GRAZING MANAGEMENT PLAN

City of Rocks National Reserve
Idaho

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September 30, 1996

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National Park Service

Idaho Department of Parks and Recreation

Development of a Grazing Management Plan

for City of Rocks National Reserve

Submitted September 30, 1996

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ABSTRACT

In 1991 the University of Idaho signed a contract with the Pacific Northwest Region of the National Park Service to produce a livestock grazing plan for City of Rocks National Reserve (CIRO). Approximately half the land inside the reserve is in private ownership and the boundaries between the reserve and adjacent private and federal lands are not fenced. Because of the complex land ownership pattern the coordinated resource management (CRM) process was used to develop the plan. Participants included the National Park Service, Idaho Department of Parks and Recreation, Bureau of Land Management, U.S. Forest Service, private landowners and the livestock permittees grazing in CIRO.

Objectives of grazing management were developed from CIRO Comprehensive Management Plan objectives for cultural and natural resources management, and through a series of CRM planning sessions involving all interested parties. Vegetation was described and mapped using the Geographical Information System at the University of Idaho. Resource and allotment data was obtained from the Bureau of Land Management and the U.S. Forest Service for those lands they administered prior to establishment of CIRO. Using the CRM process, seven individual allotment grazing management plans were developed. A plan to monitor livestock grazing and trend in CIRO was also prepared.

The plan will enable livestock grazing to continue in the reserve at an economically viable level for the permittees, while meeting the long-range objectives to preserve and protect the significant natural and cultural resources and scenic quality of CIRO.

Key Words: Livestock grazing, City of Rocks National Reserve, coordinated resource management, grazing plan, monitoring plan, range management

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GRAZING MANAGEMENT PLAN

City of Rocks National Reserve

Authority and Objectives

In establishing the National Reserve in 1988 with Public Law 100-696, Congress recognized that appropriate management of the area necessitated cooperative and joint resource use management. Public Law 100-696 directs the National Park Service to formulate the management of the reserve so that public use, historic and natural resource preservation and private use, appropriate to the area's historic rural setting, is assured.

Even though National Park Service policy and 36 C.F.R., Sec. 2.60, prohibits livestock use in park areas where that use is not expressly authorized, the legislated mandate to, "...protect the historic rural setting" and facilitate continuing private use of public lands within the Reserve, is sufficient authority for managed grazing within CIRO. This interpretation of Congressional intent was validated by the opinion rendered by the Assistant Regional Solicitor, Pacific Northwest Region. The Solicitor's opinion was predicated on 36 C.F.R. Sec. 2.60 (a) (3), which states that livestock use is prohibited except when it is "...a necessary... or required in order to maintain a historic scene" (Back 1991).

Livestock use of what is now City of Rocks National Reserve (CIRO) began as early as 1850 and continues through the present. Several of the principal management objectives of CIRO's Comprehensive Management Plan recognizes the historic importance of livestock use. Congress, by requiring the National Park Service to develop a management scheme that recognized and legitimized private use, assured the continual presence of that use.

Private use of the lands within the Reserve began with the wagon trains of the California Trail pioneers, cattle and sheep drives between 1850 and 1886, initial and subsequent homesteads between 1869 and 1910, and always present grazing from the beginning through 1988, when the National Reserve was established. From 1952, when the last crop cultivation ended, until 1988, when Congress established the Reserve, livestock grazing has been the only private use of the lands, public and private, within the Reserve.

The objectives of the Reserve's Comprehensive Management Plan include assurance that livestock use is an integral element of the historic character of CIRO. Whether or not private grazing operations continue over time, the presence of grazing and ranching operations is an objective of CIRO. The goals, then, of the Grazing Management Plan are to:

a. Manage livestock use such that an appropriate balance between grazing and natural resources protection, cultural resources preservation, recreational use, and scenic quality is assured.
b. Through managed grazing and ranching activities protect, preserve and interpret the historic rural setting.
c. Provide for managed use of designated pasture lands within the Reserve.

To achieve these goals, and with the cooperation and support of private landowners and grazing permittees within the Reserve, the following program guidelines are established:

- The natural and cultural resources and scenic quality of CIRO may not be impaired by livestock use.

- In all issues related to range utilization, management decisions will be based first on whether or not resources will be impaired.

- The 1991 AUM total for the Reserve is established as the maximum level for range utilization.
- Private lands purchased by CIRO and vacated allotments may be incorporated into the Reserve's grazing program and the available AUMs may be utilized by one or more of the remaining permittees.
- Existing landowners and permittees have preferential status for future allotment permits.
- Current allotments, which include CIRO and BLM or USFS lands outside the Reserve, will be redefined so that all grazed public lands within CIRO are exclusively CIRO allotments.
- As new CIRO allotments are established the carrying capacity for each will be determined. These carrying capacities will become the maximum AUM levels for future utilization.

HISTORY OF LIVESTOCK GRAZING ON CIRO

Domestic livestock grazing in CIRO can be traced back to the first immigrant wagon trains passing through on the newly established California Trail in 1843. In 1848 the Hudspeth Cutoff began funneling even more wagon trains through the area (Young and Sparks 1985 and Little 1994). As the immigrants trailed through and camped in the vicinity of the City of Rocks, their livestock grazed the forage. Undoubtedly, these livestock left their impact on the vegetation in the region.

In 1867 Joseph Pattee wintered cattle in the Raft River Valley, although they probably did not get to the upper end of the valley near the City of Rocks. This paved the way for the establishment of the first ranch in the Raft River Valley by J. G. Shirley and C. S. Gamble in 1869 (Young and Sparks 1985). Their headquarters were located at the mouth of the Raft River, but with 3,000 head of cattle the first year and over 10,000 cattle the next year, it is likely their cattle grazed in and around the City of Rocks.

From the late 1870's to the early 1880's Mormon settlements began to be established in the valleys adjacent to the City of Rocks (USDI-National Park Service 1991). They dry-farmed much of the area that is now in private ownership in CIRO until the 1920's and also grazed livestock in the area. The drought and severe agricultural depression following World War I resulted in many of the dry farms being taken out of cultivation and grazed by livestock. Private ownership of the lands with CIRO were obtained under the various Homestead Acts (Sharp and Sanders 1978).

The Cassia and Raft River National Forest Reserves were established in 1907. Control of livestock grazing began on the land formerly administered by the US Forest Service (USFS) in CIRO at that time. Uncontrolled livestock use continued to occur on lands formerly administered by the Bureau of Land Management (BLM) in CIRO until passage of the Taylor Grazing Act in 1934. This uncontrolled use resulted in a substantial alteration of the native vegetation. The native perennial grasses decreased in abundance and productivity, allowing sagebrush and juniper to increase. While overgrazing by livestock in the late 1800's to early 1900's contributed to the increase in brush, other factors such as control of fires, greater seed dispersal and an overall climatic shift also were a factor (Burkhardt and Tisdale 1969).

The physical features of CIRO and surrounding valleys and mountains create an environment well suited to the production of livestock. The mountain areas provide ample summer grazing, foothills and plateau lands sustain animals during the spring and fall and the lower valleys and irrigated lands furnish feed and forage through the winter months. The interrelationship of private and public lands is such that if any part of this cyclic grazing pattern is removed, it would be difficult for a ranch to continue to operate (Sharp and Sanders 1978).

When the dry farms were abandoned in the 1920's, the land was slow in reverting back to the natural vegetation and forage production was limited. With the availability of crested wheatgrass (*Agropyron desertorum*) in the late 1940's and 1950's, much of this land was re-cleared of brush and seeded to crested wheatgrass. Prior to seeding crested wheatgrass, the availability of spring and fall forage generally determined how many cattle a ranch could run. The crested wheatgrass seedings also gave the associated depleted native ranges an opportunity for recovery and improvement in ecological condition.

The economic livelihood of the permittees using the allotments addressed in this plan is largely dependent on their being able to continue to graze the number of livestock they currently are.

COORDINATED MANAGEMENT

Approximately half the lands within CIRO are in private ownership (Appendix B). Livestock grazing is the primary use of these private lands. Grazing allotments on public lands adjacent to CIRO are administered by the USFS and BLM. Those agencies also formerly administered allotments on public lands within CIRO, thus there are no boundary fences separating public land allotments within and adjacent to CIRO. Boundaries between CIRO and lands outside generally do not coincide with natural ecosystem boundaries. Under the legislation establishing CIRO, the National Park Service (NPS) and Idaho Department of Parks and Recreation (IDP&R) assumed management of grazing on publicly owned rangelands within CIRO. The USFS and BLM will continue to manage their respective lands while private landowners will continue to manage their lands.

Because of the complex land ownership patterns and the number of managing agencies involved, the development of a grazing management plan for CIRO required close coordination, cooperation, and communication among the various agencies and individuals. The Coordinated Resource Management (CRM) process was developed in the early 1950's to bring all resource owners, managers and users together, working as a team, to formulate and implement plans for the management of all major resources and ownerships within a specific area (Anderson and Baum 1988). The objective of the process is to formulate a plan, through group consensus, that all parties can agree with.

In the spring of 1991, a meeting was held to discuss the development of a grazing plan for CIRO and the CRM process. All private land owners and grazing permittees in CIRO and representatives of several state and federal agencies, including the NPS, IDP&R, BLM, USFS, Idaho Department of Fish and Game and Cassia County Extension Office, were invited to the meeting. Those attending indicated their interest in participating in the development of a grazing plan for CIRO using the CRM process.

Following several more meetings of the above parties, the group reached consensus on the management objectives for livestock grazing on CIRO. Overall management objectives for each agency involved in this plan can be found in their individual planning documents. For NPS and IDP&R administered lands this includes Public Law 100-696 that established CIRO and CIRO Comprehensive Management Plan. The Sawtooth National Forest Plan and the Cassia Resource Management Plan guide the management of USFS and BLM administered lands, respectively, on lands adjacent to CIRO.

Specific objectives for the grazing management plan on CIRO identified through the CRM process are:

Landscape. The overall landscape objective is to maintain the historic natural scene and avoid adverse impacts to the environmental and scenic values. Specific landscape objectives are:

1. Maintain or establish upward trend on all range sites.
2. Protect sensitive resources to the greatest extent possible, including threatened and endangered species and wetlands.
3. Initiate vegetative management to enhance the natural landscape when and where appropriate.
4. Use livestock grazing to obtain and maintain the landscape objectives.

Resource Use. CIRO will be managed to assure preservation of historical and natural resources, maintenance of scenic quality and recreational use. It will be managed in such a manner as to reduce conflicts between uses. Specific objectives are:

1. Protect and preserve natural resources.
2. Improve public access to CIRO lands.
3. Minimize visitor/livestock conflicts.
4. Maintain or improve recreational opportunities.
5. Maintain or improve wildlife habitats.
6. Minimize recreational conflicts with private landowners.

Livestock Grazing. CIRO will manage for optimum natural vegetation, scenic quality and livestock use appropriate to the historic rural setting and other managed uses of the Reserve.

The principal investigator of this project developed individual allotment grazing management plans, in consultation and coordination with the various private landowners, livestock permittees and affected agencies.

DESCRIPTION OF RESOURCES

PHYSICAL FEATURES

The 14,300 acre CIRO is located at the northern end of the Great Basin section of the basin and range province. The Great Basin consists of a series of narrow sub-parallel, block-faulted mountains 50 to 70 miles long separated by valleys 20 to 30 miles wide (Ross and Savage 1967). The mountain ranges are predominantly sedimentary rocks and the basins are filled with alluvial material eroded from bordering ranges. Alluvial fans with graded alluvial material are common features at the intersection of valley edge and mountain base. While most of the Great Basin has internal drainage, CIRO drains northward into the Snake River, through the Raft River Valley.

Precipitation varies from 10 to 18 inches in CIRO, with most of it falling in the winter and spring. Heavy snowfall at higher elevations to the north feeds the creeks and springs in CIRO. These creeks and springs are the only source of water for livestock. In extended droughts, such as 1988 to 1992, water becomes a more limiting factor for grazing than forage production, particularly above 6000 ft elevation. At the lower elevations of CIRO, annual forage production has a strong correlation with April to May precipitation (Sharp et al. 1992).

In the early 1980's, the USDA Soil Conservation Service (SCS) completed an Order 3 soil survey of the private lands and those formerly administered by the BLM in CIRO (SCS In Press).

VEGETATION[1]

Introduction

The vegetation classification units will follow the habitat type system as much as possible (Daubenmire 1952, Daubenmire and Daubenmire 1968). However, classification systems for much of the vegetation within CIRO have not been completed. A classification system for vegetation dominated by riparian, curlleaf mountain mahogany, Utah juniper or single-leaf pinyon has not been published. A tentative classification of these areas has been included. Classification of the sagebrush grasslands follows Hironaka et al. (1983). Vegetation classification for those areas dominated by limber pine and Douglas-fir follow Steele et al. (1983). Vegetation dominated by aspen was mapped but not classified to habitat type. Most aspen stands are seral communities to other vegetation. A cover type classification system has been published for aspen vegetation in eastern Idaho (Mueggler 1988) but the vegetation was not classified to this level in CIRO.

Taxonomy of *Artemisia* (sagebrush) follows Beetle (1960), Beetle and Young (1965) and Winward and Tisdale (1977). Taxonomy of the other plants follows Hitchcock and Cronquist (1973). For the big sagebrush species only the genus and subspecies will be used and the specific epithet, *tridentata*, will be omitted. For example, mountain big sagebrush will be referred to as *Artemisia vaseyana*.

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[1] This section was written by and based on work completed by Dr. Stephen C. Bunting, University of Idaho, in the summer of 1991, as well as from previous work in the area. A glossary of terms is provide in Appendix E.

Seedings

The four lower elevation basins have had a long history of rangeland seeding on them. The primary species used has probably included crested wheatgrass (*Agropyron cristatum*), desert wheatgrass (*A. desertorum*) and Siberian wheatgrass (*A. sibericum*) but these species are not readily distinguishable from each other in the field and will be referred to collectively as crested wheatgrass.

The condition of the seedings varies greatly. This variation is due to variation in present sagebrush density, post-seeding livestock management and condition at the time of seeding. Many of the areas within these basins were undoubtedly former agricultural fields of barley, oats and other crops that were grown by the original homesteaders. The vegetation of these areas have few native species present in the community. Typically, these areas are dominated by big sagebrush with an understory of crested wheatgrass. Few other native species have re-invaded the sites. Other seedings such as some in the Twin Sisters Basin have many more native species in the understory. It is assumed that these areas were never farmed and the natives persisted through the early livestock use and seeding projects. The seedings in Emigrant Creek and Twin Sisters Basins are generally in better condition than those in Circle Creek and Little East Basins. The vegetation of the latter two basins is generally a dense overstory of sagebrush with a sparse and suppressed understory of crested wheatgrass.

