numbers for each allotment will be adjusted as needed, based on the estimated grazing capacity determined through proper use measurements."

More specified management direction will be provided by the Colville West Land Management Plan to be prepared in the future. Upon completion of this unit plan, its effects on the allotment will have to be evaluated and incorporated into this section.

Approximately 2,560 acres of the northeast portion of the allotment and 1,200 acres of the northwest portion of the allotment are included in the South Huckleberry and Bald Snow Inventoried Roadless Areas. These areas are currently being evaluated for their suitability for wilderness classification through the Roadless Area Review and Evaluation (RARE II) process. According to Forest Service policy, no range improvement work

will be carried out on this area which will prejudice the area's consideration for wilderness classification (i.e., had they existed prior to the RARE II inventory, they would have resulted in the area not being inventoried) while the evaluation is being made.

VII. ALTERNATIVES CONSIDERED

Season-Long Grazing System

This alternative would essentially be a no-action alternative as past management has, more or less, been on a season-long basis.

Season-long, or continuous grazing use, follows the same general plan each year. Livestock are allowed access to all portions of the range throughout the grazing season. Uneven distribution and utilization is a weakness of this system. Livestock tend to concentrate on certain areas year after year. Livestock favor drainages near water and gentle topography. Forage plant deterioration and soil damage are likely on certain areas with this management system.

Deferred-Rotation Grazing System

Deferred-rotation grazing combines periodic deferment with systematic rotation between pasture units as the grazing season progresses.

Deferment is defined as: delaying grazing use on an area for an adequate period of time to provide for plant reproduction, establishment of new plants, and restoration of vigor of existing plants.

Deferred rotation grazing is designed to counteract the natural tendencies of grazing animals to select certain preferred forage plants, utilizing them heavily, by providing planned rest periods, in the form of deferment, to allow the plants to recover from the adverse effects of grazing.

Stocking rates under this system are generally higher than under season long systems due to the fact that heavier degrees of utilization are allowable. Heavier stocking rates often tend to force distribution of livestock due to increased competition for forage.

Rest-Rotation Grazing System

Rest-rotation grazing includes further refinements and combinations of deferment and rotation with the additional component of complete rest on parts of the range area during certain years. The rest periods combined with periodic deferment provide for more complete restoration of vigor and encourages better establishment of new plants of desirable forage species, to overcome the adverse effects of grazing.

Utilization of plants under this grazing system is not the primary criteria of allowable use. Means other than regulating plant utilization are used to insure maintenance of the preferred species. Allowable use is more often determined by such things as response of livestock to the system, on-site effects of forced distribution, and coordination requirements. Grazing effects are evaluated on the unit as a whole, rather than on specific species on specific sites. Range trend studies are used to monitor the effectiveness of the system on the range vegetation.

Generally, the most rapid rehabilitation of deteriorated ranges can be expected from rest-rotation grazing, as opposed to the systems discussed previously.

VIII. EFFECTS OF IMPLEMENTATION

Effects of the alternatives considered on the vegetation have been discussed to some extent in the preceding section.

Generally, season-long grazing will result in plant deterioration on certain areas, as uncontrolled stock tend to concentrate on the most preferred areas and utilize the most palatable plants excessively year after year. Adjustment in stocking rate tends only to regulate the size of the deteriorated areas.

Deferred-rotation and rest-rotation grazing systems compensate for yearly heavy use on preferred areas and species, by periodically allowing a restoration period, either deferment and/or complete rest. The difference in the systems lies in the frequency and duration of these restoration periods. Generally, rest-rotation grazing allows for more frequent and longer duration restoration periods, resulting in fuller recovery of grazed vegetation. This is expressed in a more rapid rate of range improvement on depleted range, and better maintenance on good condition range.

Several soil mapping units on the allotment have been identified as being particularly sensitive to range management. These soils display a medium to high erosion hazard and/or extremely low water storage capabilities, which severely limit their recovery potential. Sensitive soil mapping units and the reason for their sensitivity are:

Mapping Unit No.	Name	Slope	
23	Goddard	5-25%	Low water storage capacity.
24	Goddard	25-65%	Low water storage capacity.
37	Kiehl	35-65%	Low water storage capacity.
54	Namankin	0-15%	Low water storage capacity.
63	Oxerine	35-65%	Erosive, low water storage capacity.
72	Pepoon	15-35%	Erosive, low water storage capacity.
73	Pepoon-Edds	15-50%	Erosive, low water storage capacity.
74	Pepoon-Oxerine	15-50%	Erosive, low water storage capacity.

Mapping Unit No.	Name	Slope	
75	Pepoon-Rockland	15-50%	Erosive, low water storage capacity.
76	Pepoon-Togo	15-50%	Erosive, low water storage capacity.

(See Soils Map, Appendix G.)

Erosive soils on which soil cover (vegetation, moss, and litter) is reduced below 66% are subject to accelerated erosion.

Oxerine and Pepoon soils are both erosive and droughty. This makes these soils more likely to have insufficient vegetative cover to control erosion. Herbivore grazing has the potential of reducing vegetative and litter ground cover, especially on the above soils, causing increased erosion risk. Rest-rotation grazing systems provide vegetation with periodic full-season rest and deferment from livestock grazing, during which time it can overcome the adverse effects of cropping and trampling in order to maintain adequate soil cover.

Season-long grazing systems allow little or no opportunity for vegetation to overcome the effects of grazing, since it is available for use throughout the grazing season, yearly. Deferred-rotation provides intermediate chances for vegetation recovery between rest-rotation and season-long grazing systems by providing periodic partial-season rest for the forage species.

Compaction and displacement are other effects livestock grazing may have on soils. The three alternatives considered may have different results on these effects.

Compaction by livestock occurs primarily when soils are wet or damp and is directly proportioned to the number of animals trampling upon the soil. Therefore, stocking rates and animal distribution are important in managing soil compaction. Season-long grazing systems generally have lighter stocking rates than deferred-rotation and rest-rotation grazing systems. Furthermore, deferred-rotation grazing systems generally have lighter stocking rates than rest-rotation systems. In this respect, season-long systems should produce smaller amounts of compaction than deferred-rotation and rest-rotation systems, and deferred-rotation should have smaller amounts of compaction than rest-rotation systems. This reasoning holds true to a point. Other factors influencing the amount of compaction incurred that need to be considered are livestock distribution and allowances for recovery from compaction.

Season-long grazing systems typically produce poor livestock distribution. This results in large numbers of stock concentrating on relatively small areas. This presents the opportunity for excess compaction to occur.

Improved distribution results from use of deferred-rotation and rest-rotation grazing systems. The best distribution results from use of rest-rotation grazing systems. As a result, relatively fewer stock are concentrated per unit area on the range, resulting in less compaction.

Furthermore, little opportunity is given soil under season-long use to recover from the effects of compaction through natural actions of moisture, temperature, small animal activity, and root action. As a result, compacted soils under season-long grazing systems may remain more or less permanently compacted.

On the other hand, use periods in pasture units are generally shortened under deferred-rotation and rest-rotation systems, than under season-long systems, and rest periods are built in. This results in more opportunity for correction of soil compaction and less overall damage from it. Rest-rotation grazing systems generally provide the maximum amount of opportunity for recovery from compaction.

The third effect of livestock grazing on soil is that of downslope displacement of soil caused by trampling. This is more serious on light textured soils, poorly protected by vegetative or litter cover. Downslope displacement can be considered a permanent effect on soil since once displaced, it cannot, normally, be returned to its original position.

Again, this effect is directly proportional to the number of livestock on the range. In this respect, the same reasoning as for soil compaction may be used for downslope displacement except that under season-long grazing, cattle may tend to concentrate in areas of relatively flat topography where the potential for downslope displacement is small, whereas, cattle grazing under deferred-rotation or rest-rotation systems may tend to spend more time on steeper slopes where the potential for downslope displacement is greater. Therefore, rest-rotation grazing would have the greatest effect on this type of soil damage.

On the other hand, adequate vegetation and litter cover tend to protect the soil from downslope displacement. In this regard, as discussed under the effects of the alternatives on the vegetation, rest-rotation grazing systems have the advantage of improving vegetative cover, thus reducing the risk of soil displacement.

The effects of the grazing system alternatives evaluated in this report on the watershed values of the area are three-fold. Grazing systems affect: 1) water production and infiltration, 2) water quality, and 3) stream channel stability.

Generally, the amount of water produced from a watershed, or absorbed into the soil, is dependent on the amount of precipitation received, the season in which it is received, soil properties in relation to infiltration and storage capacity, and the amount and kind of vegetation cover on the soil. Grazing systems may directly affect the latter. Soil with a good cover of vegetation, particularly grasses, and litter tends to absorb more of the available moisture, reducing the amount of runoff, and increasing the amount of moisture absorbed by the soil and available for plant use. Rest rotation grazing systems generally have the greatest potential for improving the vegetative cover than the other systems being evaluated. Thus, moisture infiltration may be best under this system. Season long systems may result in the poorest vegetative cover and thus the poorest moisture infiltration.

The grazing system employed may affect water quality in two ways. It may affect sedimentation into streams and it may affect the amount of bacteria entering streams.

Sedimentation is again related to vegetative ground cover. As ground cover is decreased, overland flow of water increases, and sedimentation increases. As discussed earlier, rest-rotation grazing has the greatest potential for improving vegetative cover, thus controlling sedimentation.

Increased bacteria counts in streams may be a result of livestock feces and urine entering the water by overland flow (in runoff) or by being deposited directly in the stream. Therefore, grazing systems which tend to improve stock distribution have the least effect on water bacteria. Again, rest-rotation has the best effect on distribution, therefore, the least potential for increasing water bacteria counts, followed by deferred-rotation and season-long grazing. However, this effect is partially offset by increased stocking rates.

Also, under rest-rotation and to a lesser extent, deferred-rotation grazing systems, streams periodically have an opportunity to cleanse themselves during periods of rest.