Riparian vegetation

The riparian vegetation can be divided into four general types: 1) grass dominated meadows, 2) rush (*Juncus* spp.) dominated meadows, 3) willow-aspen stringers and 4) basin big sagebrush stringers. The two types of meadows occur in small depressions which slow water movement through them. If the soil is well drained, the sites are normally dominated by grasses. If the water runoff is extensive and/or the soil texture is heavy, resulting in poor soil drainage, rush vegetation dominates the site. These types are common in the Twin Sisters Basin (NW1/4, Sec. 18, T 16S, R 24E). If the watercourse becomes restricted and the channel well defined, willow-aspen vegetation is common such as that found in the Taylor Spring Basin (SW1/4, Sec. 23; NW1/4, Sec. 26, T 15S, R 23E). Drainage courses which have deep well drained soils adjacent to them may include stringers of basin big sagebrush along them. These are primarily found in Circle Creek Basin (N1/2, Sec. 31, T 15S, R 24E).

Locations of the riparian vegetation were determined from the NPS vegetation map and were then ocularly classified to riparian type.

Vegetation dominated by curlleaf mountain mahogany, Utah juniper and pinyon pine

A preliminary vegetation classification based on the overstory dominance of these species was developed. These are not to be identified as habitat types but rather are probably groups of habitat types. An understory indicator is not included because of the variation included within the group and inclusion would lead to confusion in nomenclature. The following groups of communities were identified:

1. *Juniperus osteosperma* (Utah juniper)
2. *Juniperus osteosperma-Pinus monophylla* (Utah juniper-pinyon pine)
3. *Pinus monophylla-Juniperus osteosperma* (pinyon pine-Utah juniper)
4. *Pinus monophylla-Juniperus osteosperma-Cercocarpus ledifolius* (pinyon pine-Utah juniper-curlleaf mountain mahogany)
5. *Cercocarpus ledifolius* (curlleaf mountain mahogany)

The understory species present within these communities is highly variable, extremely depauperate and similar across all vegetation groups. Common understory species include: bitterbrush, Indian ricegrass, bluebunch wheatgrass, Sandberg and Nevada bluegrass and several phlox species. Depauperate understories are typical for many juniper and pinyon-juniper woodland vegetation types within the Intermountain Region. Some of the above groups may be seral to others. A study of the vegetation classification of the northern Great Basin is needed to more completely understand these relationships.

The *Juniperus osteosperma* vegetation group occurs zonally immediately above the *Artemisia vaseyana/Agropyron spicatum* habitat type (ht) zone. There is evidence in many areas that the type has spread into lower vegetation types. Skeletons of big sagebrush within the juniper communities indicate that this process has been occurring for some time. Single-leaf pinyon may be present in small amounts. The best examples occur in the Cedar Hill and Southwest Hill vegetation units.

The *Juniperus osteosperma-Pinus monophylla* vegetation group occurs zonally above the *Juniperus osteosperma* group. It appears to be more mesic and consequently single-leaf pinyon can codominate the overstory. *Pinus monophylla* tends to increase in the stand with advancing succession. Examples are located on Smokey Mountain and Cedar Hill vegetation units.

The *Pinus monophylla-Juniperus osteosperma* vegetation group is found on sites which are slightly more mesic or more successionally advanced than the *Juniperus osteosperma-Pinus monophylla* vegetation group. Consequently, single-leaf pinyon assumes dominance of the overstory. This vegetation usually occurs within the reserve on northerly aspects between 2000-2500 m which have a slope greater than 35%. Good examples are found on Smokey Mountain.

The *Pinus monophylla-Juniperus osteosperma-Cercocarpus ledifolius* vegetation group is probably an azonal vegetation type found within the *Juniperus osteosperma*, *Juniperus osteosperma-Pinus monophylla*, and *Pinus monophylla-Juniperus osteosperma* zones. It usually occurs where rocky broken topography permits extensive amounts of curlleaf mountain mahogany to codominate the overstory. There is some evidence that the mahogany may be a long-lived but seral component of the community (Gruell et al. 1985). Understories are similar to those vegetations previously described but the rough topography and rock outcrops provide opportunities for other species such as aspen, big sagebrush, bitterbrush and Great Basin wildrye. Extensive areas of this vegetation occur in the Rocks and Twin Sisters Rocks vegetation units.

The *Cercocarpus ledifolius* vegetation is located on steep rocky sites which occur above the elevation where Utah juniper and single-leaf pinyon can occur. The curlleaf mountain mahogany canopy remains more open than the pinyon-juniper types and consequently, the understory remains more productive and diverse. In addition to those species commonly found in the pinyon-juniper types, mountain snowberry, western needlegrass, arrowleaf balsamroot and Wyeth buckwheat are common understory plants. A *Cercocarpus ledifolius/Agropyron spicatum* ht has been used for mountain mahogany vegetation in the Salmon and Challis National Forest region of Idaho. Bluebunch wheatgrass is a common understory species and this may be a useful designation for this vegetation within the reserve as well.

Community and habitat types of vegetation occurring in CIRO are listed in Table 1. The vegetation in CIRO was mapped from aerial photographs using a Geological Information System (Appendix A).

Table 1. Classification units used to characterize the vegetation within City of Rocks National Reserve.

	Artemisia nova/Agropyron spicatum ht (Hironaka et al. 1983) (black sagebrush/bluebunch wheatgrass)
	Artemisia arbuscula/Agropyron spicatum ht (Hironaka et al. 1983) (low sagebrush/bluebunch wheatgrass)
	Artemisia tridentata subsp. *vaseyana/Agropyron spicatum* ht (Hironaka et al. 1983) (mountain big sagebrush/bluebunch wheatgrass)
*	*Artemisia tridentata* subsp. *vaseyana/Agropyron cristatum* ct (mountain big sagebrush/crested wheatgrass)
	Artemisia tridentata subsp. *vaseyana-Symphoricarpos oreophilis/Festuca idahoensis* ht (mountain big sagebrush-mountain snowberry/Idaho fescue)
	Artemisia tridentata subsp. *vaseyana-Symphoricarpos oreophilis/Agropyron spicatum* ht (Hironaka et al. 1983) (mountain big sagebrush-mountain snowberry/bluebunch wheatgrass)
*	*Artemisia tridentata* subsp. *vaseyana-Symphoricarpos oreophilis/Agropyron cristatum* ct (mountain big sagebrush-mountain snowberry/crested wheatgrass)
	Artemisia tridentata subsp. *tridentata/Agropyron spicatum* ht (Hironaka et al. 1983) (basin big sagebrush/bluebunch wheatgrass)
*	*Artemisia tridentata* subsp. *tridentata/Agropyron cristatum* ct (basin big sagebrush/crested wheatgrass)
**	*Juniperus osteosperma* (Utah juniper)
**	*Juniperus osteosperma-Pinus monophylla* (Utah juniper-pinyon pine)
**	*Pinus monophylla-Juniperus osteosperma* (pinyon pine-Utah juniper)
**	*Pinus monophylla-Juniperus osteosperma-Cercocarpus ledifolius* (pinyon pine-Utah juniper-curlleaf mountain mahogany)
	Cercocarpus ledifolius/Agropyron spicatum ht (curlleaf mountain mahogany/bluebunch wheatgrass)
**	*Populus tremuloides* (quaking aspen)
	Pinus flexilis/Cercocarpus ledifolius ht (Steele et al. 1983) (limber pine/curlleaf mountain mahogany)
	Pseudotsuga menziesii/Osmorhiza chilensis ht (Steele et al. 1983) (Douglas fir/mountain sweetroot)
**	Riparian- *Poa* (bluegrass)
**	Riparian- *Juncus* (rush)
**	Riparian- *Salix* (willow)
**	Riparian - *Artemisia* (sagebrush)

ht= habitat type
ct= community type
* These community types are seeded communities within the habitat type immediately above.
** These vegetation units will be called "habitat types" for the purposes of this report but have not been described in the literature. Some entities such as the *Populus tremuloides* and riparian types contain more variation than is normally included within a single habitat type but this is done for simplicity.

Vegetation map units

The vegetation of CIRO was aggregated into 15 larger map units in order to simplify characterization of the area. These maps were developed attempting to keep the vegetation, soils, topography and other physical site characteristics as similar as possible. In spite of this, they usually contain five or more types of vegetation. When possible they were named after a prominent geographical feature found within the map unit. The large map units include:

1. Graham Peak
2. Finger Rock
3. Graham Creek
4. Little Cove
5. Taylor Spring Basin
6. The Rocks
7. Circle Creek Basin
8. Little East Basin
9. Smokey Mountain
10. Mahogany Ridge
11. Twin Sisters Basin
12. Twin Sisters Rocks
13. Cedar Hill
14. Southwest Hill
15. Emigrant Creek Basin

Description of map units

1. Graham Peak
   The majority of this unit is dominated by the *Cercocarpus ledifolius/Agropyron spicatum* (curlleaf mountain mahogany/bluebunch wheatgrass) and *Populus tremuloides* (quaking aspen) hts with lesser amount of *Artemisia vaseyana-Symphoricarpos oreophilis/Festuca idahoensis* (mountain big sagebrush-mountain snowberry/Idaho fescue) ht. An area of *Pinus flexilis/Cercocarpus ledifolius* (limber pine/curlleaf mountain mahogany) ht on the southeastern slope of Graham Peak has recently burned by wildfire.

2. Finger Rock
   The vegetation of this unit is classified primarily as *Artemisia vaseyana-Symphoricarpos oreophilis/Festuca idahoensis* (mountain big sagebrush-mountain snowberry/Idaho fescue), *Artemisia nova/Agropyron spicatum*, (black sagebrush/bluebunch wheatgrass), *Artemisia arbuscula/Agropyron spicatum* (low sagebrush/bluebunch wheatgrass) hts. Smaller amounts of *Cercocarpus ledifolius/Agropyron spicatum* (curlleaf mountain mahogany/bluebunch wheatgrass) occur on the rock outcrops at higher elevations.

3. Graham Creek
   This unit is located on the north-facing slopes adjacent to Graham Creek. The vegetation is primarily woodland or forested types dominated by *Pinus monophylla-Juniperus osteosperma-Cercocarpus ledifolius* (pinyon pine-Utah juniper-curlleaf mountain mahogany) and *Pseudotsuga menziesii/Osmorhiza chilensis* (Douglas fir/mountain sweetroot) hts. Adjacent areas of sagebrush vegetation are being invaded by the conifer species. This is the only portion of the reserve where Douglas-fir occurs.

4. Little Cove
   The vegetation of the upper portion of this unit is dominated by *Pinus monophylla-Juniperus osteosperma-Cercocarpus ledifolius* (pinyon pine-Utah juniper-curlleaf mountain mahogany) vegetation. The lower areas are classified as *Artemisia vaseyana-Symphoricarpos oreophilis/Agropyron spicatum* (mountain big sagebrush-mountain snowberry/bluebunch wheatgrass) ht and have been invaded by *Juniperus osteosperma* (Utah juniper). Small amounts of *Artemisia nova/Agropyron spicatum* (black sagebrush/bluebunch wheatgrass) ht which also have been invaded occur within the unit.

5. Taylor Spring Basin
This unit's vegetation is primarily *Artemisia vaseyana-Symphoricarpos oreophilis/Festuca idahoensis* (mountain big sagebrush-mountain snowberry/Idaho fescue) ht and *Artemisia nova/Agropyron spicatum*, *Artemisia arbuscula/Agropyron spicatum* (black sagebrush/bluebunch wheatgrass, low sagebrush/bluebunch wheatgrass) hts. Considerable amounts of aspen and riparian vegetation may also be found. The riparian types are dominated by *Poa* (bluegrass), *Juncus* (rush) and *Salix* (willow).

6. The Rocks
The Rocks unit is a vegetation complex of habitat types on a very small scale mosaic. The *Pinus flexilis/Cercocarpus ledifolius*, (limber pine/curlleaf mountain mahogany), *Pinus monophylla-Juniperus osteosperma-Cercocarpus ledifolius* (pinyon pine-Utah juniper-curlleaf mountain mahogany) and *Populus tremuloides* (quaking aspen) vegetations dominate but many others are present. This unit has the greatest diversity because of the sharp soil development and soil moisture gradients between habitats. Many species present on the reserve are found only within this unit. A recent fire occurred in a portion of this unit (NE1/4, Sec. 25, T 15S, R 23E) approximately 4-5 years ago.

7. Circle Creek Basin
Extensive areas of Circle Creek Basin have been seeded. The deep soils found within the southern portion of this map unit result in basin big sagebrush being a common component of the vegetation. The unit also contains the most extensive continuous area of riparian vegetation. The vegetation north of the riparian area is dominated by mountain big sagebrush. Invasion of Utah juniper has occurred in some sites along the edge of the map unit.

8. Little East Basin
The majority of this basin can be classified as an *Artemisia vaseyana/Agropyron spicatum* (mountain big sagebrush/bluebunch wheatgrass) ht and most of the area has been seeded to crested wheatgrass in the past. The seedings are in relatively poor condition and are heavily dominated by mountain big sagebrush. Unseeded areas adjacent to the seedings have an open canopy of single-leaf pinyon and Utah juniper invading into the sagebrush vegetation.

9. Smokey Mountain
The majority of this unit is dominated by *Juniperus osteosperma-Pinus monophylla* (Utah juniper-pinyon pine) and *Pinus monophylla-Juniperus osteosperma* (pinyon pine-Utah juniper) vegetation. The lower margins contain small amounts of *Artemisia vaseyana/Agropyron spicatum* (mountain big sagebrush/bluebunch wheatgrass) ht with scattered individuals of juniper. Five of the larger *Pinus monophylla* (pinyon pine) trees were cored in the northern portion of this unit (NE1/4, Sec. 29, T 15S, R 24E). The average DBH for these trees was 31 cm (range 26-41 cm) and the average age was 111 years (range 78-149 years). This indicates that the larger individuals on these better sites may not be as old as expected.

10. Mahogany Ridge
The high ridge in this map unit is dominated by *Cercocarpus ledifolius/Agropyron spicatum* (curlleaf mountain mahogany/bluebunch wheatgrass) vegetation. The lower ridge slopes contain *Artemisia nova/Agropyron spicatum*, (black sagebrush/bluebunch wheatgrass), *Artemisia arbuscula/Agropyron spicatum* (low sagebrush/bluebunch wheatgrass) and *Artemisia vaseyana/Agropyron spicatum* (mountain big sagebrush/bluebunch wheatgrass) hts. Large areas dominated by *Populus tremuloides* (quaking aspen) also occur on the slopes. Bisbee photographs indicate the possibility of a fire occurring in the past 75 years but evidence of this fire cannot be found.

11. Twin Sister Basin
The majority of this basin has been seeded to crested wheatgrass in the past. The density of sagebrush is relatively low in many of the seedings and the grasses are among the most productive of the seedings present in the reserve. Two small areas of native vegetation exist near the Twin Sisters Rocks and Register Rock which are predominantly *Artemisia vaseyana/Agropyron spicatum* (mountain big sagebrush/bluebunch wheatgrass) ht. Both areas have substantial amounts of Utah juniper invading into them.

12. Twin Sisters Rocks
This unit is comprised of the ridge that forms the divide between Twin Sisters Basin and Emigrant Creek Basin. It is dominated by *Pinus monophylla-Juniperus osteosperma-Cercocarpus ledifolius* (pinyon pine-Utah juniper-curlleaf mountain mahogany) vegetation.