Stream channel stability is the third watershed component that may be affected by grazing. Often, stream channels become unstable as a result of reduced vegetative cover which makes them more vulnerable to scouring by water. Livestock grazing has a direct effect on streamside vegetation, particularly since animals tend to congregate on stream banks since they are adjacent to water sources.

Season-long grazing makes no provision for overcoming the adverse effects of heavy use on streamside vegetation. As a result, vegetative condition on these areas is slowly undermined, and bank trampling takes place, reducing the stability of the stream channel.

Deferred-rotation and rest-rotation grazing systems have the advantage over season-long grazing systems in that they encourage better vegetative cover and soil stability.

Rest-rotation grazing has a further advantage over deferred-rotation grazing in increasing and maintaining shrubby vegetation, which is important in shading streams and keeping water temperatures low. This is possible by allowing periodic full-seasons rest, during which time, new leader growth on the shrubs is allowed to harden off. Once hardened off, the probability of them being grazed later is very low.

Effects of implementation of the alternative grazing systems on wildlife are related to the effects on the food supply, and the effects on habitat.

Of the various alternative grazing systems considered, rest-rotation grazing has the most potential for directly competing with wildlife species for forage and browse due to its more intensive utilization of the resource. This is offset somewhat by the fact that one unit of the allotment will be completely rested each year from livestock grazing. The forage in this unit thus becomes totally available for use by wildlife.

Also, under rest-rotation grazing, more secondary range, formerly almost exclusively available for wildlife use, will be utilized more heavily by livestock. This could cause further competition between wildlife and livestock.

Competition between livestock and deer could become a problem on the area of key deer winter range on the east side of the allotment. It is critical to reserve enough browse for winter deer use in this area to sustain the current population of deer during the winter months.

Rest-rotation may have a beneficial effect on winter deer browse by allowing for improvement in quantity and quality of the browse by providing periodic rest from livestock grazing.

Season-long and deferred-rotation will have proportionately smaller effects on the forage and browse supply available to wildlife due to their lower stocking rates. Also, more secondary range will be available for nearly exclusive use by wildlife.

Livestock grazing may most seriously effect habitat for small animals and fish. Small animals rely on low-growing grasses, forbs and shrubs for hiding and nesting, or denning cover, and food. Livestock grazing directly affects this habitat by removing this cover through consumption and trampling. The key to maintaining this habitat is in maintaining good range condition. As illustrated earlier in this discussion, rest-rotation grazing systems have the best potential for establishing and maintaining good range condition than either deferred-rotation or

season-long systems. Deferred-rotation has the second best potential. This is particularly important near aquatic or wetland habitats which typically are concentration points for wildlife as well as livestock.

Rest-rotation systems may have larger short-term effects on wildlife habitat because of heavier allowable use standards, however, long-term effects are generally more beneficial.

Fish are affected by the various grazing systems mainly by their effect on stream shading as influenced by riparian vegetation, particularly shrubs such as willow and alder. Streams well shaded stay cooler, favoring fish life. As discussed earlier, rest-rotation grazing systems generally have the least adverse effect on streamside shrubs. Season-long systems generally have the most adverse effect on streamside shrubs.

The alternatives considered by this report may have several effects on timber management within the allotment. These effects may be on timber regeneration and growth or timber sale activity.

Timber regeneration and growth may be adversely affected by grazing through direct physical damage to young trees by livestock or through indirect effects such as soil compaction which would retard the growth of trees. Both of these effects occur when livestock concentrate in regeneration areas. Therefore, grazing systems which promote good livestock distribution and allow for vegetation recovery following grazing will have the least impact on physical damage to trees and soil compaction. Rest-rotation grazing rates highest in minimizing these

impacts, followed by deferred-rotation grazing and season-long use. An advantage to grazing within regeneration areas may be a reduction in competition from grasses, forbs, and shrubs with trees, which may be controlled to some extent by heavy grazing. Manipulation of the degree of grazing is most easily achieved with deferred-rotation and rest-rotation grazing systems due to increased control of the cattle by utilizing two or more pastures within the allotment.

Coordination of grazing with timber harvest will be necessary to preclude or mitigate any conflicts with cattle grazing within sale areas during logging, and to insure that sale rehabilitation activities, such as erosion control seedings, are not damaged by livestock. This coordination requirement may require that cattle are kept out of logging areas at varying times. Positive control of cattle is possible under deferred-rotation and rest-rotation grazing systems by utilizing different pastures within the allotment. Alternative pastures are not available under one-pasture, season-long grazing systems. Furthermore, rest-rotation systems provide this means of control with the least disruption in the normal grazing system because pastures are normally scheduled for at least two growing seasons rest over the grazing system cycle.

Adverse effects of cattle grazing on recreation are usually in the form of cattle use within recreation areas which causes unnatural dust conditions, unpleasant smells, livestock feces on the ground, and possibly physical damage to recreation equipment from livestock trampling or rubbing. These effects are more common on heavily stocked areas. Rest-rotation grazing systems generally utilize heavier stocking rates than deferred-rotation or season-long systems. Therefore, conflicts with recreation

may be greater under rest-rotation systems on used pastures. Pastures not used during any one year or deferred from use during part of the season are available for exclusive use for undisturbed recreation during that time.

Under season-long grazing systems, livestock may tend to concentrate near water or on flat areas which are typically favorite camping areas. In these cases, season-long use is more detrimental to recreation than deferred-rotation or rest-rotation grazing systems since livestock will use these areas season-long and year after year.

Grazing is related to aesthetics or visual quality through its impact on the vegetation and soil. Grazing removes a portion of the vegetation and cattle trampling causes some degree of soil disturbance. This alters the natural visual quality of the area.

Heavier degrees of utilization will be allowed under rest-rotation grazing on used areas. This will result in shorter stubble heights on forage species and a greater degree of soil disturbance than for season-long and deferred-rotation systems. Portions of the allotment, however, will be totally ungrazed each year.

Season-long grazing may result in heavy grazing on relatively small areas scattered throughout the allotment every year. These areas will generally be the most accessible areas to both livestock and people. However, large areas will be essentially ungrazed and thus the visual quality will not be altered at all.

Deferred-rotation grazing will result in a degree of utilization intermediate between season-long use and rest-rotation grazing. Use on a portion of the allotment, each year, will be delayed until late season. All portions of the allotment will be impacted each year.

Social and economic impacts of the alternatives considered by this report include the effects of the systems on the stability and prosperity of the ranch or farm operations of the permittees, and the effect of this on the social and economic well-being of the local community, area, region and nation.

The Lake Ellen Allotment provides summer range for cattle owned by members of the Lake Ellen Grazing Association. This allotment is used in conjunction with other lands owned or leased by the Association to provide an operating unit which maintains these cattle for approximately six months each year. Deeded and leased land capacity is approximately equal to the National Forest allotment capacity, thus making a well-balanced unit. Under the present structure and management of the Association, any adjustments in management on the National Forest allotment will likely influence management on the deeded and leased lands. Changes in allowable grazing use may affect revenues collected by agencies or individuals who lease or permit grazing use to the Association as well as affecting profit or loss of the Association members.

Agencies or individuals who lease or permit grazing use to the Association besides the Forest Service are the Bureau of Land Management and Colville Confederated Indian Tribes.

Financing for the Association has been provided by Farmers Home Administration, U. S. Department of Agriculture. The Ferry County Soil and Water Conservation District, assisted by the Soil Conservation Service, has cooperated in developing the Lake Ellen Grazing Association's conservation plan.

Effects of the alternative management systems considered here would be to reduce the total allowable use on the National Forest allotment by from about 50% under season-long use, to approximately 25% under rest-rotation grazing. This effect would be to reduce the number of pounds of beef produced from the allotment. This may reduce the gross income derived from the allotment and associated lands by the Association members which could in turn reduce: 1) the number of jobs available to local people which were directly related to the Association's operation; 2) the goods and services purchased from local merchants in relation to the Association's operation; 3) grazing fees and leases collected by landowners who permitted or leased grazing use to the Association; and 4) revenue to local, State, and Federal governments from taxes and fees collected from the Association.

These effects may be relatively small in relation to the overall economy of the area, but may have large effects on individuals closely associated with the Lake Ellen Grazing Association.

The rest-rotation system alternative calls for the least reduction in current permitted grazing use, thus would have the least adverse effect on the social and economic well-being in the area.

The following economic analysis compares the economic values of the alternative grazing systems. It considers only the summer season the cattle are permitted on the National Forest. The permittee's operating costs for the period their livestock are off the National Forest are not included in this analysis. The analysis compares only the cost of improvement construction and maintenance with the benefits in terms of dollar value returned from these improvements.

Season-Long - Lake Ellen Allotment

Investment Costs

Activity

Year	Activity	Cost
1- 5	Construction of Improvements	$4,450
2-20	Maintenance	4,750
10	Heavy Maintenance	1,112

Benefits to the Association (Unit of Measure A.U.M.)

Year	Benefits
1- 3	723
4- 5	723
6-20	723

Present Value of Costs (PVC)

Activity Year	Activity Cost	Discount Factor	PVC 7%	PVC 10%	PVC 15%
1 - 3	$4,450	1.6894	$ 7,518		
1 - 3	4,450	1.5778		$ 7,021	
1 - 3	4,450	1.4136			$ 6,291
2 - 20	4,750	8.7860	41,734		
2 - 20	4,750	6.7781		32,196	
2 - 20	4,750	4.6336			22,010
10	1,112	.5084	565		
10	1,112	.3855		429	
10	1,112	.2472			275
			$49,817	$39,646	$28,576

Present Value of Benefits (PVB)

Year	Value of Benefit	Discount Factor	PVB 7%	PVB 10%	PVB 15%
1 - 3	723 x $7.50 = $5,422	1.6894	$ 9,160		
1 - 3	723 x $7.50 = $5,422	1.5778		$ 8,555	
1 - 3	723 x $7.50 = $5,422	1.4136			$ 7,664
4 - 5	723 x $7.50 = $5,422	.7130	3,866		
4 - 5	723 x $7.50 = $5,422	.6209		3,366	
4 - 5	723 x $7.50 = $5,422	.4972			2,696
6 - 20	723 x $7.50 = $5,422	5.8286	31,603		
6 - 20	723 x $7.50 = $5,422	5.03989		27,326	
6 - 20	723 x $7.50 = $5,422	3.2304			17,515
			$44,629	$39,247	$27,875

A $7.50 per animal unit month fair market value was used for this analysis.