13. Cedar Hill
This unit is composed primarily of *Juniperus osteosperma-Pinus monophylla* (Utah juniper-pinyon pine) and *Pinus monophylla-Juniperus osteosperma* (pinyon pine-Utah juniper) vegetation. Pinyon dominates the stand after succession has proceeded for long periods. This is well illustrated on the south slope above Emigrant Canyon. As the successional process occurs on the site the dominant species on the area changes from sagebrush to Utah juniper and then finally to pinyon.

14. Southwest Hill
The upper slopes of this unit are dominated by *Juniperus osteosperma-Pinus monophylla* (Utah juniper-pinyon pine) vegetation. The lower slopes are primarily *Artemisia vaseyana/Agropyron spicatum* (mountain big sagebrush/bluebunch wheatgrass) ht with juniper invading into the site. The soils and remnant plants in the understory indicate that a significant amount of this unit has been invaded by juniper during the recent period.

15. Emigrant Creek Basin
The majority of this basin is classified as an *Artemisia vaseyana/Agropyron spicatum* (mountain big sagebrush/bluebunch wheatgrass) ht and has been extensively seeded to crested wheatgrass. Smaller amounts of *Artemisia tridentata/Agropyron spicatum* (basin big sagebrush/bluebunch wheatgrass) ht also occur along the deeper soils near the waterways. The seedings are in relative poor productive condition. Utah juniper is invading into some of the seedings and adjacent unseeded areas on the periphery of the map unit.

Fire history

Evidence of recent fires is surprisingly limited considering the vegetation types included within CIRO. Direct evidence of recent fires within CIRO is restricted to three areas, the southeast slope of Graham Peak (NE1/4, Sec. 13, T 15S, R 23E), the slope immediately above Little East Basin (E1/2, Sec. 29, T 15S, R 24E) and along North Circle Creek (NE1/4, Sec. 25, T 15S, R 23E). An additional fire occurred in about 1989 in the Cedar Hills immediately south of the southern boundary. (Sec. 25 & 26, T 16S, R 23E). Bisbee photographs from the 1910-1920 period indicate more woody species occurred on the Mahogany Ridge mapping unit (Sec. 35, T 15S, R 23E: Sec. 2, T 16S, R 23E) than would appear to be currently present. No evidence of a recent fire can be found on this area, however.

Historical land management activities, livestock grazing and fire suppression, have probably affected the occurrence of fire and thereby the plant composition of areas now dominated by mountain big sagebrush or Utah juniper and single-leaf pinyon. The literature indicates that mountain big sagebrush vegetation may have had an average fire-free-interval (FFI) varying between 20-70 years during pristine conditions (Houston 1973, Wright and Bailey 1982). The FFI of a particular site varied due to factors such as topography, horizontal fuel continuity, and

occurrence of natural ignitions (Gruell 1983, Bunting et al. 1987). Human activity in pristine periods may also have affected the FFI of a particular site (Barrett and Arno 1980).

Data from the Owyhee Plateau indicate that fire may have occurred more frequently in the areas now dominated by young stands of pinyon-juniper woodland (Burkhardt and Tisdale 1969, 1976). FFI's may have been as low as 10 years in some localities. Inspection of the understory composition clearly indicates a recent expansion of pinyon and juniper into sites once occupied by sagebrush vegetation. This is evidenced by the sagebrush skeletons in these communities. Good examples of this can be found on the south slopes of the Cedar Hills (N1/2, Sec. 19, T 16S, R 24E) and Southwest Hill (N1/2, Sec. 23, and NW1/4, Sec. 24T 16S, R 23E) mapping units.

Fire occurrence in the more broken topography, such as the Rocks or the Twin Sisters mapping units, was less frequent than in the previously discussed types but fires undoubtedly happened. Fires could be initiated in lower communities and then spread into the rougher topography where they would usually go out. This can be observed in two locations in CIRO. The effect of these types of fires would be greatest on the edges of the rough topography sites. On rarer occasions, however, fires would be of sufficient intensity to burn more extensive amounts of these types of vegetation.

There has been two primary effects of the human caused increase in the FFI on the vegetation of CIRO.

1) Utah juniper has expanded into sagebrush grassland vegetation where the two types were adjacent to each other. This can be observed in the early stages on the northwest and west sides of Smokey Mountain (SW1/4, Sec. 31, T 15S, R 24E, and Sec. 7, T 16S, R 24E) and on the northwest side of Southwest Hill (NW1/4, Sec. 24, T 16S, R 23E). Later successional changes can be observed in the lower Circle Creek Basin (N1/2, Sec. 32, T 15S, R 24E) and north of northeast of the Emigrant Canyon Stage Station (N1/2, Sec. 19, T 16S, R 24E).

2) All vegetation types have become less variable with respect to successional stage and plant composition. This is particularly important for mountain big sagebrush grasslands, pinyon-juniper woodlands and mountain mahogany woodlands because fire played such an important role in the pristine development of these vegetations.

The influence of fire will be reintroduced into CIRO by initiating a prescribed fire program (those fires which are planned for a particular site to accomplish particular objectives, and intentionally ignited under predetermined conditions); or by relying on the natural occurrence of lightning-caused fires. Periodic human-caused wildfires will also occur but these are normally suppressed in most managed areas. The lightning-or human-caused fires will be unplanned with respect to their location, seasonal timing or burn characteristics which may significantly effect the other activities occurring within CIRO. If a natural fire program is selected as the mechanism, a fire management plan would have to be prepared and approved for CIRO. CIRO may not be sufficiently large or may be too discontinuous in the landownership pattern to effectively use a natural fire program throughout much of the area. Prescribed fire may have to be relied upon if fire is to be reintroduced into many portions.

The development of a juniper or pinyon-juniper overstory has made the use of prescribed fire not feasible in many portions of CIRO. These areas cannot be burned under conditions that would be considered safe by most fire management officers. The areas which are in the initial stages of juniper establishment and still have potential for using prescribed fire are located on the perimeter of the small basins included within CIRO. The primary areas include the western margins of the Little East Basin, the western and southern margin of Circle Creek Basin, those portions of Twin

Sisters Basin which are east and south of the road, and the lower portions of Emigrant Creek Basin.

Fire was a dominant influence on the development of other vegetation types, such as the mountain big sagebrush dominated areas, found within CIRO during the pristine period. While the absence of fire in these vegetation types will have effects on the composition and function of the communities, the changes are not nearly of the same magnitude as those initiated by juniper establishment. CIRO managers must rely upon either prescribed fire or wildfire to provide this influence on these other types.

GRAZING MANAGEMENT

Early attempts to manage livestock grazing on public lands focused on determining carrying capacity and establishing seasons of use based on range readiness. Initially, carrying capacity was determined by determining the production of key forage species and allocating a certain percentage, generally one half, of the forage to be used. The remaining half of the forage was left unused to meet the plants physiological needs. However, such calculations of carrying capacity were not very precise as production varies from year to year and some plant species withstand grazing better than others.

A more accurate method of determining carrying capacity is to use historical stocking rates, monitor range trend and adjust livestock numbers accordingly. However, just because range trend is down does not mean livestock numbers should be reduced. Trend may be down due to causes other than grazing or some other change in management may alleviate the problem without a change in numbers. Both the USFS and BLM accessed carrying capacity of the allotments in CIRO just prior to establishment of CIRO, based on their monitoring data. It is recommended that the stocking rates determined at that time be continued and any future adjustments be based on range trend in each allotment.

Range readiness is defined as the stage of plant growth at which grazing may begin under a specific management plan without permanent damage to vegetation or soil. Weather conditions affect range readiness and they vary from year to year. As a consequence, the date at which a given range area becomes ready may vary by as much as two weeks either side of the norm. Range readiness should be determined by an on-the-ground inspection by the permittee(s) and agency representatives each year prior to turnout - not by a set calendar date. If cattle are turned out too early it not only may affect the plants but the cattle may also lose weight. Turning out later than necessary may increase the cost of feeding cattle or result in overuse of another pasture.

The physiological needs of plants can be met through manipulation of grazing animals by: 1) delaying initial grazing until range readiness, 2) allowing adequate leaf area to remain after a grazing period, 3) allowing adequate time between grazing periods to permit replenishment of leaf area and vigor, and 4) allowing adequate leaf area and time late in the growing season for replenishment of vigor and bud development. Plants must also be allowed to reproduce themselves periodically, either through seed production or vegetatively.

Various grazing systems have been developed to meet the physiological needs of the plants. Grazing systems recommended for CIRO are of two basic types: 1) deferred rotation and 2) rest-rotation. Deferred rotation grazing is the systematic rotation among two or more pastures of a delay in grazing on an area for an adequate period of time to provide for plant reproduction, establishment of new plants or restoration of vigor (Society for Range Management 1989). Rest-rotation grazing is the systematic rotation among pastures of no grazing use for a complete growing season.

These grazing systems should adequately meet the physiological needs of the plants. However, to address other concerns, such as food and cover for wildlife and aesthetics, the ultimate determining factor for moving cattle will be based on amount of forage remaining. A pre-determined percent of utilization will not be used, but rather movement of cattle out of a pasture should be determined by a joint range tour by CIRO personnel, other affected agencies and the permittee(s). Factors to consider are range trend, opportunity for regrowth, wildlife needs, how the movement will affect other pastures, forage production and aesthetics.

The University of Idaho has conducted research on the management of crested wheatgrass seedings for over 35 years in the Raft River Valley, 30 miles from CIRO. Management programs for grazing crested wheatgrass developed at this research facility (Sharp 1970) have proven to be effective and efficient and are recommended for CIRO on several allotments.

Rest-rotation grazing systems will be used on two allotments in CIRO. Developed in the early 1950's on bunchgrass rangeland in northeastern California (Hormay and Talbot 1961, Hormay 1970), it has been well proven to be an effective way to improve depleted bunchgrass rangeland.

Two allotments in CIRO consist of only one pasture in the allotment. This limits the management options for meeting the physiological needs of the plants. The recommended grazing management of these two allotments includes: delaying turnout until range readiness, salting, herding and improved water distribution to obtain uniform distribution of cattle in the allotment and removing cattle when the desired degree of utilization is obtained.

An objective of CIRO is to protect or restore wetlands and riparian areas to enhance water quality, aesthetic resources and wildlife habitat. Riparian areas in CIRO are primarily springs or seeps and two streams, Circle Creek and an intermittent stream in Emery Canyon. Most of Circle Creek is either on private property or in areas not grazed by livestock.

Because of the relative small riparian areas subjected to grazing on CIRO lands and the tendency of livestock to concentrate on such areas, it is recommended that these areas be fenced off, including springs. Water for livestock should be piped off the riparian areas. Where this is not feasible, livestock use should be controlled through herding and placement of salt away from the streams. A change to non-hot season use should also be investigated to enhance grazed riparian areas. However, the latter would require a change in season of use on adjacent BLM, Forest Service or private land and may not be feasible. Where riparian areas are grazed CIRO personnel and permittees should closely monitor cattle use in key riparian areas. Hall and Bryant (1995) recommend using three warning signs as an indicator that cattle may shift their grazing preference from the most palatable species (generally Kentucky bluegrass) to less palatable but more sensitive species such as sedges and willows. The warning signs are:

1. When stubble height of the most palatable species approaches 3 inches, assume that cattle preference will change and undesired grazing use may begin.

2. As grazing continues monitor more frequently to detect when the stubble height decreases from 3 inches toward 3/4 of an inch. Assume that cattle preference has changed and that unacceptable grazing use has or is about to begin. Consider moving the cattle to another pasture.

3. As the grazing season advances, monitor drying soil and vegetation curing in the riparian areas. This may also cause a shift in species preference from drier grasses to the greener species (willows, sedges) along the water's edge.

If the monitoring indicates unacceptable impacts are not occurring on desired species, grazing can continue. If they are, then the cattle will be moved. Permittees can prolong the use of a pasture by frequent herding to minimize cattle grazing and loafing in riparian areas.

GRAHAM CREEK ALLOTMENT GRAZING MANAGEMENT PLAN

GENERAL INFORMATION

The Graham Creek Allotment consists of land administered by CIRO, Bureau of Land Management, U.S. Forest Service and private lands of the Bruesch estate and Cordell Sheridan. Cordell Sheridan is the permittee on the allotment (Bruesch estate holds the permit on the 80 acres of BLM land). The allotment grazing plan was developed in cooperation and consultation with these agencies and private land owners/permittee. The Forest Service has indicated that due to the small acreage involved, they will defer management of National Forest land within the allotment to CIRO.

DESCRIPTION OF ALLOTMENT

Location and Area

The Graham Creek Allotment is located in the northern end of CIRO near Almo in Cassia County, Idaho. In Township 15 S., Range 23 E. it includes all of section 24, most of section 13 and portions of sections 12, 13, 14, 23, and 25. In Township 15 S., Range 24 E. it includes portions of sections 19, 20, 28, and 29 (Appendix B). Land ownership and acreage are shown in Table 2.

Table 2. Land ownership in the Graham Creek Allotment.

LAND OWNERSHIP	APPROXIMATE NUMBER OF ACRES
CIRO	2800
Bureau of Land Management	80
U.S. Forest Service	118
Private[1]	135
TOTAL	3133

[1] Private land fenced within CIRO, owned by Bruesch estate. An additional 320 acres owned by Bruesch estate is included in this plan, as well as private land owned by Cordell Sheridan.

Climate, Topography, Vegetation

Precipitation on the Graham Creek Allotment averages from about 12 inches at the lower elevation to 18+ inches at the higher elevations. The growing season is also highly variable on the allotment. Range readiness on the lower pastures generally occurs by May 15, but may vary by as much as two weeks. Grass production on the lower pastures has a high correlation with April to June precipitation. Range readiness at the higher elevations is not reached until mid-June and grass production is not so dependent on April to June precipitation.

Elevation of the allotment ranges from 6000 to 8867 feet. The majority of the allotment consists of steep slopes with a small amount of alluvial fan. Graham Creek runs for approximately 1 1/2 miles through the allotment.

Vegetation in the allotment consists of the following map units described in the section on vegetation: Graham Peak, Finger Rock, Graham Creek, Little Cove, Taylor Spring Basin, and The Rocks (Appendix A). Approximately 160 acres on the east side of the allotment was seeded to crested wheatgrass in the mid-1960's. Sagebrush density has increased in recent years on the seeding, reducing the grass production.

Permittee and Permitted Use

Cordell Sheridan is the permittee on CIRO land within the allotment. He leases the Bruesch's private land and also uses the 80-acre BLM permit they hold. Although the NPS does not attach permits to a private property base, for all practical purposes the Graham Creek Allotment is attached to the Bruesch ranch. This is because of the Bruesch private land and BLM permit that are fenced within the allotment.

The season of use on the lower three pastures (East, Center, and West) is May 1 to June 15 and from September 16 to September 30. Season of use on the upper two pastures (The Circle and Indian Grove) is June 16 to September 15. The overall season of use on the allotment is thus May 1 to September 30.

The current CIRO permit is for 65 head of cows with calves or 195 AUMs, although carrying capacity is higher. The BLM permit is for 27 AUMs. With the 135 acres of private land fenced within the allotment and other private land included in the grazing systems of the allotment providing an additional 68 AUMs of forage, the overall capacity of the allotment is 290 AUMs for five months (Table 3). In addition to the acreage listed, approximately 390 acres in section 30 will be available for Cordell Sheridan to use on a rotational basis. However, it will not be permanently allocated to him, nor will additional AUMs be assigned to him. Use of this area will be determined on an annual basis by the Superintendent of CIRO.