Net Present Worth (NPW) = PVB - PVC Season-long Use.

Discount Factor	
7%	NPW = 44,629 - 49,817 = -$5,188
10%	NPW = 39,247 - 39,646 = -$ 399
15%	NPW = 27,875 - 28,575 = -$ 701

Benefit - Cost Ratio - Season-Long Use

$$B/C = \frac{PVB}{PVC}$$

Discount Factor	
7%	44,629/49,817 = .90
10%	39,247/39,646 = .99
15%	27,875/28,575 = .98

Three Pasture Deferred Rotation

Lake Ellen Allotment

Investment Costs

Activity

Year	Activity	Cost
1 - 3	Construction of Improvements	$5,610
2 - 20	Yearly Maintenance	5,300
10	Heavy Maintenance	3,500

Benefits to the Association (Unit of Measure A.U.M.)

Year	Benefits
1 - 3	1395 A.U.M.'s
4 - 5	1180 A.U.M.'s
6 - 20	870 A.U.M.'s

Present Value of Costs (PVC)

Activity Year	Activity Cost	Discount Factor	PVC 7%	PVC 10%	PVC 15%
1 - 3	$5,610	1.6894	$ 9,478		
1 - 3	$5,610	1.5778		$ 8,851	
1 - 3	$5,610	1.4136			$ 7,930
2 - 20	$5,300	8.7860	16,566		
2 - 20	$5,300	6.7781		35,924	
2 - 20	$5,300	4.6336			24,558
10	$3,500	.5084	1,779		
10	$3,500	.3855		1,349	
10	$3,500	.2472			865
			$57,823	$46,124	$33,353

Present Value of Benefits (PVB)

Year	Value of Benefit	Discount Factor	PVB 7%	PVB 10%	PVB 15%
1 - 3	1290 x $7.50 = $9675	1.6894	$16,345		
1 - 3	1290 x $7.50 = $9675	1.5778		$15,265	
1 - 3	1290 x $7.50 = $9675	1.4136			$13,677
4 - 5	1080 x $7.50 = $8100	.7130	5,775		
4 - 5	1080 x $7.50 = $8100	.6209		5,029	
4 - 5	1080 x $7.50 = $8100	.4972			4,027
6 - 20	870 x $7.50 = $6525	5.8286	38,032		
6 - 20	870 x $7.50 = $6525	5.03989		32,885	
6 - 20	870 x $7.50 = $6525	3.2304			21,078
			$60,152	$53,179	$38,782

A $7.50 per animal unit month fair market value was used for this analysis.

Net Present Worth (NPW) = PVB - PVC Three Pasture Deferred Rotation

Discount Factor

7%	NPW = $60,152 - 57,823 = $2,329
10%	NPW = $53,179 - 46,124 = $7,055
15%	NPW = $38,782 - 33,353 = $5,429

Benefit Cost Ratio Three Pasture Deferred Rotation Grazing System

$$B/C = \frac{\text{PV Benefit}}{\text{PV Cost}}$$

Discount Factor	Benefit Cost Ratio
7%	60,152/57,823 = 1.04
10%	53,179/16,124 = 1.15
15%	38,782/33,353 = 1.16

Three-Pasture Rest-Rotation System

Investment Costs

Activity Year	Activity	Cost
1 - 3	Construction of Improvements	$5,610
2 - 20	Yearly Maintenance	$5,300
10	Heavy Maintenance	$3,500

Benefits to the Association (Unit of Measure A.U.M.)

Year	Benefits
1 - 3	1410 A.U.M.'s
4 - 5	1238 A.U.M.'s
6 - 20	974 A.U.M.'s

Present Value of Costs - Same as Alternative for Three-Pasture Deferred-Rotation Grazing.

PVC 7% $57,823

PVC 10% $46,124

PVC 15% $33,353

Present Value of Benefits (PVB)

Year	Value of Benefits	Discount Factor	PVB 7%	PVB 10%	PVB 15%
1 - 3	1325 x $7.50 = $9938	1.6894	$16,789		
1 - 3	1325 x $7.50 = $9938	1.5778		$15,680	
1 - 3	1325 x $7.50 = $9938	1.4136			$14,048
4 - 5	1150 x $7.50 = $8625	.7130	6,150		
4 - 5	1150 x $7.50 = $8625	.6209		5,355	
4 - 5	1150 x $7.50 = $8625	.4972			4,288
6 - 20	974 x $7.50 = $7305	5.8286	42,578		
6 - 20	974 x $7.50 = $7305	5.03989		36,816	
6 - 20	974 x $7.50 = $7305	3.2304			23,598
			$65,517	$57,851	$41,934

A $7.50 per animal unit month fair market value was used for this analysis.

Net Present Worth (NPW) = PVB - PVC - Three-Pasture Rest-Rotation System

Discount Factor	
7%	NPW = $65,517 - $57,823 = $ 7,694
10%	NPW = $57,851 - $46,124 = $11,727
15%	NPW = $41,934 - $33,353 = $ 8,581

Benefit - Cost Ratio - Three-Pasture Rest-Rotation Grazing System

B/C = PV Benefit / PV Cost

7%	$65,517/$57,823 = 1.13
10%	$57,851/$46,124 = 1.25
15%	$41,934/$33,353 = 1.26

Four-Pasture Rest-Rotation System

Investment Costs

Activity Year	Activity	Cost
1 - 3	Construction of Improvements	$6,760
2 - 20	Yearly Maintenance	$5,610
10	Heavy Maintenance	$4,220

Benefits to the Association (Unit of Measure A.U.M.)

Year	Benefits
1 - 3	1435 A.U.M.'s
4 - 5	1305 A.U.M.'s
6 - 20	1106 A.U.M.'s

Present Value of Costs (PVC)

Activity Year	Activity Cost	Discount Factor	PVC 7%	PVC 10%	PVC 15%
1 - 3	$6760	1.6894	$11,420		
1 - 3	$6760	1.5778		$10,666	
1 - 3	$6760	1.4136			$ 9,556
2 - 20	$5610	8.7860	49,289		
2 - 20	$5610	6.7781		38,025	
2 - 20	$5610	4.6336			25,994
10	$4220	.5084	2,145		
10	$4220	.3855		1,627	
10	$4220	.2472			1,043
			$62,854	$50,318	$36,593

Present Value of Benefits (PVB)

Year	Value of Benefits	Discount Factor	PVB 7%	PVB 10%	PVB 15%
1 - 3	1370 x $7.50 = $10,275	1.6894	$17,359		
1 - 3	1370 x $7.50 = $10,275	1.5778		$16,212	
1 - 3	1370 x $7.50 = $10,275	1.4136			$14,525
4 - 5	1240 x $7.50 = $9300	.7130	6,631		
4 - 5	1240 x $7.50 = $9300	.6209		5,774	
4 - 5	1240 x $7.50 = $9300	.4972			4,624
6 - 20	1106 x $7.50 = $8295	5.8286	48,348		
6 - 20	1106 x $7.50 = $8295	5.03989		41,806	
6 - 20	1106 x $7.50 = $8295	3.2304			26,796
			$72,338	$63,792	$45,945

A $7.50 per animal unit month fair market value was used for this analysis.

Net Present Worth (NPW) = PVB - PVC - Four-Pasture Rest-Rotation System

Discount Factor	
7%	NPW = $72,338 - $62,854 = $ 9,484
10%	NPW = $63,792 - $50,318 = $13,474
15%	NPW = $45,945 - $36,593 = $ 9,352

Benefit - Cost Ratio - Four-Pasture Rest-Rotation Grazing System

$B/C = \frac{\text{PV Benefit}}{\text{PV Cost}}$

7%	$72,338/$62,854 = 1.15
10%	$63,792/$50,318 = 1.27
15%	$45,949/$36,593 = 1.26

Five-Pasture Rest-Rotation Grazing System

Investment Costs

Activity Year	Activity	Cost
1 - 3	Construction of Improvements	$13,700
2 - 20	Yearly Maintenance	$ 5,610
10	Heavy Maintenance	$ 6,500

Benefits to the Association (Unit of Measure A.U.M.)

Year	Benefits
1 - 3	1445 A.U.M.'s
4 - 5	1335 A.U.M.'s
6 - 20	1180 A.U.M.'s

Present Value of Costs (PVC)

Activity Year	Activity Cost	Discount Factor	PVC 7%	PVC 10%	PVC 15%
1 - 3	$13,700	1.6894	$23,145		
1 - 3	$13,700	1.5778		$21,616	
1 - 3	$13,700	1.4136			$19,366
2 - 20	$ 5,610	8.7860	49,289		
2 - 20	$ 5,610	6.7781		38,025	
2 - 20	$ 5,610	4.6336			25,995
10	$ 6,500	.5084	3,305		
10	$ 6,500	.3855		2,506	
10	$ 6,500	.2472			1,607
			$75,739	$62,147	$46,968

Present Value of Benefits (PVB)

Year	Value of Benefits	Discount Factor	PVB 7%	PVB 10%	PVB 15%
1 - 3	1390 x $7.50 = $10,425	1.6894	$17,612		
1 - 3	1390 x $7.50 = $10,425	1.5778		$16,449	
1 - 3	1390 x $7.50 = $10,425	1.4136			$14,737
4 - 5	1280 x $7.50 = $9,600	.7130	6,845		
4 - 5	1280 x $7.50 = $9,600	.6209		5,961	
4 - 5	1280 x $7.50 = $9,600	.4972			4,773
6 - 20	1180 x $7.50 = $8,850	5.8286	51,583		
6 - 20	1180 x $7.50 = $8,850	5.03989		44,594	
6 - 20	1180 x $7.50 = $8,850	3.2304			28,589
			$76,040	$67,004	$48,099

A $7.50 per animal unit month fair market value was used for this analysis.

Net Present Worth (NPW) = PVB - PVC - Five-Pasture Rest-Rotation System

Discount Factor	
7%	NPW = $76,040 - $75,739 = $ 301
10%	NPW = $67,004 - $62,147 = $4,857
15%	NPW = $48,099 - $46,968 = $1,131

Benefit - Cost Ratio - Five-Pasture Rest-Rotation Grazing System

$$B/C = \frac{\text{PV Benefit}}{\text{PV Cost}}$$

7%	$76,040/$75,739 = 1.00
10%	$67,004/$62,147 = 1.08
15%	$48,099/$46,968 = 1.02

Deferred - Rotation Grazing Analysis of Profit to Permittees

Year	3 Month Season
1 - 3	1290 A.U.M.'s or 430 animals
4 - 5	1080 A.U.M.'s or 360 animals
6 - 20	870 A.U.M.'s or 290 animals

Year 1 - 3 430 animals x 90% calf crop = 387 calves.

387 calves x 475 lb./calf = 183,825 lbs. of beef to market.

183,825 lbs. x $.35/lb. = $64,338.75.

Year 4 - 5 360 animals x 90% calf crop = 324 calves.

324 calves x 475 lbs./calf = 153,900 lbs. of beef to market.

153,900 lbs. x $.35/lb. = $53,865.

Year 6 - 20 290 animals x 90% calf crop = 261 calves.

261 calves x 475 lb./calf = 123,975 lbs. of beef to market.

123,975 lbs. x $.35/lb. = $43,391.

Three-Pasture Rest - Rotation Grazing System Analysis of Profit

Year	3 Month Grazing Season
1 - 3	1325 A.U.M.'s = 442 animals
4 - 5	1150 A.U.M.'s = 383 animals
6 - 20	974 A.U.M.'s = 325 animals

Year 1 - 3 442 animals x 90% calf crop = 398 calves.

398 calves x 475 lb./calf = 189,050 lbs. of beef to market.

189,050 lbs. x $.35/lb. = $66,167.50

Year 4 - 5 383 animals x 90% calf crop = 345 calves.

345 calves x 475 lb./calf = 163,875 lbs. of beef to market.

163,875 lbs. x $.35/lb. = $57,356.25.

Year 6 - 20 325 animals x 90% calf crop = 292 calves.

292 calves x 475 lbs./calf = 138,700 lbs. of beef to market.

138,700 lbs. x $.35/lb. = $48,545.

Four-Pasture Rest - Rotation Grazing System Analysis of Profit to Association.

Year	3 Month Season
1 - 3	1370 A.U.M.'s or 457 animals
4 - 5	1240 A.U.M.'s or 413 animals
6 - 20	1106 A.U.M.'s or 369 animals

Year 1 - 3 457 animals x 90% calf crop = 411 calves.

411 calves x 475 lbs./calf = 195,225 lbs. of beef to market.

195,225 lbs. x $.35/lb. = $68,328.75.

Year 4 - 5 413 animals x 90% calf crop = 372 calves.

372 calves x 475 lbs./calf = 176,700 lbs. of beef to market.

176,700 lbs. x $.35/lb. = $61,845.

Year 6 - 20 369 animals x 90% calf crop = 332 calves.

332 calves x 475 lbs./calf = 157,700 lbs. of beef to market.

157,700 lbs. x $.35/lb. = $55,195.

Five-Pasture Rest-Rotation Grazing System Analysis of Profit to Association.

Year	3 Month Season
1 - 3	1390 A.U.M.'s or 463 animals
4 - 5	1280 A.U.M.'s or 427 animals
6 - 20	1180 A.U.M.'s or 393 animals

Year 1 - 3 463 animals x 90% calf crop = 417 calves.

417 calves x 475 lbs./calf = 198,075 lbs. of beef to market.

198,075 lbs. x $.35/lb. = $69,326.25.

Year 4 - 5 427 animals x 90% calf crop = 384 calves.

384 calves x 475 lbs./calf = 182,400 lbs. of beef to market.

182,400 lbs. x $.35/lb. = $63,840.

Year 6 - 20 393 animals x 90% calf crop = 354 calves.

354 calves x 475 lbs./calf = 168,150 lbs. of beef to market.

168,150 lbs. x $.35/lb. = $58,852.50.

Summary of Net Present Worth of Alternatives

Discount Factor	Three-Pasture Deferred-Rotation	Three-Pasture Rest-Rotation Grazing	Four-Pasture Rest-Rotation Grazing	Five-Pasture Rest-Rotation Grazing	Season-Long Grazing
7%	$ 2,329	$ 7,694	$ 9,484	$ 301	$ 5,188
10%	7,055	11,727	13,474	4,857	- 399
15%	5,429	8,581	9,352	1,131	- 701

Summary of Benefit-Cost Ratios for Alternatives

Discount Factor	Three-Pasture Deferred-Rotation	Three-Pasture Rest-Rotation Grazing	Four-Pasture Rest-Rotation Grazing	Five-Pasture Rest-Rotation Grazing	Season-Long Grazing
7%	1.04	1.13	1.15	1.00	.90
10%	1.15	1.25	1.27	1.08	.99
15%	1.16	1.26	1.26	1.02	.98

Summary of Market Values to Permittees from Implementation of Various Grazing Systems

Three-Pasture Deferred-Rotation		Three-Pasture Rest-Rotation		Four-Pasture Rest-Rotation		Five-Pasture Rest-Rotation	
Year		Year		Year		Year	
1 - 3	$64,338	1 - 3	$66,167	1 - 3	$68,329	1 - 3	$69,326
4 - 5	$53,865	4 - 5	$57,356	4 - 5	$61,845	4 - 5	$63,840
6 - 20	$43,391	6 - 20	$48,545	6 - 20	$55,195	6 - 20	$58,852

IX. EVALUATION OF ALTERNATIVES

The preferred alternative from among those considered in this report has been evaluated using the information in the preceding section as displayed in Table 1. The alternatives were rated according to the evaluation criteria listed in section III of the report. Points from one to three were given for each criteria, one being the least acceptable and three being the most acceptable. The preferred alternative is the one rating the highest total numerical score.

TABLE 1

Evaluation Criteria	Alternatives Considered: Alternative #1 Season-Long Use	Alternative #2 Deferred-Rotation	Alternative #3 Rest-Rotation
1. Utilize the resource consistant with other resource values, such as soil, watershed, wildlife, recreation, & timber.	1	2	3
2. Maintain a sustained yield of forage for domestic livestock and wildlife.	1	2	3
3. Reverse the downward trend in the ecological condition of the vegetation cover for maintaining and managing soil stability for the watershed.	1	2	3
4. Coordinate the grazing of livestock with the other resources.	1	2	3
5. Promote stability of family ranches and farms affected.	1	2	3
6. Secure management and appropriate treatment where the vegetation and soils are ecologically poor.	1	2	3
7. Achieve and maintain stable stream channels to maintain a high quality of water production from the watershed.	1	2	3
TOTAL	7	14	21

Rest-rotation grazing, according to this analysis is the preferred alternative, rating highest in total score.

Specific design of a rest-rotation grazing system can vary, depending on the number and configuration of the pasture units. Analysis of three rest-rotation systems for the Lake Ellen Allotment has been made in the Evaluation Report, Appendix I of this report. A four-pasture system is indicated as being most suitable on this allotment by this analysis.

XI. MANAGEMENT REQUIREMENTS AND CONSTRAINTS

Management requirements and constraints as discussed in this section of the Environmental Assessment Report and Range Management Plan will serve as instructions for implementing, maintaining, and monitoring the preferred grazing system. Also, this section identifies coordination needs and specified measures that may be necessary to preclude or mitigate adverse effects of grazing on the resources.

Season of Use and Stocking

Allowable grazing use under the preferred grazing system as described in Section X will be 1110 A.U.M.'s. In as much as the National Forest allotment is a part of an integrated management system utilizing private and leased lands, the season of use and the actual number of animals may vary from year to year depending on the use made of the associated lands. Total use, however, is not to exceed 1110 A.U.M.'s. The general season of use will not begin prior to about June 1, and the season shall

end no later than about October 10 on the Lake Ellen Allotment. The actual beginning of the grazing season will not begin prior to range readiness as determined by certain plant development indicators. Indicators of range readiness to be used are:

Grasses

Bluebunch Wheatgrass	Leaves about 8" in height, seed stalks showing.
Idaho Fescue	Leaves 5" in height, seed heads present.
Pinegrass	Leaves 4-6" in height.

Forbs

Western Yarrow	Flower stalks beginning to show.
Arrowhead Balsamroot	Leaves about 3/4 developed, beginning to bloom.
Dandelion	Leafage developed, full bloom.

Shrubs

Serviceberry	Part of blooms out.
Snowberry	7 to 8 pairs of leaves unfolded from each bud.

Soils

Upland sites should be fairly dry and firm. Wet or moist meadow areas should be dry enough to carry stock without breaking sod or destroying the cover.

The approximate season of use will average about three months. A three-month season would allow 369 head of cows and calves to utilize the allotment.

Stocking rates are subject to change pending verification of allotment capacity through production and utilization studies.

The Lake Ellen Allotment is to be managed under a four-pasture rest-rotation grazing system. (See Range Allotment Map, Appendix F, for pasture unit boundaries.)

Approximate gross capacities of the pasture units are as follows:

	Unit A	Unit B	Unit C	Unit D
	Ledgerwood	Cedar Ridge	Dollar	White
AUM's	514	450	346	329

The rest-rotation grazing system is summarized below:

	Pasture Unit			
	Ledgerwood	Cedar Ridge	Dollar	White
Year	A	B	C	D
1	D	E	E	R
2	E	R	E	D
3	E	D	R	E
4	R	E	D	E
	Repeat Cycle			

Treatments are:

E - Early season grazing for maximum livestock production.