Table 3. Season of use and permitted use on the Graham Creek Allotment.

OWNERSHIP	SEASON OF USE	AUMS
CIRO	6/16 - 9/15	195
Forest Service	6/16 - 9/15	0
BLM	5/1 - 6/15 9/16 - 9/20	23 4
Private	5/1 - 9/30	68
TOTAL	5/1 - 9/30	290

GRAZING MANAGEMENT

Pasture Description

The Graham Creek Allotment is divided into six pastures by fences and/or topography that provides natural barriers to livestock movement (Appendix B).

Grazing History

The three lower pastures were formerly administered by the BLM. The BLM still maintains administrative control of 80 acres on the east side of the East Pasture. Approximately 135 acres of private rangeland owned by the Bruesch estate are fenced within these pastures on an exchange of use agreement. Prior to this plan these pastures were grazed in progression from east to west from May 1 to June 15 and grazed again from September 16 to 30. While the permit provided for use by 31 head from June 16 to September 15, by agreement with the permittee this use was not made.

The two upper pastures, Indian Grove and The Circle, were formerly administered by the Forest Service. Approximately 118 acres in the northwest corner of Indian Grove Pasture are still within the National Forest boundary. Previously these pastures were grazed in a two-pasture deferred-rotation system from June 16 to September 15.

Grazing Systems

Lower pastures. The three lower allotment pastures (East, Center, West), in combination with a private pasture owned by Cordell Sheridan, will be managed under a deferred-rotation system from May 1 to June 15. The private pasture will be grazed in an alternating early/late spring grazing with the three allotment pastures. When the allotment pastures are to be grazed early, turnout will be on or about May 1, but the exact date will be determined by a range readiness inspection by the permittee and representatives of CIRO and BLM. Cattle will be moved from the early use pasture to the deferred pasture(s) while there is still sufficient soil moisture for regrowth, provided there is sufficient forage on the deferred pasture(s) to carry the cattle until June 15.

When grazing the allotment pastures in the spring, cattle will be progressively moved through the pastures from east to west. While the cattle tend to move themselves in this fashion, the permittee will push the cattle to the next pasture as moderate use (40-60 percent) is reached, but in a timely fashion to be ready to move out of the West pasture on or about June 15. In the fall, the lower pastures, predominantly the West and Central pastures, will be used from September 16 to 30. These pastures basically serve as a holding pasture as the cattle drift and/or are gathered from the Indian Grove pasture.

The alternating early use should result in increased vigor, upward trend and earlier range readiness on both the private pasture and the allotment pastures. The period of use on any given pasture will be sufficiently short that the riparian area along Graham Creek should also benefit.

Upper pastures. The two upper pastures plus a privately owned pasture (Bruesch's Quaking Aspen Pasture) will be grazed in two-pasture rest rotation, one pasture deferred grazing system. The Quaking Aspen Pasture (private) will be grazed from June 16 to July 15 in even-numbered calendar years, beginning in 1994, and will be rested in the odd years. The Circle Pasture will be grazed from June 16 to July 15 in odd years beginning in 1993 and rested in even years. Use on the Indian Grove Pasture will be deferred until July 15 each year, which should allow for a seed ripe treatment each year (Figure 1 and Table 4).

GRAZING TREATMENT	GRAZING PERIOD 6/16 7/15 9/15
1. Grade for Livestock Production	
2. Rest for Vigor/Seedling Establishment	REST FROM GRAZING
3. Defer for Seed Ripe and Then Trample Seed	

Figure 1. Grazing system used on the upper Graham Creek Allotment pastures.

Table 4 Grazing treatment[1] by pasture on the upper Graham Creek Allotment pastures.

PASTURE NAME	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
The Circle	1	2	1	2	1	2	1	2	1	2
Quaking Aspen	2	1	2	1	2	1	2	1	2	1
Indian Grove	3	3	3	3	3	3	3	3	3	3

[1] For treatment description refer to Figure 1.

Livestock Movement and Distribution

Allotment fences and water facilities will be maintained at least five days before entry into a pasture.

Cattle will be well distributed at time of entry into a pasture. Salting will be done in a manner to enhance good distribution. The permittee will check on the cattle frequently and move them as necessary to obtain uniform utilization. A special effort will be made by the permittee to lessen impacts on riparian zones and areas of concentrated recreational use.

FLEXIBILITY AND BILLING PROCEDURES

Flexibility

Turnout and rotation dates are for billing purposes and general guidelines. Turnout will be based on range readiness, as determined in late April on a range tour by the permittee and representatives of CIRO and BLM. Calendar rotation dates are also a guideline, with actual rotation dates adjusted if necessary through mutual agreement by affected parties.

The grazing system will be flexible enough to allow for alteration of dates and pasture movements in emergency situations to assure adequate forage and water for livestock. However, such deviations will be with prior approval by the appropriate agency representative(s). Departure from the sequence of grazing treatments may be necessary to accommodate any proposed land treatments or in case of drought, wildfire, etc.

Permit and Billing Procedures

Each agency (CIRO) has its own permit and billing requirements. Refer to each agency's permit for these instructions. Although CIRO issues permits for only three years at a time, this is a ten-year plan.

MONITORING AND EVALUATION

Monitoring procedures for the allotment are described in the section on monitoring.

The BLM had two permanent trend photo plots on the allotment, prior to establishment of CIRO. Three additional permanent trend photo points will be established on the allotment. Nested frequency transects will also be established at each permanent photo point. Locations of existing and proposed permanent photo/trend plots are shown on the range improvement map (Appendix C).

EXISTING AND PROPOSED RANGE IMPROVEMENTS

Proposed Range Improvements

Brush Control. Control of both sagebrush and juniper is needed on 120 acres in the east end of the East Pasture (SW 1/4 SW 1/4 Sec. 21, S 1/2 SE 1/4 Sec. 20) to achieve the natural landscape and increase forage production. Utah juniper has invaded much of the area and sagebrush density has increased. Prescribed burning would be the most economical and environmentally acceptable means of controlling the brush. However, the lack of fine fuel and potential liability if the fire gets away are drawbacks to use of fire. The BLM has developed a fire plan for burning the 80 acres it administers in the allotment. The BLM, CIRO, permittee and adjacent private land owners should review the plan and make a decision on whether to burn or not in the near future.

Mountain big sagebrush has increased in density on approximately 80 acres near Taylor Springs (NW 1/4, NE 1/4 SE 1/4 Sec. 23). A prescribed burn would return the area to its natural landscape and increase forage production. A fire plan for the burn would need to be coordinated with not only the Graham Creek Allotment permittee, but also the Walter's Creek Allotment permittees and Wally Taylor (private land adjacent to the area).

Water Development. Consideration should be given to piping water to the southeast of Indian Grove Spring, to pull livestock away from the grove of trees and associated riparian area. There is a potential to make more water available in an existing trough on the hillside above Indian Grove by reworking the headbox on a spring just through the fence in Forest Service's Walters Creek pasture. This would help keep cattle on the hillside and lessen use around Indian Grove. Approval and cooperation of the Forest Service would need to be obtained. There is also the potential to develop a spring in section 25.

EMERY CANYON ALLOTMENT GRAZING MANAGEMENT PLAN

GENERAL INFORMATION

The Emery Canyon Allotment consists of land administered by CIRO and less than 10 acres by Bureau of Land Management. The Bureau of Land Management has deferred management of the small acreage to CIRO. The U.S. Forest Service administers 145 acres of CIRO land in their adjacent Walters Creek Allotment. The allotment also includes 25 acres of Wallace Taylor's private land under exchange of use. Bill Tracy and Ted Tracy are the permittees on the allotment. This grazing plan was developed in cooperation and consultation with these agencies and permittees.

DESCRIPTION OF ALLOTMENT

Location and Area

The Emery Canyon Allotment is located in the northwest corner of CIRO and includes parts of sections 23, 26, 35, 36 and a very small part of section 27 in Township 15S, Range 23E (Appendix B). Land ownership and acreage are shown in Table 5.

Table 5. Land ownership in the Emery Canyon Allotment.

LAND OWNERSHIP	APPROXIMATE NUMBER OF ACRES		
	Emery Creek	Bath Rock	Total
CIRO	670	360	1030
Bureau of Land Management	10	0	10
Private[1]	25	0	25
TOTAL	705	360	1065

[1]Private land fenced within CIRO includes 25 acres belonging to Wallace Taylor under exchange of use.

Climate, Topography, Vegetation

Precipitation on the Emery Canyon Allotment averages about 16-18 inches. The growing season varies from year to year, but range readiness always occurs prior to July 1. Forage production benefits from winter, spring and summer precipitation.

Elevation of the allotment ranges from 6600 to over 7700 feet. Most of the allotment is accessible to livestock and suitable for grazing. Riparian areas from springs occur in the southern end of each pasture in the allotment.

Vegetation in the allotment consists of the following map units described in the section on vegetation: Finger Rock, Taylor Springs, Mahogany Ridge and The Rocks. Most of the forage in the allotment is produced by the *Artemisia nova/Agropyron spicatum* (black sage/bluebunch wheatgrass and *Cercocarpus ledifolius/Agropyron spicatum* habitat types. The riparian areas are primarily of the riparian-sagebrush and riparian-bluegrass types (Appendix A).

Permittee and Permitted Use

Permittees on the Emery Canyon Allotment are Bill Tracy and Ted Tracy. The allotment is divided into two units or pastures, Emery Creek and Bath Rock. Season of use is July 1 to July 31. The current carrying capacity of the allotment is over 240 AUMs; but the permitted use is presently set at 132 AUMs. Season of use and permitted use are shown in Table 6. The Forest Service has allocated 17 AUMs to the CIRO land they administer in the adjacent Walters Creek Allotment.

Table 6. Season of use and permitted use on the Emery Canyon Allotment.

PASTURE	PERMITTEE	SEASON OF USE	AUMS
Emery Creek	Bill Tracy	7/1 - 7/31	48
	Ted Tracy	7/1 - 7/31	84
Bath Rock	J. E. Tracy	7/1 - 7/31	48
	Ted Tracy	7/1 - 7/31	84
TOTAL		7/1 - 7/31	132

[1]Permitted AUMs on CIRO land includes 132 AUMs in the Emery Creek unit and 17 AUMs in the Walters Creek unit.

GRAZING MANAGEMENT

Pasture Description

The Emery Canyon Allotment is separated from adjacent allotments by fences and/or topography that provides natural barriers to livestock movement. It is divided into two pastures or units, Emery Creek and Bath Rock.

Grazing History

The entire allotment was formerly administered by the U.S. Forest Service. In the mid-1980's the Forest Service established the Walters Creek allotment and set up a two-pasture deferred-rotation system with a season of use of July 1 to September 30. One unit was used early and the other late in the season, with the early/late use rotated between pastures on a two-year cycle. While this system has benefited the resources, it has had some problems. Cattle distribution and thus uniform utilization has been a problem because of topography, sources of water and preferred feed on riparian areas. During the 1988 to 1992 drought, decreased spring flow made it difficult for the cattle to get sufficient water.

Grazing Systems

A two-pasture deferred-rotation system will be used on the allotment. The Emery Creek unit will be grazed from July 1 to the end of July in even-numbered calendar years and from mid-July to mid-August in odd years. The Bath Rock unit will be grazed from July 1 to mid-July in odd years and from August 1 to mid-August in even years (Table 7).

Table 7. Grazing treatment[1] by pasture on the Emery Canyon Allotment.

PASTURE NAME	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Emery Creek	2	1	2	1	2	1	2	1	2	1
Bath Rock	1	2	1	2	1	2	1	2	1	2

[1]Treatment 1 is early use and treatment 2 is late use.

This system should insure that grass plants reach seed ripe and replenish carbohydrate reserves on the deferred pasture and thus each unit every other year. Dates of rotation are approximate. Actual dates of rotation should be based on available feed remaining in the early use unit and the anticipated opening date on the Walters Creek Allotment. This should be determined by a joint range inspection by the permittees, CIRO and Forest Service personnel each year in mid-July to early August.

Livestock Movement and Distribution

Allotment fences and water facilities will be maintained at least five days before entry into a pasture.

Cattle will be well distributed at time of entry into a pasture. Salting will be done in a manner to enhance good distribution. The permittees will check on the cattle frequently and move them as necessary to obtain uniform utilization. A special effort will be made by the permittees to lessen impacts on riparian zones and areas of concentrated recreational use, especially in Emery Canyon. Consideration should be given to fencing the riparian area and the main road into a lane and piping water to troughs away from the riparian area.

FLEXIBILITY AND BILLING PROCEDURES

Flexibility

Turnout and rotation dates are for billing purposes and general guidelines. Turnout will be based on range readiness, as determined each summer prior to turnout on a range tour by the permittees and representatives of CIRO.

The grazing system will be flexible enough to allow for alteration of dates and pasture movements in emergency situations to assure adequate forage and water for livestock. However, such deviations will be with prior approval by the appropriate agency representative(s). Departure from the sequence of grazing treatments may be necessary to accommodate any proposed land treatments or in case of drought, wildfire, etc.

Permit and Billing Procedures

Each agency (CIRO, Forest Service) has its own permit and billing requirements. Refer to each agency's permit for these instructions. Although CIRO issues permits for only three years at a time, this is a ten-year plan.

MONITORING AND EVALUATION

Monitoring procedures for the allotment are described in the section on monitoring. There were no permanent trend study sites on what is now CIRO land, prior to establishment of CIRO. A permanent trend study site should be established in Emery Canyon on the Emery Creek unit and at least one site in the Bath Rock unit (Appendix C). An additional permanent trend photo point, located in the upper end of the Emery Creek unit and one on each riparian area would also be useful.

EXISTING AND PROPOSED RANGE IMPROVEMENTS

Proposed Range Improvements

Brush Control. Control of a dense stand of mountain big sagebrush along the west and north boundaries of the Taylor property in the Emery Creek unit would aid in achieving the natural landscape objective and increase forage production. A portion of this area west of the Taylor property burned in a wildfire in 1992. Prescribed burning would be the most economical and environmentally acceptable means of controlling the brush. A fire plan for the burn would need to be written and coordinated with not only the Walters Creek permittees, but also the Graham Creek permittee (see Graham Creek Allotment Grazing Plan), Wally Taylor (private land) and the BLM which has land just to the west of this area.

Water Development. Water is more of a limiting factor on the allotment, especially during and following a drought, than is forage production. Consideration should be given to developing additional water in the upper end of the Emery Creek unit and also on CIRO land in the Walters Creek unit. A well with a portable generator or solar powered pump is one possibility. It might also be feasible to pipe water from a spring on National Forest land in the upper end of the Walters Creek unit or from the Indian Grove spring in high flow years.

Fencing. A temporary fence was put in to protect the 1992 burned area in the Emery Creek unit for two growing seasons. This fence is still in place, with plans for Curtis Durfee to use the burned area. If additional water can be developed in the upper end of the Emery Creek unit, consideration should be given to putting in a permanent fence and cattle guard from the west side of the Taylor property to the west boundary of the allotment, to control cattle use in Emery Canyon. The canyon could be grazed a few days each year as a riparian pasture.

Consideration should also be given to fencing the riparian area in the Bath Rock pasture and piping water to a trough outside the riparian area.

TRAIL CANYON ALLOTMENT GRAZING MANAGEMENT PLAN

GENERAL INFORMATION

The Trail Canyon Allotment includes land administered by CIRO, Bureau of Land Management and private land of Curtis Durfee and Oscar Jones. Curtis Durfee, Harold Durfee and William D. Jones are the permittees. The allotment grazing plan was developed in cooperation and consultation with these agencies, private landowner and permittees.

DESCRIPTION OF ALLOTMENT

Location and Area

The Trail Canyon Allotment is located on the west side of CIRO, with about one half inside CIRO and the other half outside. In Township 15 S., Range 23 E., it includes portions of sections 34 and 35. In Township 16 S., Range 23 E., it includes portions of sections 2, 3, 9, 10, 11, 14 and 15 (Appendix B). Land ownership and acreage are shown in Table 8.

Table 8. Land ownership in the Trail Canyon Allotment.

LAND OWNERSHIP	APPROXIMATE NUMBER OF ACRES	PERCENT OWNERSHIP
CIRO	740	30.3
Bureau of Land Management	910	37.2
Private[1]	795	32.5
TOTAL	2445	

[1] Private land consists of approximately 755 acres belonging to Curtis Durfee and a narrow strip (40 acres) in Section 35 belonging to Oscar Jones. Approximately 240 acres of private land is within CIRO boundary.

Climate, Topography, Vegetation

Precipitation on the Trail Canyon Allotment averages from about 14 inches at the lower elevations to about 16 inches at the higher elevations. Range readiness on the lower elevation is generally reached by late May and by mid-June at the higher elevations. Forage production at the lower elevations has a high correlation with April to June precipitation.

Elevation of the allotment ranges from 6000 to 7715 feet. The majority of the land consists of fairly steep slopes covered with mahogany and juniper trees that makes uniform livestock distribution difficult. Most of the forage production is on more level topography, which is mostly private land. Trail Creek and Junction Creek run for approximately 1 1/2 and 1/2 miles, respectively, through the allotment.

Vegetation in CIRO portion of the allotment is made up of the following map units: Mahogany Ridge, Southwest Hill and Twin Sisters Rocks. Much of the private land and some of the lower BLM land was seeded to crested wheatgrass many years ago. Sagebrush and juniper tree densities have increased on the seeding in recent years, reducing forage production.

Permittees and Permitted Use

Curtis Durfee, Harold Durfee and William D. Jones currently have CIRO and BLM permits to graze cattle on the allotment. Season of use on the allotment is the same for both CIRO and BLM, from June 1 to October 4. However, each permittee has a different permitted use (Table 9).

Carrying capacity of the allotment is currently 196 AUMs. With 40 percent of the allotment area within CIRO, 40 percent of the total use (79 AUMs) was allocated to CIRO and 60 percent (117 AUMs) to the BLM (Table 9).

Table 9. Season of use and permitted use on the Trail Canyon Allotment.

OWNERSHIP	PERMITTEE	SEASON OF USE	PERCENT OF PERMIT	AUMS[1]
CIRO	Curtis Durfee	6/5 - 10/1	39.4	31
	Harold Durfee	6/5 - 10/4	32.2	26
	William Jones	6/1 - 6/30	28.4	22
BLM	Curtis Durfee	6/5 - 10/1	39.4	47
	Harold Durfee	6/5 - 10/4	32.2	38
	William Jones	6/1 - 6/30	28.4	32
TOTAL		6/1 - 10/4		196

[1]Allocation of AUMs to CIRO and BLM was calculated as a percentage of land within and outside of CIRO boundary.

GRAZING MANAGEMENT

Pasture Description

The Trail Canyon Allotment is separated from adjacent allotments by fences and/or topography that provides natural barriers to livestock movement. It consists of one large pasture (Appendix B).

Grazing History

The entire allotment was formerly administered by the Bureau of Land Management. The permittees move their cattle to this allotment in early June from another BLM allotment grazed earlier in the year. Thus, turnout has been based not only on range readiness in this allotment, but also on use in the other allotment. Most of the grazing use has been made on the crested wheatgrass seeding in the Trail Creek Basin. Steep topography and a dense stand of mountain mahogany and juniper trees has limited grazing use of the higher elevations. Season-long use has been the way the pasture was used for many years.

Grazing Systems

With only one pasture and season-long use, grazing management is limited to degree of use. This is taken into account with the current stocking rate.

Curtis Durfee has suggested the northern end of the allotment be fenced off from the southern end to defer use on the southern end. This would require approximately one mile of fence over steep topography. Another half mile would be required if the fence was built to follow the terrain. While this would be of some benefit to the resources on both sides of the fence, the cost to benefit ratio may be prohibitive.

It is recommended the current system of season-long use be continued until CIRO, BLM, private land owner and permittees develop other grazing management options, such as splitting the allotment into two or more pastures or developing a rotation system with another allotment(s). The BLM has indicated it would prefer to change to an early spring use to enhance the riparian area along Trail Creek.

Livestock Movement and Distribution

Allotment fences and water facilities will be maintained at least five days before entry into a pasture.

Cattle will be well distributed at time of entry into a pasture. Salting will be done in a manner to enhance good distribution. The permittees will check on the cattle frequently and move them as necessary to obtain uniform utilization. A special effort will be made by the permittees to lessen impacts on riparian zones and areas of concentrated recreational use, especially along Trail Creek.

FLEXIBILITY AND BILLING PROCEDURES

Flexibility

Turnout and rotation dates are for billing purposes and general guidelines. Turnout will be based on range readiness, as determined by a range readiness tour each spring by the permittees and representatives of CIRO and BLM. Turnout on the Trail Canyon Allotment will also need to be coordinated with use on the BLM's Junction Seeding Allotment.

Permit and Billing Procedures

Each agency (CIRO, BLM) has its own permit and billing requirements. Refer to each agency's permit for these instructions. Although the NPS issues permits for only three years at a time, the grazing plan should be coordinated with the BLM's land use plan, which will be rewritten in the mid-1990's.

MONITORING AND EVALUATION

Monitoring procedures for the allotment are described in the section on monitoring. The BLM established a permanent trend study site in the NW 1/4 NW 1/4 of Section 14 in 1984 (Appendix C). This study site is now on CIRO land and it should continue to be monitored.

EXISTING AND PROPOSED RANGE IMPROVEMENTS

Proposed Range Improvements

Brush Control. Sagebrush and rabbitbrush (*Chropsothamnus* sp.) have increased in density on the crested wheatgrass seeding and adjacent native rangeland. Control of these brush species would aid in achieving the natural landscape objective and increase forage production. Since rabbitbrush resprouts from the crown of the plant after fire, prescribed burning is not a practical means of brush control. Plowing and seeding or use of herbicides are the only means of controlling the rabbitbrush. Even though these tools may not be available on CIRO land, they could be applied to BLM and private land. The majority of the land with potential for improvement is private and BLM land. A brush control project would require coordination among the permittees and various land owners.

If a brush control project is completed, consideration should be given to permanently fencing the area off from the remainder of the allotment and setting up a deferred rotation grazing system.

Water Development. The allotment is fairly well watered and no additional water developments are necessary. Fencing of springs, development of head boxes and piping the water from the headbox to troughs should be considered.

TRACY LANE ALLOTMENT GRAZING MANAGEMENT PLAN

GENERAL INFORMATION

The Tracy Lane Allotment consists of land administered by CIRO and BLM. The majority of the allotment is within CIRO. R. O. Jones and Sons, Inc. is the permittee on the allotment. This grazing plan was developed in cooperation and consultation with these agencies and permittee.

DESCRIPTION OF ALLOTMENT

Location and Area

The Tracy Lane Allotment is located in the southwest corner of CIRO and on adjacent Bureau of Land Management land. It includes portions of sections 14, 15, 22, 23 and 24 in Township 16 S, Range 23 E (Appendix B). Land ownership and acreage are shown in Table 10.

Table 10. Land ownership in the Tracy Lane Allotment.

OWNERSHIP	NUMBER OF ACRES	PERCENT OF LAND
CIRO	560	64
BLM	320	36
TOTAL	880	

Climate, Topography, Vegetation

Precipitation on the Tracy Lane Allotment probably averages about 14 inches. The growing season is fairly uniform on the allotment. Range readiness generally occurs by mid-May but may vary by two weeks. Grass production has a high correlation with April to June precipitation.

Elevation of the allotment ranges from 5900 to 7000 feet. Most of the allotment is accessible to livestock grazing, with the exception of the central portion of the northern boundary. Topography is sufficiently steep here to form a natural barrier to livestock movement into the adjacent allotment. Approximately 1/2 mile of a tributary to Junction Creek flows through the southwest corner of the allotment on BLM land.

Vegetation in the allotment consists of the Southwest Hill and Emigrant Creek Basin map units described in the section on vegetation. Most of the forage in the allotment is produced on a 240 acre crested wheatgrass seeding. Sagebrush, rabbitbrush and juniper densities have increased on the seeding and adjacent native range.

Permittee and Permitted Use

R. O. Jones and Sons, Inc. is the only permittee on the Tracy Lane Allotment. Season of use is from May 5 to June 4. The current carrying capacity of the allotment is 77 AUMs. Season of use and permitted use are shown in Table 11.

Table 11. Season of use and permitted use[1] on the Tracy Lane Allotment.

OWNERSHIP	SEASON OF USE	NO. OF CATTLE	AUMS
CIRO	5/5 - 6/4	49	49
BLM	5/5 - 6/4	28	28
TOTAL	5/5 - 6/4	77	77

[1]The number of cattle and AUMs allocated to CIRO and BLM was calculated from the percent of land each agency has in the allotment.

GRAZING MANAGEMENT

Pasture Description

The Tracy Lane Allotment is separated from adjacent allotments by fence, except the northern boundary. About a mile of the northern boundary consists of a natural barrier to livestock movement due to steep terrain. There is only one pasture in the allotment.

Grazing History

The entire allotment was administered by the BLM prior to creation of CIRO. Use in the allotment has been from May 5 to June 4. Livestock distribution has been a problem on the allotment, with use concentrated on the crested wheatgrass seeding in the basin. Sagebrush, rabbitbrush and juniper have increased in density on the seeding and adjacent native range.

Grazing Systems

With only one pasture and early spring use every year, grazing management is limited to degree of use. The current moderate stocking rate takes this into account.

It is recommended the current stocking rate and season of use continue. However, CIRO, BLM and permittee should explore various means of establishing a deferred rotation system on the allotment. Options might include a rotation with another BLM allotment the permittee uses or splitting the allotment into two pastures. If a reliable source of water was developed in the eastern half of the allotment, a north-south fence only 1/2 to 3/4 mile long would facilitate a two-pasture system. In such a system one pasture would be grazed early (May 5 - May 19) and the other pasture late (May 19 - June 4). The next year the order of use would be reversed.

Livestock Movement and Distribution

Allotment fences and water facilities will be maintained at least five days before entry into a pasture.

Cattle will be well distributed at time of entry into a pasture. Salting will be done in a manner to enhance good distribution. The permittee will check on the cattle frequently and move them as necessary to obtain uniform utilization. A special effort will be made by the permittee to lessen impacts on riparian zones and areas of concentrated recreational use.

FLEXIBILITY AND BILLING PROCEDURES

Flexibility

Turnout and rotation dates are for billing purposes and general guidelines. Turnout will be based on range readiness, as determined by a range tour each spring by the permittee and representatives of CIRO and BLM.

Permit and Billing Procedures

Each agency (CIRO, BLM) has its own permit and billing requirements. Refer to each agency's permit for these instructions. Although the NPS issues permits for only three years at a time, the grazing plan should be coordinated with the BLM's land use plan, which will be rewritten in the mid-1990's.

MONITORING AND EVALUATION

Monitoring procedures for the allotment are described in the section on monitoring. The BLM established a permanent trend study site in the SE 1/4 NW 1/4 of Sec 23 in 1984 (Appendix C). This study site is now on CIRO land and it should continue to be monitored.

EXISTING AND PROPOSED RANGE IMPROVEMENTS

Proposed Range Improvements

Brush Control. Sagebrush and rabbitbrush (*Chropsothamnus* sp.) have increased in density on the crested wheatgrass seeding and adjacent native rangeland. Control of these brush species would aid in achieving the natural landscape objective and increase forage production. Since rabbitbrush resprouts from the crown of the plant after fire, prescribed burning may not be a practical means of brush control. Plowing and seeding or use of herbicides are the only means of controlling the rabbitbrush. Even though these tools may not be available on CIRO land, they could be applied to BLM land. A brush control project would require coordination among CIRO, BLM and permittee.

Fencing. Trespass cattle are a problem in the northeast and southeast corners of the allotment. This could be alleviated by putting in a cattle guard on the main road in the southeast corner and finishing the allotment boundary fence in the northeast corner. Consideration should be given to splitting the allotment, north to south, with a fence and cattle guard. This should definitely be done if a brush control project is completed.

Water Development. Additional water in the eastern part of the allotment would improve livestock distribution. This could be done by improving the stockpond in the NE corner of the allotment. However, if the allotment is split in two, this pond may not have the capacity to water all the cattle every year. A pump and pipeline might be necessary.

HEATH CANYON ALLOTMENT GRAZING MANAGEMENT PLAN

GENERAL INFORMATION

The Heath Canyon Allotment includes land administered by CIRO, Bureau of Land Management and private land of Olen Ward. The majority of the allotment is private land and only 400 acres of CIRO and BLM land are grazed. The only permittee on the allotment is Olen Ward. He does an excellent job of managing the allotment and thus grazing management on the allotment is a low priority with CIRO.

DESCRIPTION OF ALLOTMENT

Location and Area

The Heath Canyon Allotment is located in the southeast corner of CIRO. CIRO lands in the allotment include portions of Sections 7, 18, and 19 in Township 15 S, Range 24 E and Sections 13 and 24 in T 15 S, R 23 E (Appendix B). Land ownership and acreage are shown in Table 12.

Table 12. Land ownership in the Heath Canyon Allotment.

LAND OWNERSHIP	APPROXIMATE NUMBER OF ACRES	PERCENT OWNERSHIP
CIRO[1]	1240	42.8
BLM[1]	645	22.2
PRIVATE[2]	1015	35
TOTAL	2900	

[1]Only 400 acres out of the 1885 acres of federal land are grazed (320 acres in CIRO).
[2]Private land acreage and percent ownership includes only the private land in Pasture Number 1 (Appendix B). An additional 1500 acres of private land is used in the rest rotation grazing system.

Climate, Topography, Vegetation

Precipitation on the Heath Canyon Allotment probably averages from about 12 to 16 inches. With most of the forage being produced by crested wheatgrass and a rest-rotation grazing system being used, range readiness generally occurs by May 1. Forage production has a high correlation with April to June precipitation.

Elevation of the allotment ranges from 5600 to 7400 feet. Only 400 acres of the federal lands (CIRO, BLM) are grazed by cattle because of steep, rocky slopes dominated by juniper. Most of the private land is in a basin that is accessible to livestock. No riparian areas occur on CIRO land that is grazed.