R - Rest entire season for range improvement.

D - Defer until late season for establishment of plant vigor, seed production, and establishment of new plants.

Actual use dates and livestock numbers, within the constraints of the indicated capacity, will be determined yearly and agreed to jointly by the Association and the Forest Service as specified in Section C-4 of the Grazing Agreement between the Forest Service and Lake Ellen Grazing Association. Such agreements will be documented in writing in the form of Annual Use Plans.

The White pasture unit, Unit D, is higher in elevation than units A, B, and C. Thus, range readiness dates are three to four weeks later than the lower areas. The approximate range readiness for Unit D is 6/21. When livestock are scheduled to go directly from private or leased lands to Unit D, turn on will have to be delayed until the later range readiness date.

Herd Management

Cattle entering the allotment from private or leased lands may be trailed or trucked to the appropriate pasture unit.

Roundup in the fall is to be completed in a timely manner. All cattle are to be off of the allotment by the date called for in the Annual Use Plan.

Livestock move dates between early use and deferred pasture units may vary from year to year, depending on maturation dates of the forage species and actual utilization within the pastures. Moves between pastures should not be made until after seed maturation on bunchgrass

to take full advantage of the value of deferment. However, if impacts on the resources of the allotment exceed the planned limits prior to that time, moves between units should be made then.

Planned impacts under the various pasture treatments are:

Early Use and Deferred Pastures - Utilization of key forage species not to exceed about 65% by weight of current seasons growth. Approximate minimum stubble heights are: Bluebunch Wheatgrass - 2-4", Idaho Fescue - 2", Kentucky Bluegrass - 1", Pinegrass - 2". Use on key browse species not to exceed 65% of current annual leader growth. Soil disturbance from trampling, tracks, downslope displacement, sod breakage, exposure of roots, uprooting or burial of plants not to exceed 20% of soil surface.

Rested Pasture - No use on forage species allowed during the grazing season by livestock. Resource damage will be considered to have occurred if any use of this pasture is made.

Additionally, on key deer winter range, the allowable impact on key browse species such as serviceberry and red stem ceanothus, by cattle, shall not exceed 50% of current years leader growth.

The soil disturbance criteria will be the overriding resource impact determining proper use under this grazing system.

Moves between the early use and deferred pasture units should be accomplished within about four days after the agreed upon move date. Moves should begin about three days prior to the move date. The early-use pasture should be cleared of cattle as much as possible by four days after the move date.

Permittees should watch for overgrazing and soil damage throughout the grazing season and take appropriate action if problems should develop.

Riding will be necessary to assure proper livestock distribution and movement, and to assure that livestock have a continual supply of salt and water.

Livestock salting will be done by the "drop salting" method. That is, no permanent salt ground will be used. Salt will be placed away from areas of concentrated use and moved to "fresh feed" areas as proper use is approached adjacent to salt locations. Salt will be used to the extent practicable to affect good livestock distribution. Salt should be distributed within a pasture unit prior to moving stock in, and picked up before moving them out, to enhance movement. As a general rule, salt should not be placed within 1,000 feet of any water source, or on or immediately adjacent to a road, unless for a specific management purpose, such as to increase utilization in the area or to aid in gathering stock at the end of the grazing season. Salt should not be placed directly on the ground. Stumps, rocks, downed trees, or portable salt boxes should be utilized where practical.

Allotment Inspections and Studies

Range readiness checks will be made on the allotment as deemed necessary to determine yearly turn-on dates, and establish long-term average range-readiness dates. Range-readiness checks will be made on one or more key areas on the allotment. Range-readiness criteria is as discussed under Season of Use and Stocking.

Production and utilization plots are to be established on selected key areas of the allotment during the spring of 1978. These plots are to be read yearly near the end of the use period to verify allotment capacity and monitor utilization. Utilization is to be measured according to the paired plot or actual weight method. Key area locations are shown on the Range Allotment Map, Appendix F. A tabulation of key areas, their locations, and their key species is as follows:

Key Area		Location			
No.	Name	Tp.	Rng.	Sec.	Key Species
1	Barnaby Ck.	35N	36E	SE¼ SW¼ 33	Feid, Caru
2	Viewpoint Spr.	35N	36E	SW¼ NE¼ 22	Agsp, Feid
3	Cedar Ridge	35N	35E	NE¼ SW¼ 13	Feid
4	South Huckleberry	35N	36E	SW¼ SW¼ 15	Feid
5	Cedar Ridge Road	35N	36E	NW¼ NW¼ 24	Feid, Agsp
6	Dollar Mtn.	35N	36E	SE¼ SW¼ 36	Caru
7	Stall Ck.	35N	35E	NE¼ SW¼ 34	Caru

There is one permanent range trend cluster established on the allotment. This is at the Cedar Ridge Road key area. Additional range trend clusters are needed on the allotment. These should be established in conjunction with key areas number 2, 6, and 7. The photo trend method of sampling as described in Region 6 Regional Guide 2-1, July 1976, should be used in setting up these transects. Transects should be read at a minimum of every five years and preferably at the end of each grazing cycle.

At least two range inspections should be made each year on the allotment. The first should be made prior to the anticipated move date from early pasture to deferred pasture to determine utilization within the early pasture and to check plant development in the deferred pasture. The second inspection should be made near the end of the grazing season to determine livestock impacts in the deferred pastures. Effectiveness of the management systems and problem areas can be noted during these inspections. The permittees will be invited to accompany the Forest Officer on these inspections and share in gathering of the necessary data.

Cattle are to be counted by the Forest Service as they enter the allotment.

Range improvements will be spot checked periodically to assure that they are being maintained and to assess their effectiveness.

An annual plan of use will be prepared yearly by the Forest Service and the Association to define how the range will be used for the coming

year. Compliance with this plan as well as the terms of the Grazing Agreement and provisions of the management plan will be checked yearly.

Range Improvement Construction

A schedule for constructing range improvements needed for implementation of the rest-rotation system of management is listed in Appendix D-2, Proposed Range Improvements.

Priorities for construction from first to last are:

1. Cedar Ridge Fence.
2. Canyon Creek Trail Fence.
3. Onion Ridge Fence.
4. Ellen Water Development.
5. Dollar Mtn. Water Development.
6. White Mtn. Water Development.
7. Stall Creek Water Development.
8. Onion Ridge Corral.

Additional improvements may be added to this list as necessary.

All improvement work will be covered by a cooperative agreement between the Association and Forest Service. Construction will be in accordance with Region 6 range improvement standards.

Interim Actions

The present permitted grazing use on the allotment is 1,500 A.U.M.'s.

Indicated capacity is 1,110 A.U.M.'s. A program of reductions will be necessary to bring permitted use in line with the indicated capacity. Also, at the same time, improvements are needed to facilitate implementation of the four-pasture rest-rotation grazing system.

A three-year program of reductions is planned beginning in 1979 to bring the actual use in line with the indicated capacity. The following table displays the planned stocking rates over the three-year period until indicated capacity is achieved:

Year	AUM's Permitted	Amt. of Reduction	% Decreased
1979	1380 AUM's	120/AUM's	8%
1980	1245 AUM's	135/AUM's	9%
1981	1110 AUM's	135/AUM's	9%
	3735 AUM's	390/AUM's	26%

An ongoing monitoring program to monitor actual utilization will be initiated in 1978 to verify allotment capacity. Adjustments in the reduction program may be made as indicated by the results of this monitoring. Range productivity and use patterns. Adjustments in allowable use will be made to correspond with capacity estimates after reevaluations are made.

Correlation with Other Uses and Activities

The Lake Ellen Campground is the only developed campground in the area of the allotment. Cattle use is restricted in the campground. Fences and natural barriers serve to prevent cattle from entering the campground.

However, occasional cattle use has been noted within the restricted area. When this happens, the Association will be asked to remove their cattle promptly. Maintenance of restriction fences should be timely and kept up to prevent this situation as much as possible.

Several timber sales are either operating on this allotment at this time or are proposed for sale in the near future. Where erosion control seedings and tree planting are used to control erosion and restock the area, cattle control will be necessary following the activity to allow establishment of these practices. It is suggested that cattle be excluded from these areas for at least two growing seasons following the activity. This can normally be done by scheduling the rest and deferment periods of the rest-rotation system within the areas needing protection during the times it is needed. Coordination efforts between timber management and range management that may minimize the need for adjusting the normal prescribed grazing schedule are:

1. Restricting timber sales to one pasture unit within the allotment.
2. Timing logging so that units of the sale within only one pasture unit are completed per year.
3. Utilizing temporary fences to restrict cattle from activity areas needing protection.

Other grazing practicies that may be necessary to achieve the needed protection on activity areas are herding and distributing cattle away from these areas, and through partial non-use of the grazing permit which allows non-use of the area affected.

The needs for each timber sale will have to be evaluated on a case by case basis for the necessity of the above practices. Specific actions will be defined in the annual plan of grazing use.

Annual allotment use plans should be coordinated with timber sale logging plans to prevent or mitigate conflicts that may result due to cattle grazing within a timber sale during logging activity.

Several natural barriers to cattle movement have been identified as occurring on the allotment. In many instances, these are used as pasture unit or allotment boundaries. Dense timber stands are often a major portion of these barriers. Timber sale activity has the potential of removing these barriers with roads or removal of the restricting timber. When this occurs, provisions should be made to replace the barrier or otherwise restore a means of controlling livestock movement.

Key winter deer range on the east side of the allotment is necessary for the winter food requirement of a number of deer that winter in that area. Cattle use on this range must be such that sufficient browse is left at the end of the grazing season to sustain the winter needs of these deer. It is felt that grazing capacity allowed for wildlife and proper use standards on browse set for this area will insure that this need is met.

Continuing coordination with the use of the Association's private and leased land consistant with the concepts under which the Association was formed is necessary to insure the best use of all resources involved and to implement sound conservation practices.

XII. CONSULTATION WITH OTHERS

The Environmental Assessment for this report was completed by an interdisciplinary Forest Service team which represented, among other disciplines, soil science, hydrology, wildlife, biology, forestry, and range conservation.