Vegetation on CIRO land in the allotment consists of the following map units described in the section on vegetation: Cedar Hill, Smokey Mountain, Twin Sisters Rocks and Emigrant Creek Basin. Dominated by juniper and pinyon pine these vegetation units provide little forage and are mostly unused by cattle. Most of the private land falls within the Twin Sisters Basin map unit and has been seeded to crested wheatgrass. Sagebrush, rabbitbrush and juniper have increased in density since the area was seeded. The crested wheatgrass seedings on the private land provide most of the forage in the allotment.

Permittee and Permitted Use

Olen Ward is the only permittee on the allotment. His permit for the 400 acres of suitable federal range provides for 49 AUMs, with the season of use May 1 to November 30. However, with a rest-rotation grazing system, cattle are not on the federal range for the full season of use.

GRAZING MANAGEMENT

Pasture Description

The Heath Canyon Allotment is divided into six pastures, numbered 1-6. Most of the federal land is in Pasture Number 1 (Appendix B). The allotment is separated from adjacent allotments by fences and topography that provide natural barriers to livestock movement.

Grazing History

The federal land in the allotment was formerly all administered by the BLM. With the creation of CIRO, 62 percent of the federal land falls within CIRO boundary. Because only 400 acres of the federal range are grazed by cattle, the permittee was allowed to develop the management plan for the allotment.

The allotment is primarily used in the spring and fall. Under normal conditions cattle are placed in the allotment between May 1 to 10. Replacement heifers are added on about June 1. The majority of the cattle are taken off and placed on a National Forest allotment about June 30. A few cattle that need special attention are retained on the allotment through the summer.

When the cattle come off the National Forest allotment on September 21, the calves are weaned and the dry cows and replacement heifers are returned to the Heath Canyon Allotment. They remain there until November 30 or until weather drives them out. In dry years the cattle may come off earlier.

There are four primary fields that are used in a rest-rotation grazing system. Two smaller fields are used as needed.

Grazing Systems

The allotment will continue to be managed as in the past. The permittee has proven himself to be a good steward of the land and with only 400 acres of federal land being grazed, there is no need for a change in management by CIRO. Under the four pasture rest-rotation system being used, each pasture will receive complete rest from grazing every four years and will be grazed either early or late in the season the other three years.

A four pasture rest-rotation grazing system (Hormay, 1961 and 1970) consists of four basic steps in the following sequence, repeated every four years:

1. Graze the range for optimum livestock production.
2. Rest the range to restore plant vigor.
3. Rest the range until seed ripe, then graze for optimum livestock production.
4. Rest the range for seedling establishment.

Livestock Movement and Distribution

Since nearly all of the grazed area in the allotment is private land, the permittee has flexibility.

FLEXIBILITY AND BILLING PROCEDURES

Flexibility

Turnout and rotation dates are for billing purposes and general guidelines. Turnout will be based on range readiness, as determined by the permittee. The permittee will make an effort to lessen impacts on areas of concentrated recreational use, especially around the Twin Sisters.

Permit and Billing Procedures

Each agency (CIRO, BLM) has its own permit and billing requirements. Refer to each agency's permit for these instructions. Although the NPS issues permits for only three years at a time, the grazing plan should be coordinated with the BLM's land use plan, which will be rewritten in the mid-1990's.

MONITORING AND EVALUATION

Because of the small acreage of CIRO land grazed, no permanent trend study sites are recommended on the allotment. Monitoring by CIRO will consist of collection of actual use data and visual inspection of the allotment as needed. Such inspections should be done with the permittee. The permittee is encouraged to establish permanent photo trend plots on the allotment, especially in areas of concern.

EXISTING AND PROPOSED RANGE IMPROVEMENTS

Proposed Range Improvements

No improvements are proposed on CIRO land. If CIRO determines improvements are needed in the future, they will coordinate such improvements with the permittee and BLM.

CIRCLE CREEK ALLOTMENT GRAZING MANAGEMENT PLAN

GENERAL INFORMATION

The Circle Creek Allotment includes land administered by CIRO, BLM and very small areas of private land owned by Robert Eck, et al and Zon G. Lloyd. The allotment grazing plan was developed in cooperation and consultation with these agencies.

DESCRIPTION OF ALLOTMENT

Location and Area

The Circle Creek Allotment is located in the northeast corner of CIRO. In Township 15 S, Range 24 E, it includes portions of Sections 19 and 28 to 31 (Appendix B). Land ownership and acreage are shown in Table 14.

Table 13. Land ownership in the Circle Creek Allotment.

LAND OWNERSHIP	APPROXIMATE NUMBER OF ACRES	PERCENT OWNERSHIP
CIRO	1235	74.2
BLM[1]	405	24.3
Private	25	1.5
TOTAL	1665	

[1]The BLM acreage includes an isolated 40 acre crested wheatgrass seeding not shown on the map.

Climate, Topography, Vegetation

Precipitation on the allotment ranges from 12 inches at the lower elevations to 16 inches at the higher elevations. Range readiness on the lower elevation crested wheatgrass seedings is generally reached by early to mid-May. Forage production has a high correlation with April to June precipitation.

Elevation of the allotment ranges from 5600 to 7600 feet. About one half of the allotment consists of steep, rocky slopes with heavy stands of juniper and pinyon pine. Little livestock use is made on these slopes. Approximately one mile of Circle Creek runs through the allotment, with 1/4 mile across CIRO land.

Vegetation on the allotment consists of the following map units described in the section on vegetation: Little Cove, Little East Basin, Circle Creek Basin, The Rocks and Smokey Mountain (Appendix B). Most of the forage production on the allotment occurs on crested wheatgrass seedings. Sagebrush and juniper tree densities have increased on the seedings in recent years, reducing forage production.

Permittee and Permitted Use

The BLM has allocated 14 AUMs of use from May 1 to May 10 on the 40 acre isolated tract to J. E. Tracy. Since CIRO plans to construct its office on this 40-acre tract, the 14 AUMs from the BLM tract, plus the 10 AUMs assigned to Tracy on the CIRO portion will be transferred to the Tracy permit in the Emery Canyon Allotment. No permanent permits will be issued on the allotment. However, as indicated in the Graham Creek Allotment plan, approximately 480 acres in the lower part of section 30 will be available to Cordell Sheridan on a rotational basis. The remaining portion of the Circle Creek Allotment will be kept in reserve to be used as the Superintendent of CIRO deems necessary. It is recommended that the allotment be used to provide flexibility in grazing management of the entire CIRO. For instance, if a pasture in another allotment needs to be rested for a full grazing season, the permittee(s) in that allotment would be allowed to use the Circle Creek Allotment.

GRAZING MANAGEMENT

Pasture Description

The Circle Creek Allotment is separated from adjacent allotments by fences and/or topography that provides a natural barrier. The isolated 40 acre crested wheatgrass is managed by the BLM as a separate pasture. However, it is proposed to become an administrative site with no grazing use. The main allotment is split into two pastures by the fenced lane along the county road (Appendix B).

Grazing History

The entire allotment was formerly administered by the BLM. In 1984 the BLM adjusted the date of turnout on the 40 acre tract from April 25 to May 1 and reduced the AUMs from 34 to 23 on the allotment. After use of the 40 acre tract, the permittee moved onto the main portion of the allotment. The two pastures were generally used in a two-pasture deferred rotation system, with the south pasture being used early one year and the north pasture early the next year. During the recent drought, water for livestock was in short supply in the north pasture. Grazing use was primarily on the crested wheatgrass seedings on private land.

Grazing Systems

It has been proposed that CIRO assume administration of BLM lands in the allotment. This plan is written with that assumption, although details to the agreement are not final. Until the agreement is finalized, the Superintendent of CIRO and BLM Area Manager will determine how and when the allotment is to be used on an annual basis. No specific grazing system will be prescribed.

Livestock Movement and Distribution

Allotment fences and water facilities will be maintained at least five days before entry into a pasture.

Cattle will be well distributed at time of entry into a pasture. Salting will be done in a manner to enhance good distribution. The permittee(s) will check on the cattle frequently and move them as necessary to obtain uniform utilization. A special effort will be made by the permittee to lessen impacts on riparian zones and areas of concentrated recreational use.

FLEXIBILITY AND BILLING PROCEDURES

Flexibility

Use of the allotment will be at the discretion of the Superintendent of CIRO and BLM Area Manager.

Permit and Billing Procedures

Each agency (CIRO, BLM) has its own permit and billing requirements. Refer to each agency's permit for these instructions. Although CIRO issues permits for only three years at a time, the grazing plan should be coordinated with the BLM's land use plan, which will be rewritten in the mid-1990's.

MONITORING AND EVALUATION

Monitoring procedures for the allotment are described in the section on monitoring. There were no permanent trend study sites on what is now CIRO land, prior to establishment of CIRO. A permanent trend study site should be established on the crested wheatgrass seeding in the SE 1/4 of Sec. 31 and another approximately in the center of Sec. 30.

EXISTING AND PROPOSED RANGE IMPROVEMENTS

Proposed Range Improvements

Additional water development in the north pasture would make it more usable, especially during drought. Two springs in this area could provide more water with some work on the head boxes and installation of troughs. Another possibility would be to pipe water from the pond below the road, but this would require some type of pump.

Brush control is needed on the crested wheatgrass seedings. Control of the brush would aid in achieving the natural landscape objective and increase forage production.

KEMPTON ALLOTMENT GRAZING MANAGEMENT PLAN

GENERAL INFORMATION

The Kempton Allotment is newly created from private lands recently acquired by CIRO from Jim Kempton. It will be administered by CIRO and will be used by Curtis Durfee and Olen Ward. The allotment grazing plan was developed in cooperation and consultation with CIRO and the permittee.

DESCRIPTION OF ALLOTMENT

Location and Area

The Kempton Allotment is located near the center of CIRO in Township16 S, Range 23 E. It includes the western half of Sec. 1, the southeast corner of Sec. 2 and approximately half of Sec. 12, totaling 360 acres (Appendix B).

Climate, Topography, Vegetation

Precipitation on the Kempton Allotment averages 12 to 14 inches annually. Range readiness occurs well before the July 1 turnout date. Forage production has a high correlation with April to June precipitation, but also benefits from winter moisture.

Elevation of the allotment ranges from 6000 to 6800 feet, with a gentle southerly slope. All of the allotment is suitable for grazing. A spring fed riparian area runs through the northern end of the allotment.

Vegetation in the allotment consists primarily of the Twin Sister Basin map unit described in the section on vegetation. Most of the area was plowed and seeded to crested wheatgrass sometime in the past. Mountain big sagebrush has re-invaded most of the area to the point it is inhibiting grass production. There are also areas with a good stand of the native western wheatgrass. Riparian areas in the northern end of the allotment are in fairly good condition with an overstory of basin big sagebrush.

Permittee and Permitted Use

Curtis Durfee will be the only permittee in the north pasture on the allotment. Permitted use will be from July 1 to July 31, with 22 AUMs allocated (permit transferred from former Walters Creek Allotment). Olin Ward will be the permittee in the south pasture with 28 AUMs allocated. The south pasture will become a part of the Heath Canyon Allotment.

GRAZING MANAGEMENT

Pasture Description

The Kempton Allotment currently consists of one pasture but will be divided in half by a fence. This will create a north pasture and a south pasture, with the fence being built east to west in the narrow part of the pasture.

Grazing History

History of grazing on the allotment is unknown at this time, as it was formerly private land.

Grazing Systems

The north pasture will be used by Curtis Durfee, in a two pasture deferred rotation system with the burned area in the Emery Creek Allotment. Early use will be alternated between the two areas. This will result in only 15 days grazing by 22 head of cattle each year. Special attention should be given to monitoring use on the riparian areas, with cattle being herded away from these areas when necessary.

The south pasture will be used by Olen Ward and made a part of the Heath Canyon Allotment, which it is adjacent to.

Livestock Movement and Distribution

Allotment fences and water facilities will be maintained at least five days before entry into a pasture.

Cattle will be well distributed at time of entry into a pasture. Salting will be done in a manner to enhance good distribution. The permittee will check on the cattle frequently and move them as necessary to obtain uniform utilization. A special effort will be made by the permittee to lessen impacts on riparian zones.

FLEXIBILITY AND BILLING PROCEDURES

Flexibility

Turnout and rotation dates are for billing purposes and general guidelines. Turnout will be based on range readiness, as determined by a range readiness tour each summer by the permittee and representatives of CIRO.

Permit and Billing Procedures

Refer to CIRO permit for permit and billing instructions.

MONITORING AND EVALUATION

Monitoring procedures for the allotment are described in the section on monitoring. No permanent trend study sites are presently located in the allotment. At least two sites should be established, one in the south unit and one in the north unit (when fenced).

EXISTING AND PROPOSED RANGE IMPROVEMENTS

Existing Range Improvements

Other than perimeter fences that are in bad need of repair or replacement and spring development, there are no range improvements.

Proposed Improvements

Brush Control. Sagebrush has increased in density on the allotment to the point that it is severely limiting forage production. Control of the brush would not only increase forage production many times over current levels, but would also aid in achieving the natural landscape objective. A prescribed burn would be the most effective way to control the brush. A burn would need to be coordinated with the permittee and neighboring private land owners.

Water Development. To make effective use of the south pasture a source of water must be developed. The easiest and least expensive source would be to pipe water from a nearby well on adjacent private land. This would require permission of the private land owner. Other alternatives are to pipe water from a spring in the northern end of the allotment (expensive) or to require the permittee to haul water (also expensive).

ISOLATED TRACTS OF CIRO

There are four isolated small tracts of CIRO land not included in the preceding allotment grazing management plans (Table 16). Only one of these isolated tracts is readily accessible to livestock and thus is grazed. All but two of these tracts occur in BLM allotments.

Table 14. Isolated tracts of CIRO not addressed by the grazing plan.

LOCATION	MANAGEMENT OF AREA	NUMBER OF ACRES	USE
W 1/2 SW 1/4 SW 1/4 Sec. 26, T 15 S, R 23 E	BLM	15	Grazed
S 1/2 SE 1/4 Sec. 32, T 15 S, R 24 E	BLM	80	Ungrazed
NE 1/4 NE 1/4 Sec. 7, T 16 S, R 24 E	Private	40	Ungrazed
E 1/2 E 1/2 Sec. 19, T 16 S, R 24 E	BLM	150	Ungrazed

The ungrazed tracts are too steep and rocky to be accessible to cattle and also do not produce any forage, due to the dense stands of juniper and pinyon-pine trees. Since there is no grazing use made of these areas, they do not warrant special attention. Monitoring of these tracts should consist of an occasional visual inspection by CIRO.

The approximately 15 acre grazed tract is under BLM management, with essentially the same land management objectives as the CIRO. The fence line could be adjusted relatively easily to include the 15 acres within the CIRO boundary and in the Emery Canyon Allotment. This would need to be coordinated with the BLM and permittee(s) in the adjacent allotment.

MONITORING AND EVALUATION

The purpose of monitoring is to determine if ongoing management actions are having the desired affect on the resource. The monitoring program must be able to determine whether objectives are or are not being reached and why or why not. Monitoring must identify what areas of management need revision to produce the desired objective. Just as the allotment plan should be a cooperative, coordinated plan developed by the various landowner/administrator and user groups, so should the monitoring be a cooperative, coordinated effort. The monitoring program will be divided into short-term and long-term monitoring procedures.

Short-Term Monitoring

Actual Use. Each permittee will submit an actual use record at the end of the grazing season to the CIRO. This record will include dates of use in each pasture and number and age of cattle. This information will be used for actual use billing as well as interpretation of other monitoring data.

Weather Data. Weather information, especially precipitation, is essential for the interpretation of other monitoring studies. CIRO should establish a high quality gauge at the Visitors Center that will record daily precipitation. The permittee(s) are encouraged to establish at least one gauge per allotment that is read seasonally and/or by event.

Utilization Mapping. Periodic mapping of livestock and wildlife utilization patterns can provide useful information on key areas, distribution problems and an opportunity to make any needed adjustments in annual operating plans. When done jointly by the permittee(s) and appropriate agency personnel, it also provides an excellent forum for interpretation of other monitoring data and making management decisions.

An annual range inspection tour at the end of the grazing season should be made by the permittee(s) and agency personnel. Degree of use and distribution by pasture (not just key areas) should be mapped and discussed. It is of no management utility to measure degree of use precisely on a few transect locations. The question that needs to be answered is what areas of a pasture were underused, correctly used or severely used. It is more useful for the permittee and agency personnel to jointly observe grazing use patterns on the whole pasture than to spend time measuring plots or transects. If it is not possible to map utilization every year, it should be done as needed.

The Key Forage Plant Method will be used to map utilization patterns. This is an ocular estimate of forage utilization within one of six utilization classes. The method used by the BLM (USDI-BLM 1984) is detailed in Appendix D. Photo guides are available that facility training for ocular estimates of utilization (Kingery et al 1992).

As the use map is being made, field notes on conditions and situations observed should also be made. These notes should include comments on climatic conditions of that year's growing season which directly affect vegetation growth. A determination needs to be made while the observers are on the ground as to whether or not the degree of use is in accordance with the grazing plan. The use map and field notes are decision information that bear directly on how grazing is to be done for the remainder of the current season or during the next grazing season. Did this season's grazing use conform to the grazing plan and if not, what changes need to be made?

Permittees are encouraged to take photographs at various sites in a pasture, especially photo trend plots, just prior to grazing and immediately after grazing. The photographs make an excellent permanent record of utilization in a pasture.

Long-Term Monitoring

Range trend is the measurement of the ecological health of a range over time. It is described in terms of upward, downward, or static (not apparent) trend. Trend is used to evaluate whether management actions are meeting management objectives. Trend is determined by measuring or documenting various attributes on the rangeland at two or more points in time. Both the BLM and USFS use permanent photo points and nested frequency transects to monitor trend. The University of Idaho also recommends these two methods for monitoring range trend.

Photographic Records. It has often been said that "a picture is worth a thousand words," and that holds true for monitoring range trend. Permanent photographic plots or photo points taken at intervals in time provide a visual record of how an allotment has responded to a management plan. It provides a record that leaves little room for disagreement and thus bridges the gap when conflict arises. The method requires little training, time or expense. Agencies and permittees should cooperate in the establishment of permanent photo points and taking the pictures.

Photos will be taken at least once a year at a specific time; either in the fall at the end of the grazing season or in the spring during the growing season, and preferably both times. Systematic location of photo points and diligently taking the photos annually is the key to obtaining reliable records of what is happening on the range. The date, trend plot identification number, pasture, allotment and the name of the photographer will be recorded. Field notes will also be made on livestock and wildlife use in the area and any unusual activities that may have affected the site such as insects (grasshoppers), rabbits, camp site or other disturbances.

Photo points will be marked with a steel fence post as a reference point. Photo plots will consist of a 3 ft x 3 ft steel frame. The plot will be permanently located by at least one steel rod approximately 24-30 inches long driven into the ground to mark the lower right corner of the plot. Additional rods or long spikes will be driven into at least two additional corners of the plot frame to permanently mark its exact location. The exposed ends of the markers will be painted bright red or yellow for easy visibility. The photo plot will be located 10-25 ft to the south of the steel reference post. The exact location of the point will be noted on a map and distances from readily recognizable landmarks noted.

The camera point from which the close-up photo is taken of the 3 x 3 plot will be located on the north side of the photo plot so that photos can be taken any time of day without casting a shadow across the plot. The photographer should stand so that the plot frame will just fill the picture.

A general view photograph will be taken from the same point as the photo plot. Just raise the camera up so that you shoot just over the plot frame, but include some sky in the background.

Nested Frequency Transects. For efficient detection of trend an easily measured attribute that is sensitive to small changes in species composition is needed. Frequency (species presence or absence) meets this requirement. It is objective, rapid and requires little training to use, beyond a knowledge of plant identification.

A nested frequency plot frame (four plot sizes within one frame) is used in order to record the presence or absence of several species at the same time. For the greatest possible chance of detecting a significant change in the frequency of a species over time, a frame size should be used

that allows a given species to be present from 20-80% of the time. A diagram of the nested frequency frame is shown in Appendix D. A minimum of 100 microplots per site should be read.

Since the BLM had established several nested frequency study sites on CIRO lands prior to its establishment, the BLM transect layout and procedures will be used. A detailed description of these procedures, taken from the BLM monitoring handbook (USDI-BLM 1984) are given in Appendix E. The nested frequency transects should be read at least every three years.

Location of Trend Studies

The number of trend transects and photo points required depends on the size and complexity of the area being monitored. The very minimum is one study site per pasture. If the pasture has two or more major types of rangeland such as high and low elevation ranges, a study site should be located in each type. Although it is desirable to have more than one study site per pasture, time and manpower constrains may preclude additional sites. The agencies may already have study sites established on the allotment. The permittee(s) and agency personnel should get together and determine if the existing study sites are adequate in both number and location.

Study sites should be located in key areas and in some cases in critical areas. If stable or upward trend can be shown on critical areas, then the remainder of the pasture is most likely in stable or upward trend. The permittee(s) and agency personnel should tour the allotment together to locate the study sites. A photo point will be established at each trend transect. Because of the relative ease of taking photos, additional photo points should be considered.

Interpretation

Interpretation of short-term monitoring data should be done annually on the range, in a cooperative effort by the permittees(s) and appropriate agency personnel. It is preferable to do this as near the end of the grazing season as possible. Long-term monitoring data should be interpreted in the same manner, in those years long-term data is gathered. Any necessary changes in management actions should be mutually agreed upon at the time of interpretation and put in writing.

Five types of monitoring data will be gathered: actual use, weather, utilization mapping, photographs and nested frequency. All but nested frequency will be collected on an annual basis and should be interpreted annually. The short-term data may indicate a needed change in management prior to the next grazing season. It also provides a basis for interpretation of factors affecting range trend.

Nested frequency data and photographs provide an indication of range trend. Although changes in trend are relatively slow on arid and semi-arid rangelands, both frequency and photos are sensitive to small changes. Static trend may indicate that the management system is working and no changes are needed, or it may be an indication that any changes have been too slight for the monitoring to detect. Upward trend indicates that management is working in obtaining desired objectives. Downward trend indicates some change in management is needed. However, it does not necessarily mean an adjustment in stocking rate is needed. In fact, adjustments in stocking rate should be the last management action considered. If livestock distribution is the problem, then salting, herding, new water developments or a change in the grazing system should be considered rather than adjusting numbers.

Changes in trend may be due to weather, insects or other factors besides livestock grazing (Sharp et al 1990, 1992). Failure to meet management objectives may also indicate unrealistic objectives, rather than a needed change in management.

COOPERATIVE RESPONSIBILITIES

The success of a plan is dependent on how well it is carried out. For this plan to work the CIRO permittee(s) and other agencies should make a commitment to carry their respective responsibilities as follows:

Permittee(s) will:

1. Control livestock and insure orderly movement between pastures as indicated in the plan.
2. Maintain all structural range improvements such as fences, cattleguards, wells, waterholes, and pipelines in working condition that the operator has agreed to maintain in writing.
3. Cooperate in the construction of new livestock-benefiting projects.
4. Locate salt to help provide good livestock distribution.
5. Submit accurate actual use information by pasture use, in a timely manner as described in this plan.
6. Submit timely payment for grazing use.
7. Assist in the monitoring studies as described in this plan.

CIRO will:

1. Initiate and supervise the grazing system.
2. Modify, in consultation with the permittees and other agencies affected, the plan when studies or other circumstances indicate the objectives are not being met.
3. Consult with the permittees concerning pertinent information regarding the allotment.
4. Assist in monitoring studies as described in this plan.
5. Minimize trespass on private land and disturbance of livestock on the allotment.

Bureau of Land Management will:

1. Cooperate and coordinate with the permittees and CIRO in the initiation and supervision of the allotment plans.
2. Consult with the permittees and CIRO concerning pertinent information regarding the allotments.
3. Assist in monitoring studies as described in this plan.

Forest Service will:

1. Cooperate and coordinate with the permittees and CIRO in the initiation and supervision of the allotment plans.

2. Consult with the permittees and CIRO concerning pertinent information regarding the allotments.

3. Assist in monitoring studies as described in this plan.

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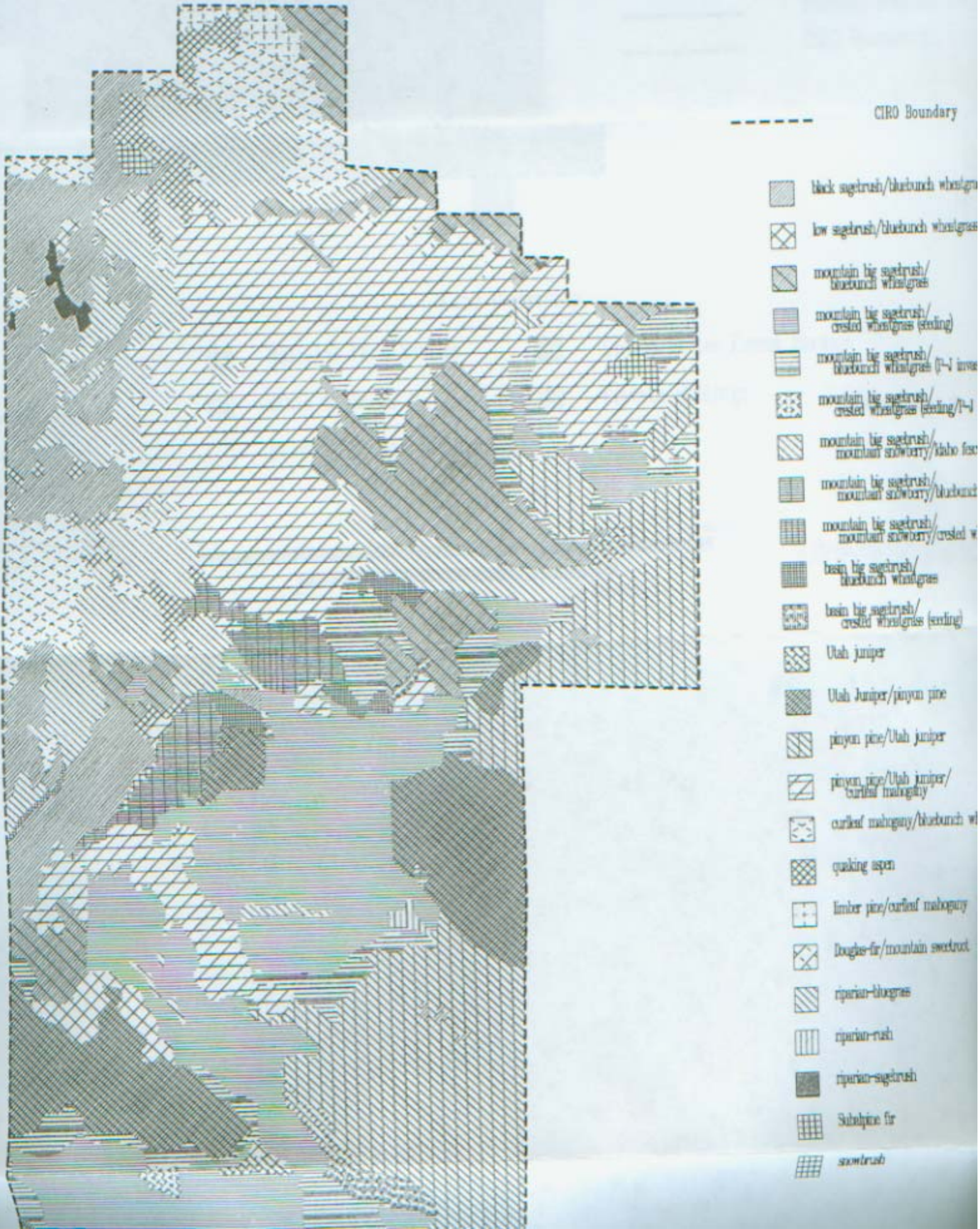
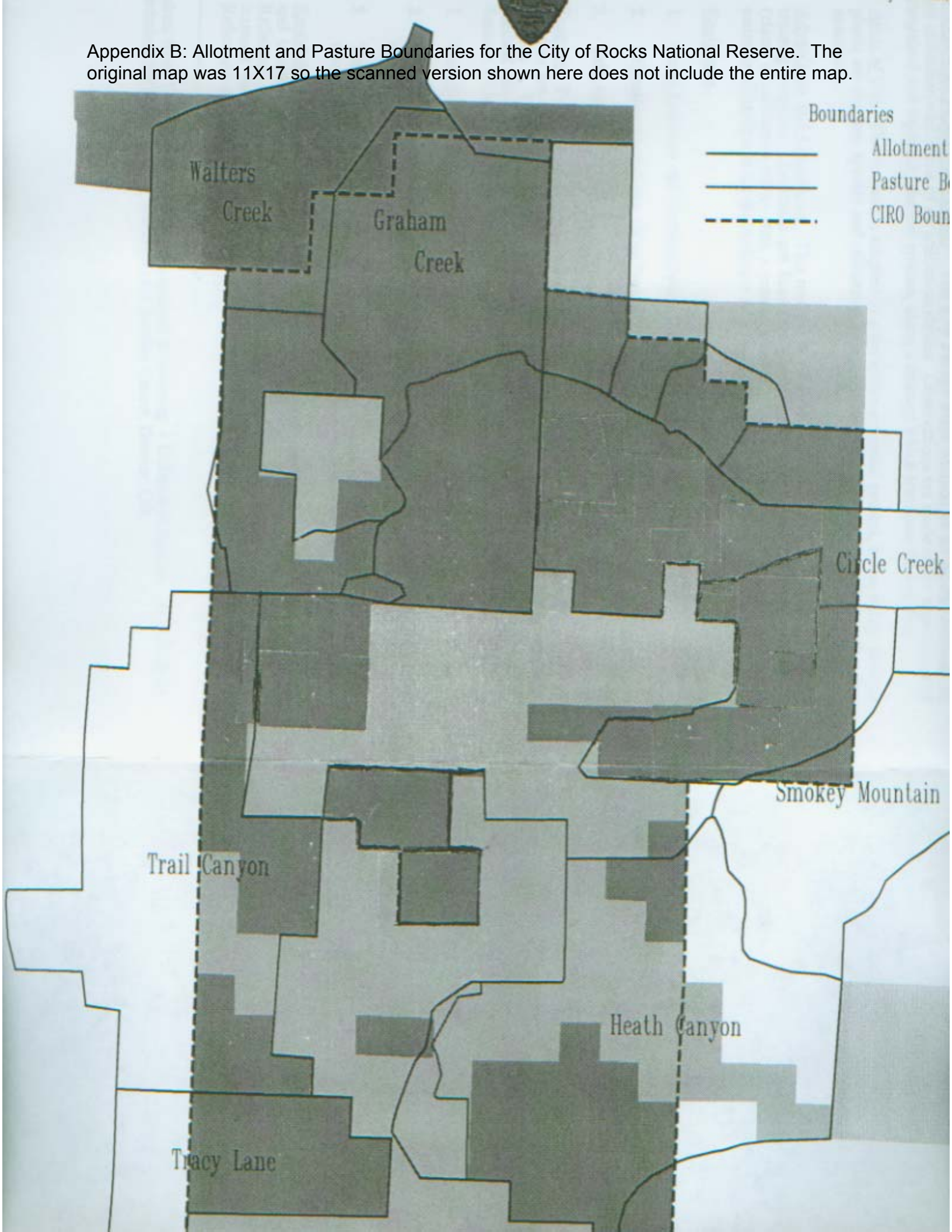
Appendix A: Vegetation map for the City of Rocks National Reserve. The original map was 11X17 so the scanned version shown here does not include the entire map.