Inputs and comments were requested by letter from the following individuals and agencies from outside the Forest Service whose comments have been written into the various sections of this plan:

1. Steve Zender - Wildlife Biologist, Washington State Dept. of Game.
2. Colville Confederated Tribes - Inchelium, Washington.
3. Linda Bond - Chairperson, Northern Rockies Chapter, Sierra Club.
4. U.S.D.A. Soil Conservation Service - Republic, Washington.
5. Ferry County Commissioners - Republic, Washington.

Correspondence between these individuals and agencies concerning this Environmental Assessment Report and Management Plan is on file in the 2210 Analysis and Plans file at the Kettle Falls Ranger District.

In addition to the above individuals and agencies, the Lake Ellen Grazing Association was involved in this Environmental Assessment and Range Management Plan through personal contacts, meetings, and correspondence.

XIII. FINDING OF NO SIGNIFICANT EFFECT

Implementation of the preferred action evaluated and selected through this Environmental Assessment process will not constitute a major action significantly affecting the quality of the environment. Generally accepted and tested principles of range management have been used in designing the selected alternative. When applied according to the requirements specified in this report, little or no adverse environmental effects will occur.

Response from individuals and agencies from outside the Forest Service indicate that this alternative is neither highly controversial or of great concern to the respondents.

The Environmental Assessment Report indicates there will be no significant effect on the environment. Therefore, it has been determined that an Environmental Statement will not be prepared.

Robert B. Tennill — 1/2/79

Forest Supervisor — Date

GRAZING ALLOTMENT SUMMARY SHEET

Forest Colville
District Kettle Falls

Allotment Lake Ilen
Field Work: Date Completed 7/77 By W. B. Reed
Summary: Date Completed 2/23/78 By W. B. Reed

Gross Acres of Allotment	20,578	Acres
Alienated Land	0	Acres
Net National Forest Land	20,578	Acres
Net Other Land	0	Acres
Total Net Acres in Allotment	20,578	Acres
Closed to Grazing	0	Acres
Unsuitable	7,664	Acres
Suitable	12,914	Acres

	Range Type	Condition Class										
		Excellent		Good		Fair		Poor		Very Poor		
		Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Total Acre
	P1B					114	160	132	117			246
	P2D							16	1,274			16
	P5S					287	415					287
	P6AC			277	545	454	330	323	140			1,054
	P6S			99	240	1,315	476	352	260			1,766
	P6N					917	530	1,084	210	849	50	2,850
	P6AP					751	190	50	270			801
*	T7CP											127
**	T7AP											447
	S5N			95	300							95
	S6AC					2,317	55					2,317
	S6S							312	105			312
	S6AP			940	300	1,656	180					2,596
				1411		7,811		2269		849		

* 1385 lbs/Ac

** 300 lbs/Ac

GRAZING ALLOTMENT SUMMARY SHEET

Forest Colville
District Kettle Falls

Allotment Lak Ellen - Unit #1 Ledgerwood
Field Work: Date Completed 7/77 By W.B. Reed
Summary: Date Completed 2/23/78 By W.B. Reed

Gross Acres of Allotment	4,914	Acres
Alienated Land		Acres
Net National Forest Land	4,914	Acres
Net Other Land		Acres
Total Net Acres in Allotment	4,914	Acres
Closed to Grazing		Acres
Unsuitable	623	Acres
Suitable	4,291	Acres

Range Type	Condition Class										
	Excellent		Good		Fair		Poor		Very Poor		
	Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Total Acre
P1B					114	160					114
P2D							16	1,274			16
P5S					233	415					233
P6S					554	476	52	260			606
P6AC					39	330	323	140			362
P6N							965	210	568	50	1,533
P6AP					412	190					412
T7CP-S											
T7AF-S											
S6S							292	105			292
S6AC					643	55					643
S6AP					80	178					80

GRAZING ALLOTMENT SUMMARY SHEET

Forest Colville
District Kettle Falls

Allotment Lake len - Unit #2 Cedar Ridge
Field Work: Date Completed 7/77 By W.B. Reed
Summary: Date Completed 2/23/78 By W.B. Reed

Gross Acres of Allotment	3,865	Acres
Alienated Land		Acres
Net National Forest Land		Acres
Net Other Land		Acres
Total Net Acres in Allotment		Acres
Closed to Grazing		Acres
Unsuitable	564	Acres
Suitable	3,301	Acres

Range Type	Condition Class										
	Excellent		Good		Fair		Poor		Very Poor		
	Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Total Acre
P1B											
P2D											
P5S					54	415					54
P6S			99	240	731	476	207	260			1,037
P6AC					180	330	54	140			234
P6N					182	530	119	210	281	50	582
P6AP					169	190					169
T7CP											
T7AF											
S5N			95	300							95
S6S							20	105			20
S6AC					176	55					176
S6AP					934	178					934

GRAZING ALLOTMENT SUMMARY SHEET

Forest Colville
District Kettle Falls

Allotment Lake Ellen - Unit #3 Dollar
Field Work: Date Completed 7/77 By W.B. Reed
Summary: Date Completed 2/23/78 By W.B. Reed

Gross Acres of Allotment	7,676	Acres
Alienated Land		Acres
Net National Forest Land		Acres
Net Other Land		Acres
Total Net Acres in Allotment		Acres
Closed to Grazing		Acres
Unsuitable	4,783	Acres
Suitable	2,893	Acres

Range Type	Condition Class										
	Excellent		Good		Fair		Poor		Very Poor		
	Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Total Acre
P1B							132	117			132
P2D											
P5S											
P6S											
P6AC											
P6N					396	530					396
P6AP					170	190					170
* T7CP											127
** T7AP											305
S1B											
S5N											
S6AC					1,498	55					1,498
S6AP			210	300	55	178					265

* 1385 lbs/Ac forage available
** 300 lbs/Ac forage available

GRAZING ALLOTMENT SUMMARY SHEET

Forest Colville
District Kettle Falls

Allotment Lake en - Unit #4 White
Field Work: Date Completed 7/77 By W.B. Reed
Summary: Date Completed 2/23/78 By W.B. Reed

Gross Acres of Allotment	4,123	Acres
Alienated Land		Acres
Net National Forest Land		Acres
Net Other Land		Acres
Total Net Acres in Allotment		Acres
Closed to Grazing		Acres
Unsuitable	1,637	Acres
Suitable	2,486	Acres

Range Type	Condition Class										
	Excellent		Good		Fair		Poor		Very Poor		
	Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Acres	lbs/Ac	Total Acre
P1B											
P2D											
P5S											
P6S							96	260			96
P6AC			277	545	235	330					512
P6N					339	530					339
P6AP							50	270			50
T7CP											
* T7AP											172
S1B											
S5N											
S6AC											
S6AP			730		587						1,317

* 300 lbs/Ac forage available

VEGETATIVE AND SOIL CONDITION TREND SUMMARY

Forest Colville Allotment Lake Ellen Pasture Unit

District Kettle Falls Date 3/10/78 By W. B. Reed

Primary Range

Condition Class	Vegetative Trend (acres)				Soil Trend (acres)			
	UP	Down	Static	Total	Up	Down	Static	Total
Excellent					935		784	1,719
Good	277	99		376	1,029	611	2,901	4,541
Fair	1,877	601	1,360	3,838	49	711		760
Poor	120	1,552	285	1,957				
Very Poor			849	849				
Total	2,274	2,252	2,494	7,020	2,013	1,322	3,685	7,020
Percent	33	32	35		29	19	52	

Secondary Range

Condition	Vegetative Trend (acres)				Soil Trend (acres)			
	Up	Down	Static	Total	Up	Down	Static	Total
Excellent							1,656	1,656
Good			1,035	1,035			3,664	3,664
Fair		3,104	869	3,973				
Poor			312	312				
Very Poor								
Total		3,104	2,216	5,320			5,320	5,320
Percent		58	42				100	

U.S. DEPARTMENT OF AGRICULTURE

Forest Service

Range Improvement Summary
Existing - ~~Proposed~~
(Strike out one)

	Imp. No.	Improvement Name	Location	Units	Kind of Construction	year Comp.	Construction Maintenance Responsibility	Remarks
*	301	Barnaby C. G.	Twp 35N Rng 36E SW SE Sec. 33	1	14' steel deck, timber base	1960	F.S.	
	302	Cottonwood C. G.	Twp 35N Rng 36E NE NE Sec. 30	1	14' steel deck, timber base	1971	F.S.	
	303	Sherman C. G.	Twp 35N Rng 35E NE SE Sec. 16	1	14' steel deck, timber base	1973	F.S.	
	304	Stall C. G.	Twp 35N Rng 35E SE SE Sec. 33	1	steel deck, timber base	1976	F.S./B.I.A.	
	305	Lake Ellen Trail	Twp 35N Rng 36E Secs. 11,14,15,22, 27,28,33	1.5 mi.		1950	L.E.G.A.	
	306	Cottonwood Water Development	Twp 35N Rng 36E NE NW Sec. 20	1	metal trough (400 gals)	1950	L.E.G.A.	Reconstructed in 1976
	307	Mule Camp Water Development	Twp 35N Rng 36E NE NW Sec. 19	1	metal trough (400 gallon)	1970	L.E.G.A.	
	308	Nueske Water Development	Twp 35N Rng 36E NW NE Sec. 17	1	metal trough	1970	L.E.G.A.	
	309	LaFluer Water Development	Twp 35N Rng 36E SW SE Sec. 11	1	wooden plank trough	1970	L.E.G.A.	
	3010	Viewpoint Water Development	Twp 35N Rng 36E SW NE 22	1	~~wooden~~ trough Metal	1970	L.E.G.A.	

*First two digits of improvement number are the allotment TRI number.

U.S. DEPARTMENT OF AGRICULTURE

Forest Service

Range Improvement Summary
Existing - ~~Proposed~~
(Strike out one)

Imp. No.	Improvement Name	Location	Units	Kind of Construction	year Comp.	Construction Maintenance Responsibility	Remarks
3011	South Cedar Ridge Water Development	Twp 35N Rng. 35E NE NW Sec. 23	1	metal trough		L.E.G.A.	
3012	Onion Water Development	Twp 35N Rng 35E SW NW Sec. 34	1	wooden plank trough	1971	L.E.G.A.	
3013	South Huckleberry Water Development	Twp 35N Rng 36E NE NE Sec. 21	1	wooden plank trough	1950	L.E.G.A.	needs reconstruction
3014	Upper Barnaby C.G.	Twp 35N Rng 36E NE NE Sec. 30	1	14' steel deck, timber base	1973	F.S.	
3015	Lake Ellen Fence	Twp 35N Rng 36E Secs. 27 & 34	1 mi.	four wire, steel post	1960	L.E.G.A.	added to in 1975
3016	Cottonwood Fence	Twp 35N Rng 36E Secs. 20,21,29,30	2 mi.	three wire, steel post	1971	L.E.G.A.	
3017	Upper Barnaby Fence	Twp 35N Rng 35N SE Sec. 23	.25 mi.	three wire, steel post	1973	L.E.G.A.	
3018	Sherman Fence	Twp 35N Rng 35E SE Sec. 16	.25 mi.	4 wire, steel and wooden post	1973	L.E.G.A.	Allotment Boundary Fence
3019	Barnaby/BIA Fence	Twp 35N Rng 36E Secs. 32,33	.8 mi.	4 wire, steel and wooden posts	1970	L.E.G.A.	Allotment and Forest Boundary Fence

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Range Improvement Summary
Existing - ~~Proposed~~
(Strike out one)

Imp. No.	Improvement Name	Location	Units	Kind of Construction	year Comp.	Construction Maintenance Responsibility	Remarks
3020	Dollar/BIA Fence	Twp 35N Rng 35E Sec. 36	.6 mi.	4 wire, steel and wooden posts	1970	L.E.G.A.	Allotment and Forest Boundary Fence. Not exactly on line.
3021	Stall/BIA Fence	Twp 35N Rng 35E Secs. 33 & 34	1 mi.	4 wire, steel posts	1976	L.E.G.A.	Allotment and Forest Boundary Fence
3022	Sleepy Hollow/BIA Fence	Twp 35N Rng 35E Secs. 31,32,33 Twp 35N Rng 34E Sec. 30 36	2.3 mi.	4 wire, steel posts	1970	L.E.G.A.	Allotment and Forest Boundary Fence

U.S. DEPARTMENT OF AGRICULTURE

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Range Improvement Summary

~~Existing~~ - Proposed

(Strike out one)

Imp. No.	Improvement Name	Location	Units	Kind of Construction	year Comp	Construction Maintenance Responsibility	Remarks
3027	Cedar Ridge Fence	Twp 35N Rng 35E Sec. 14 & 15	1.2 mi.	4 wire, steel posts	1978	Construction: F.S. 50% L.E.G.A. 50% Maintenance: 100% L.E.G.A.	Allotment Boundary Fence. Est. total cost: $2,760
3028	Canyon Creek Trail Fence	Twp 35N Rng 36E Sec. 8 & 9	.5 mi.	4 wire, steel posts	1979	Construction: F.S. 50%, L.E.G.A. 50% Maintenance: 100% L.E.G.A.	Allotment Boundary Fence. Extension of an existing fence. Est. total cost: $1,150
3029	Onion Ridge Fence	Twp 35N Rng 35E Sec. 28	.5 mi.	3 wire, steel posts	1979	Construction: 50% F.S. 50% L.E.G.A. Maintenance: 100% L.E.G.A.	Separates Dollar and White units. May need a cattleguard across White Mountain Rd. at some future time.
3030	Onion Ridge Corral	Twp 35N Rng 35E Sec. 28	1	pole with loading chute	1980	Construction: 50% F.S., 50% L.E.G.A. Maintenance: 100% L.E.G.A.	

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Range Improvement Summary
Existing - ~~Proposed~~
(Strike out one)

Imp. No.	Improvement Name	Location	Units	Kind of Construction	year Comp.	Construction Maintenance Responsibility	Remarks
3023	√ Ellen Water Developement	Twp 35N Rng 36 E SW SE Sec. 22	1	steel trough, fenced enclosure	1980	Construction: F.S. 100% Maintainance: 100% LEGA	Est. cost $1300
3025	√ Snow Camp Water Develepement	Twp 35N Rng 35E NE SW Sec. 30	1	steel trough, fenced enclosure	1980	Construction: F.S. 100% Maintainance: 100% LEGA	Est. cost $1300
3031	√ SW White Mtn. Water Developement	Twp 35N Rng 34E NW SE Sec. 36	1	steel trough, fenced enclosure	1980	Construction: F.S. 100% Maintainance: 100% LEGA	Est. cost $1300
3029	√ Onion Ridge Fence	Twp 35N Rng 35E Sec. 28	0.5 miles	3 wire, steel posts	1980	Construction: F.S. 100% Maintainance: 100% LEGA	Est. cost $750.60
3031	√ Diane Spr. Water Developement	Twp 35N Rng 35E SE NW Sec. 28	1	steel trough, fenced enclosure		Construction: F.S. 100% Maintainance: 100% LEGA	Est. cost $1300

RANGE ANALYSIS EVALUATION REPORT

LAKE ELLEN ALLOTMENT

I. NARRATIVE

Initial range environmental analysis field work was completed on the Lake Ellen Allotment during the summer of 1977 by W. Bradley Reed, Range Conservationist, U.S. Forest Service. Range types were mapped utilizing aerial photo interpretation and field observations. Data on vegetative cover, composition, forage production, and range suitability were gathered using procedures outlined in the Range Environmental Analysis Handbook, FSH 2209.21, R6. Range condition was evaluated by using standard condition guides developed by the U.S. Forest Service, Region 6. Range trend was evaluated from observations made of indicators of trend as discussed in FSH 2209.21, R6 and other sources.

Vegetative conditions on the allotment were found to be generally poor to fair with soil condition being fair or better. Vegetative trends were found to be approximately equally divided between upward, downward and static. Soil trend was found to be generally static.

This data indicates the need for improved management on the allotment as evidenced by the large amount of acreage in poor or fair vegetative condition and downward or static trend.

The indicated capacity of the allotment is estimated to be approximately 25% below what is currently permitted.

Measures felt necessary to encourage upward trends and improve vegetative condition are to implement a rest rotation grazing system of management and to reduce the stocking rate to the indicated capacity.

Potential for range improvement appears to be good on this allotment due to the favorable soil-moisture relationships and the predominate vegetation which responds readily. Improved range condition will result in increased carrying capacity.

A. MANAGEMENT PROBLEMS AND CONSIDERATIONS

Over the course of the initial field evaluation of the allotment several situations were observed which are problems for management or considerations that need to be taken into account in designing management for the future. A discussion of these follows:

1. Range Readiness:

The allotment ranges in elevation from approximately 2,200 feet above sea level to 6,921 feet on White Mountain. Because of this great difference in elevation, yearly plant development is not uniform across the whole allotment.As a result, the range readiness date does not coincide on all portions of the allotment. Generally the elevation increases from East to West on the Lake Ellen allotment. The higher areas on the West side of the allotment are typically up to 3 to 5 weeks later in range readiness than the lower, eastern portions of the allotment. This fact complicates designing a grazing

systems for the allotment since higher areas may not be ready for use by the normal turn-on dates making them unavailable for early season use. On the other hand, if the turn-on date was adjusted to coincide with range readiness at the higher elevations, the low elevation forage would be well beyond its prime in nutrient value at the time of turn on thus missing the opportunity to use it when it would give the best results in terms of livestock production.

A variable opening date for grazing may be a solution to this problem. Another alternative to this problem may be to develop management systems for the low and high portions of the allotment independent of each other and manage it with two herds of cattle.

2. Herd Management:

Because of rough, often steep terrain and dense brushy vegetation, herding of cattle and roundup is difficult. For this reason, management systems should be designed with a minimum of moves between pasture units and moves should be as logical and natural as possible. Also, permittees will have to intensify riding and herding, within economic limitations, to accomplish the objectives and requirements of the management plan.

Because cattle will be confined to pasture units under an improved management system rather than allowed to wander over the entire allotment, roundup should be easier because less area will have to be covered.

3. Allotment Boundary Control:

Each year a number of cattle from the Lake Ellen Allotment have drifted off of the allotment into Sherman Creek and Canyon Creek. Also, to a lesser extent, cattle have drifted into Hall Creek from the White Mountain area. This drift has caused problems with unauthorized use on other allotments, conflicts with other resource uses, as well as accountability of Lake Ellen cattle at the end of the grazing season. Riding has proven ineffective in controlling this cattle drift, which indicates the need for fencing controls. Fences are needed on Cedar Ridge, across the Canyon Creek trail, and possibly between White Mountain and Hall Creek. A total of approximately 2 miles of allotment boundary fence is indicated at this time.

4. Range Improvements:

Many range improvements exist on the allotment. Several of the water developments are in deteriorated condition. This, in many cases is limiting the capacity of the range by limiting the number of cattle that can utilize the development. In order to fully utilize the potential of these water developments, considerable maintenance will have to be done to restore them to effective working order.

5. Access Between Upper Ledgerwood and Cedar Ridge:

Upper Ledgerwood and Cedar Ridge are two key grazing units. At this time there is no good route to move cattle between these areas. A trail needs to be constructed to give access between them and facilitate cattle movement.

6. Key Areas:

Several areas have been identified that are felt will serve as a reflection of overall range "health" on the allotment. It is felt that these areas will be the first to respond, either positively or negatively, to range management practices. For these reasons it is recommended to establish key areas at these locations and to monitor yearly production and utilization at these sites. Following is a list of key areas.

Number	Name	Location Twp.	Range	Section	Key Species
1.	Barnaby Creek	35N	36E	SE¼SW¼33	Feid, Caru
2.	Viewpoint Spr.	35N	36E	SW¼NE¼22	Agsp, Feid
3.	Cedar Ridge	35N	35E	NE¼SW¼13	Feid
4.	South Huckleberry	35N	36E	SW¼SW¼15	Feid
5.	Cedar Ridge Road	35N	36E	NW¼NW¼24	Feid, Agsp
6.	Dollar Mtn.	35N	36E	SE¼SW¼36	Caru
7.	Stall Creek	35N	35E	NE¼SW¼34	Caru

A permanent trend study is established on the Cedar Ridge Road key area. Additional trend studies should be established on the Viewpoint Spring, Stall Creek, and Dollar Mountain key areas in 1978 utilizing the Range Trend Sampling by photographs technique (USDA Forest Service, Pacific Northwest Region, R-6 Regional Guide 2-1, July 1976). Transects should be read at a minimum of every five years.

The effectiveness of key areas should be evaluated yearly. Key area locations should be changed if they are not adequately monitoring utilization on the allotment.

B. MANAGEMENT ALTERNATIVES

Four alternatives to range management have been considered for the Lake Ellen Allotment. These are designed to take advantage of existing range improvements as well as potential improvements which would improve animal distribution and increase allotment capacity.

Cattle movement between pasture units was also considered in designing the grazing system. An attempt was made to consider systems which require the minimal amount of cattle movement. Where movement is necessary, an attempt was made to use the most logical and natural movement.

A discussion of the management alternatives follows:

Alternative # 1 -- 3 pasture deferred rotation

* Pasture Units

Ledgerwood
Cedar Ridge
Dollar/White

Proposed Deferrment Schedule

Year	Pasture Unit Ledgerwood	Cedar Ridge	Dollar/White
1	Early	Mid	Deferred
2	Deferred	Early	Mid
3	Early	Deferred	Mid
		Repeat Cycle	

Deferment in this case means delaying use until after forage species have been allowed to mature. Indicators that will be used to indicate plant maturity will be seed set on bunchgrass.

Improvements necessary to implement this system are as follows:

1.	Cedar Ridge Boundary Fence - approx. 1 mile		$2,300
2.	Canyon Creek Trail Boundary fence	- approx. 1/2 mile	$1,150
3.	Stall Ck. Water Development	- 1 each	$ 500
4.	White Mtn. Water Development	- 1 each	$ 500
5.	Dollar Water Development	- 1 each	$ 500
6	Ellen Water Development	- 1 each	$ 500
		Total Cost	$5,450

** Allowable Use 870 AUM's

* See maps of alternatives in Graphics section
** See Environmental Analysis Report and Management Plan for capacity estimates.

Alternative # 2 - 3 pasture rest rotation

Pasture Units
Ledgerwood
Cedar Ridge
Dollar/White

Proposed Rest Rotation Schedule

Year	Pasture Unit Ledgerwood	Cedar Ridge	Dollar/White
1	Early	Defer	Rest
2	Rest	Early	Defer
3	Defer	Rest	Early
		Repeat Cycle	

Improvements necessary to implement this system are as follows:

Same as Alternative # 1

Approximate Total Cost

Same as Alternative # 1

Allowable Use 974 AUM's

Requirements of this system are that each pasture is deferred and rested over the three year cycle.

Alternative # 3 - Four pasture rest rotation

Pasture Units
Ledgerwood
Cedar Ridge
Dollar
White

Proposed Rest Rotation Schedule

Year	Pasture Unit Ledgerwood	Cedar Ridge	Dollar	White
1	Defer	Early	Season Long	Rest
2	Season Long	Rest	Early	Defer
3	Early	Defer	Rest	Season Long
4	Rest	Early	Defer	Season Long

Repeat Cycle

Improvements necessary to implement this system are as follows:

1.	Cedar Ridge Boundary Fence		approx. 1 mile	$2,300
2.	Canyon Ck.Trail Boundary Fence	-	approx. 1/2 mile	$1,150
3.	Stall Ck. Water Development	-	1 each	$ 500
4.	White Mtn. Water Development	-	1 each	$ 500
5.	Dollar Mtn. Water Development	-	1 each	$ 500
6.	Ellen Water Development	-	1 each	$ 500
7.	Onion Ridge Fence	-	approx. 1/2 mile	$1,150
			Approximate Total Cost	$6,600

Allowable Use 1106 AUM's

Requirements for this system are that each pasture is deferred and rested over the four year cycle.

Alternative # 4 - 5 pasture rest rotation

Pasture Units
Upper Ledgerwood
Lower Ledgerwood
Cedar Ridge
Dollar
White

Proposed Rest Rotation System

Year	Upper Ledgerwood	Lower Ledgerwood	Cedar Ridge	Dokar	White
1	Early	Rest	Defer	Early	Defer
2	Rest	Defer	Early	Defer	Early
3	Defer	Early	Defer	Early	Rest
4	Early	Defer	Early	Rest	Defer
5	Defer	Early	Rest	Defer	Early

Repeat Cycle

Improvements necessary to implement this system are as follows:

1.	Cedar Ridge Boundary Fence	-	approx. 1 mile	$2,300
2.	Canyon Ck. Trail Boundary Fence	-	approx. 1/2 mile	$1,150
3.	Stall Ck. Water Development	-	1 each	$ 500
4.	White Mtn. Water Development	-	1 each	$ 500
5.	Dollar Water Development	-	1 each	$ 500
6.	Ellen Water Development	-	1 each	$ 500
7.	Onion Ridge Fence	-	approx. 1/2 mile	$1,150
8.	Ledgerwood Fence	-	approx. 2 mile	$4,600
9.	Doukhabor Water Development	-	1 each	$ 500
10.	Sec. 19 Water Development	-	1 each	$ 500
11.	Sec. 15 Water Development	-	1 each	$ 500
12.	Sec. 36 Water Development	-	1 each	$ 500
13.	Sec. 23 Water Development	-	1 each	$ 500
14.	Onion Ridge Corral (optional)	-	1 each	$1,500
			Approx. Total Cost	$15,200

Allowable Use 1180 AUM's

Requirements for this system are that each pasture is deferred twice and rested once over the five year cycle.

C. PREFERRED ALTERNATIVE:

The alternatives to allotment management were evaluated by using the following matrix:

Alternative	Constraints Improv. in Range Condition	Effect on Wildlife	Cost Benefit	Herd Manage.	Total
1	1	1	2	1	5
2	5	5	3	4	17
3	4	4	5	5	18
4	3	3	1	2	9

The constraints were rated on a scale of 1 through 5. One being the least desirable and 5 being the most desirable. Accordingly, the alternative with the highest overall score is the most preferred alternative.

The following criteria were used in evaluating the constraints:

A. Improvement in range condition:

1. Rate of vegetative recovery.
2. Degree of soil trampling or compaction
3. Effect on soil litter cover.
4. Effect on water quality

B. Effect on wildlife:

1. Degree of competition for preferred wildlife forage and browse.
2. Rate of range improvement

C. Cost/Benefit:

1. Economic analysis of cost benefit

D. Herd management:

1. Frequency and difficulty of stock movement.
2. Effectiveness of range improvements on livestock distribution.
3. Animal husbandry effects.

On the basis of this analysis, alternative number 3 would be the most preferred alternative.

Evaluation made by: W. Bradley Reed Date: 1/13/78
Range Conservationist

Colville National Forest
Kettle Falls Ranger District
Lake Ellen Allotment

Summary of Past Actual Use

Year	Number	Season	Animal Months
1916	6	4/16-11/15	42
1917	6	4/16-11/15	42
1918	12	4/16-11/15	84
1919	10	4/16-11/15	70
1920	58	4/16-11/15	406
1921	87	4/16-11/15	609
1922	95	4/16-11/15	665
1923	28	4/16-11/15	196
1924	31	4/16-11/15	217
1925	15	4/16-11/15	105
1926	16	4/16-11/15	112
1927	16	4/16-11/15	112
1928	14	4/16-11/15	98
1929	15	4/16-11/15	105
1930	40	4/16-11/15	280
1931	41	5/1-10/31	246
1932	73	5/1-10/31	438
1933	90	5/1-10/31	540
1934	201	5/1-10/31	1,206
1935	297	5/1-10/31	1,782
1936	238	5/1-10/31	1,428
1937	239	5/1-10/31	1,434
1938	187	5/1-10/31	1,122
1939	192	5/1-10/31	1,152
1940	231	5/1-10/31	1,386
1941	168	5/1-10/31	1,008
1942	207	5/1-10/31	1,242
1943	261	5/1-10/31	1,566
1944	238	5/1-10/31	1,428
1945	234	5/16-10/31	1,287
1946	203	5/16-10/31	1,116
1947	118	5/21-10/15	570
1948	101	5/21-10/15	489
1949	115	5/21-10/15	555
1950	103	5/21-10/15	498
1951	149	5/21-10/15	720
1952	131	5/21-10/15	633
1953	148	5/21-10/15	715
1954	151	5/21-10/15	729
1955	163	5/21-10/15	787
1956	159	5/21-10/15	768
1957	158	5/21-10/15	763
1958	126	5/21-10/15	609

Summary of Past Actual Use (cont.)

Year	Number	Season	Animal Months
1959	128	5/21-10/15	618
1960	106	5/21-10/15	512
1961	113	5/21-10/15	546
1962	105	6/1-10/15	472
1963	132	6/1-10/15	594
1964	132	6/1-10/15	594
1965	132	6/1-10/15	594
1966	132	6/1-10/15	594
1967	132	6/1-10/15	594
	50	8/15-10/15	100
1968	262	6/1-10/15	1,087
1969	250	6/1-9/30	1,000
1970	391	6/6-9/30	1,388
1971	564	6/1-9/29	1,763
1972	500	6/1-8/30	1,500
1973	510	6/5-11/1	1,961
1974	600	6/15-10/1	1,803
1975	500	6/23-10/20	1,147
1976	500	6/16-10/7	1,570
1977	501	6/20-9/20	1,520