Appendix B: Allotment and Pasture Boundaries for the City of Rocks National Reserve. The original map was 11X17 so the scanned version shown here does not include the entire map.



APPENDIX C

RANGELAND MONITORING - UTILIZATION STUDIES[1]

KEY FORAGE PLANT METHOD. The Key Forage Plant Method is an ocular estimate of forage utilization within one of six utilization classes. Observations are made of the appearance of the rangeland and especially the key species, along a transect which traverses the key area.

A. Areas of Use. This method is adapted to areas where perennial grasses, forbs, and/or browse plants are the key species and utilization data must be obtained over large areas using few examiners.

B. Advantages and Limitations. This method is rapid and does not require unused areas for training purposes. Estimates are based on a descriptive term representing a broad range (class) of utilization rather than a precise amount. Different examiners are more likely to estimate utilization in the same classes than to estimate the same utilization percentages.

C. Equipment.

1. Study Location and Documentation Data Form.

2. Utilization Study Data - Key Forage Plant Method Form.

3. Tally counter (optional).

D. Training. Personal judgment is involved in any estimation method. Estimates are only as good as the training and experience of the examiners. (See Section 3, this Reference, and Section 4, Technical Reference 4400-1.) The training described for the Ocular Estimate Method often helps examiners using this method make the utilization class estimations. (See Section 5.22d.) This method requires that the examiners be trained to:

1. Identify the plant species.

2. Recognize the six herbaceous or six browse utilization classes using the written class descriptions.

3. Think in terms of the general appearance of the rangeland (slightly used, heavily used, etc.) at each observation point, rather than weight or height removed.

E. Establishing Studies. Select key area(s) and key species and determine the number, length, and location of the transects. (See Section 3, this Reference, and Section 5, Technical Reference 4400-1.) Document the location and other pertinent information concerning a transect on the Study Location and Documentation Data Form. (Section 6, Technical Reference 4400-1.)

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[1] Taken from USDI-BLM. 1984. Rangeland monitoring - Utilization studies. USDI-BLM Technical Reference 4400-3, BLM Denver Service Center, Denver, CO.

F. Sampling Process. After examiners are trained and have confidence in their ability to judge utilization by utilization class ("light", "heavy", etc.), proceed with the collection of utilization data. At each observation point along the transect, estimate the utilization class using the written description of the class. In those cases where part of a class description does not apply (example: percentage of seedstalks remaining), judge utilization based on those parts of the description that do apply. An observation point is the immediate area containing the key species visible to examiners when standing at a particular location along the transect. (See Section 3.73b.) Record the estimates by dot count by utilization class on the Utilization Study Data - Key Forage Plant Method Form.

1. Herbaceous Utilization Classes. Six utilization classes are used to show relative degrees of use of key herbaceous species (grasses and forbs). Each class represents a numerical range of percent utilization. Estimate utilization within one of the six classes. Utilization classes are described as follows:

   a. No Use (0-5%). The rangeland shows no evidence of grazing use; or the rangeland has the appearance of negligible grazing.

   b. Slight (6-20%). The rangeland has the appearance of very light grazing. The key herbaceous forage plants may be topped or slightly used. Current seedstalks and young plants of key herbaceous species are little disturbed.

   c. Light (21-40%). The rangeland may be topped, skimmed, or grazed in patches. The low value herbaceous plants are ungrazed and 60 to 80% of the number of current seedstalks of key herbaceous plants remain intact. Most young plants are undamaged.

   d. Moderate (41-60%). The rangeland appears entirely covered as uniformly as natural features and facilities will allow. Fifteen to 25% of the number of current seedstalks of key herbaceous species remain intact. No more than 10% of the number of low value herbaceous forage plants are utilized. (Moderate use does not imply proper use.)

   e. Heavy (61-80%). The rangeland has the appearance of complete search. Key herbaceous species are almost completely utilized with less than 10% of the current seedstalks remaining. Shoots of rhizomatous grasses are missing. More than 10% of the number of low value herbaceous forage plants have been utilized.

   f. Severe (81-100%). The rangeland has a mown appearance and there are indications of repeated coverage. There is no evidence of reproduction or current seedstalks of key herbaceous species. Key herbaceous forage species are completely utilized. The remaining stubble of preferred grasses is grazed to the soil surface.

2. Browse Utilization Classes. Six utilization classes show relative degrees of use of available current year's growth (leaders) of key browse plants (shrubs, half shrubs, woody vines, and trees). Each class represents a numerical range of percent utilization. Estimate utilization within one of the six classes. Utilization classes are described as follows:

   a. No Use (0-5%). Browse plants show no evidence of use; or browse plants have the appearance of negligible use.

b. Slight (6-20%). Browse plants have the appearance of very light use. The available leaders of key browse plants are little disturbed.

c. Light (21-40%). There is obvious evidence of leader use. The available leaders appear cropped or browsed in patches and 60 to 80% of the available leader growth of the key browse plants remains intact.

d. Moderate (41-60%). Browse plants appear rather uniformly utilized and 40 to 60% of the available leader growth of key browse plants remains intact.

e. Heavy (61-80%). The use of the browse gives the appearance of complete search. The preferred browse plants are hedged and some plant clumps may be slightly broken. Nearly all available leaders are used and few terminal buds remain on key browse plants. Between 20 to 40% of the available leader growth of the key browse plants remains intact.

f. Severe (81-100%). There are indications of repeated coverage. There is no evidence of terminal buds and usually less than 20% of available leader growth on the key browse plants remains intact. Some, and often much, of the second and third years' growth of the browse plants has been utilized. Hedging is readily apparent and the browse plants are more frequently broken.

G. Calculating Percent Utilization. Calculate the percent utilization as follows:

1. Convert the dot count to the number of observations for each utilization class.

2. Multiply the number of observations in each utilization class times the midpoints of the class intervals.

3. Total the products for all classes.

4. Divide the sum by the total number of observations on the transect.

5. Record the average percent utilization on the Utilization Study Data - Key Forage Plant Method Form.

APPENDIX D

RANGELAND MONITORING - TREND STUDIES[1]

NESTED FREQUENCY METHOD.

A. General Description. The Nested Frequency Method consists of observing nested plots of various sizes along pace or belt transects. The frame is constructed such that successively smaller plots are included inside the next larger plot. Close-up and general view photographs should be used with this method. The indicator of trend monitored with this method is frequency. (See Section 3.3.)

B. Areas of Use. This method is applicable to a wide variety of vegetation types and is suited for use with grasses, forbs, and shrubs.

C. Advantages and Limitations.

1. Frequency sampling is simple to perform and easy to duplicate from year to year by the same or different examiners. It is appealing because it is objective and rapid. The only decisions that have to be made in the collection of frequency data are plant species identification and whether or not a plant of the listed species occurs within a plot. The method encourages consistent, rapid, and accurate observations while minimizing bias among different examiners. Much data can be obtained for many species within a short period of sampling time.

2. Frequency data can be collected in different-sized plots with each placement of the nested frame. When a plant of a particular species occurs within a plot, it also occurs in all of the successively larger plots. Frequency of occurrence for various size plots can be analyzed even though frequency is recorded for only one size plot. This eliminates problems with comparing frequency data from different plot sizes. Use of the nested plot configuration improves the chance of selecting a proper size plot for frequency sampling.

D. Equipment.

1. Study Location and Documentation Data Form
2. Trend Study Data - Nested Frequency Method--Four Transects Form
3. Trend Study Data - Nested Frequency Method--Four Transect Summary Form
4. Trend Study Data - Nested Frequency Method--Ten Transects Form
5. Trend Study Data - Nested Frequency Method--Ten Transect Summary Form

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[1] Taken from USDI-BLM. 1985. Rangeland monitoring - Trend studies. USDI-BLM Technical Reference 4400-4, BLM Denver Service Center, Denver, CO. 130p.

6. Photo Identification Label

7. Frame to delineate the 3- x 3-foot photo plots

8. Stakes - 3/4- or 1-inch angle iron not less than 16 inches

9. Hammer

10. Permanent yellow or orange spray paint

11. Camera - 35-mm with 28-mm wide-angle lens

12. Exposure meter (if camera is not equipped with one)

13. Film

14. Tripod (optional)

15. Black felt tip pen

16. Nested frequency plot frame

17. Tally counter (optional)

18. Compass

19. Steel post

20. Post driver

21. Other equipment which may be needed depending on the study layout are listed below: (See Section 4.46f(3).)

    a. Stakes which are stout enough to have a tape stretched between them

    b. Steel tape - 100-foot

    c. Two small "C" clamps

E. Training. The accuracy of the data depends on the training and ability of the examiners. Examiners must be able to identify plant species and be able to tell whether or not a species occurs, according to study specifications, within a plot. They must also be familiar with the operation of the camera equipment. (See Section 3, this Reference, and Section 4, Technical Reference 4400-1.)

F. Establishing Studies. Careful establishment of studies is a critical element in obtaining meaningful data. See Sections 5.2 through 5.4, Technical Reference 4400-1.)

1. Site Selection. Stratify the allotment, wildlife habitat area, herd management area, watershed area, or other designated management area; select the key area(s) and key species; and determine the number and location of the nested frequency studies. (See Section 5.1, Technical Reference 4400-1.)

2. Number of Studies. Establish one nested frequency study on each key area; establish more if needed. (See Sections 1 and 5, Technical Reference 4400-1.

3. Study Layout. Use the study layout described for the Pace Frequency Method or for the Quadrat Frequency Method. (See Sections 4.44f(3) or 4.45f(4) respectively.)

4. Reference Post or Point. Permanently mark the location of each study by means of a reference post (steel post) placed about 100 feet from the study location stake or the baseline beginning point stake depending on the study layout. Record the bearing and distance from the post to the study location stake or the baseline beginning point stake. An alternative is to select a reference point, such as a prominent natural or physical feature, and record the bearing and distance from that point to the study location stake or the baseline beginning point stake. If a post is used, it should be tagged to indicate that it marks the location of a monitoring study established by the Bureau of Land Management and that it should not be disturbed.

5. Study Identification. Number studies for proper identification to ensure that the date collected can be positively associated with specific sites on the ground.

6. Study Documentation. Where the study layout for the Pace Frequency Method is selected, document the location, starting point, bearing, distance between transects, sampling interval, and other pertinent information concerning a study on the Study Location and Documentation Data Form. where the study layout for the Quadrat Frequency Method is selected, document the location of the baseline, bearing, number of transects, transect locations along the baseline, number of plots (quadrats) per transect, and other pertinent information concerning a study on the Study Location and Documentation Data Form. (See Section 6, Technical Reference 4400-1.) Plot the precise location of the studies on detailed maps and/or aerial photos.

G. Taking Photographs. The directions for taking close-up and general view photographs are described in Section 3.4.

H. Sampling Process. In addition to collecting the specific studies data, general observations should be made of the study sites. (See Section 3.5.)

1. Using the Nested Frequency Plot Frame. By using a nested plot frame, data for four different sized plots are collected and evaluated for preferred frequency values. For most plant species, the frequency values must be between 20 and 80% in order to detect change when the study is read again. The data will indicate the size plot needed to effectively sample the particular vegetation/species. Data is collected for all sized plots each time the study is read. Data collected with a given size plot can be compared over time only with data collected with the same size plot.

2. Running the Transects. Depending on the study layout selected, run the transects as described for the Pace Frequency Method or for the Quadrat Frequency Method. (See Sections 4.44h(2) and 4.45h(2) respectively.)

3. Collecting Frequency Data. Collect frequency data for all plant species. (See Section 3.1.) For uniformity in recording data, the four nested plots are numbered from "1" through "4," with the largest plot size corresponding with the higher number. Determine the smallest size plot in which a plant of the species occurs. Record the data by dot count tally, by species, by plot number (size of plot), by transect, on the Trend Study Data - Nested Frequency Method--Four Transects Form or on the Trend Study Data - Nested Frequency Method--Ten Transects Form. Enter the dot count tally in the

quadrat on the form representing the smallest size plot in which a plant of the species occurs. (For example, if one plant of a species occurs inside plot "1" and another plant of that species occurs outside plot "1" but within plot "4," record the species occurrence for plot "1" only. Presence of a species in plot "1" automatically connotes presence of the species in all larger plots.) Only one tally is made regardless of the number of individual plants of a species that occur within a plot.

a. Herbaceous plants (grasses and forbs) must be rooted in the plot to be counted.

b. Trees and shrubs (including half shrubs) are counted if rooted in the plot or if the canopy of these plants overhangs the plot. In some cases, it may be preferable to count trees and shrubs only if they are rooted in the plot.

c. Annual plants are counted whether green or dried.

d. Specimens of the plants which are unknown should be collected and marked for later identification.

e. Frequency occurrence of seedlings by plant species may be tallied.

f. An alternative method for recording frequency data is explained in Illustration 33.

I. Calculations. Make the compilations and calculations and record the results in the appropriate plot size quadrats and columns on the Trend Study Data - Nested Frequency Method--Four Transect Summary Form or on the Trend Study Data - Nested Frequency Method--Ten Transect Summary Form.

1. Compiling Data. Determine the number of occurrences for each species for each plot size by transect.

a. Plot "1." Count the number of occurrences of a species in plot "1" and record the value in the plot "1" quadrat on the summary form.

b. Plot "2." Count the number of occurrences of the same species in plot "2" and add this value to the value recorded for plot "1." Record the sum in the plot "2" quadrat on the summary form.

c. Plot "3." Count the number of occurrences of the same species in plot "3" and add this value to the value recorded for plot "2." Record the sum in the plot "3" quadrat on the summary form.

d. Plot "4." Count the number of occurrences of the same species in plot "4" and add this value to the value recorded for plot "3." Record the sum in the plot "4" quadrat on the summary form.

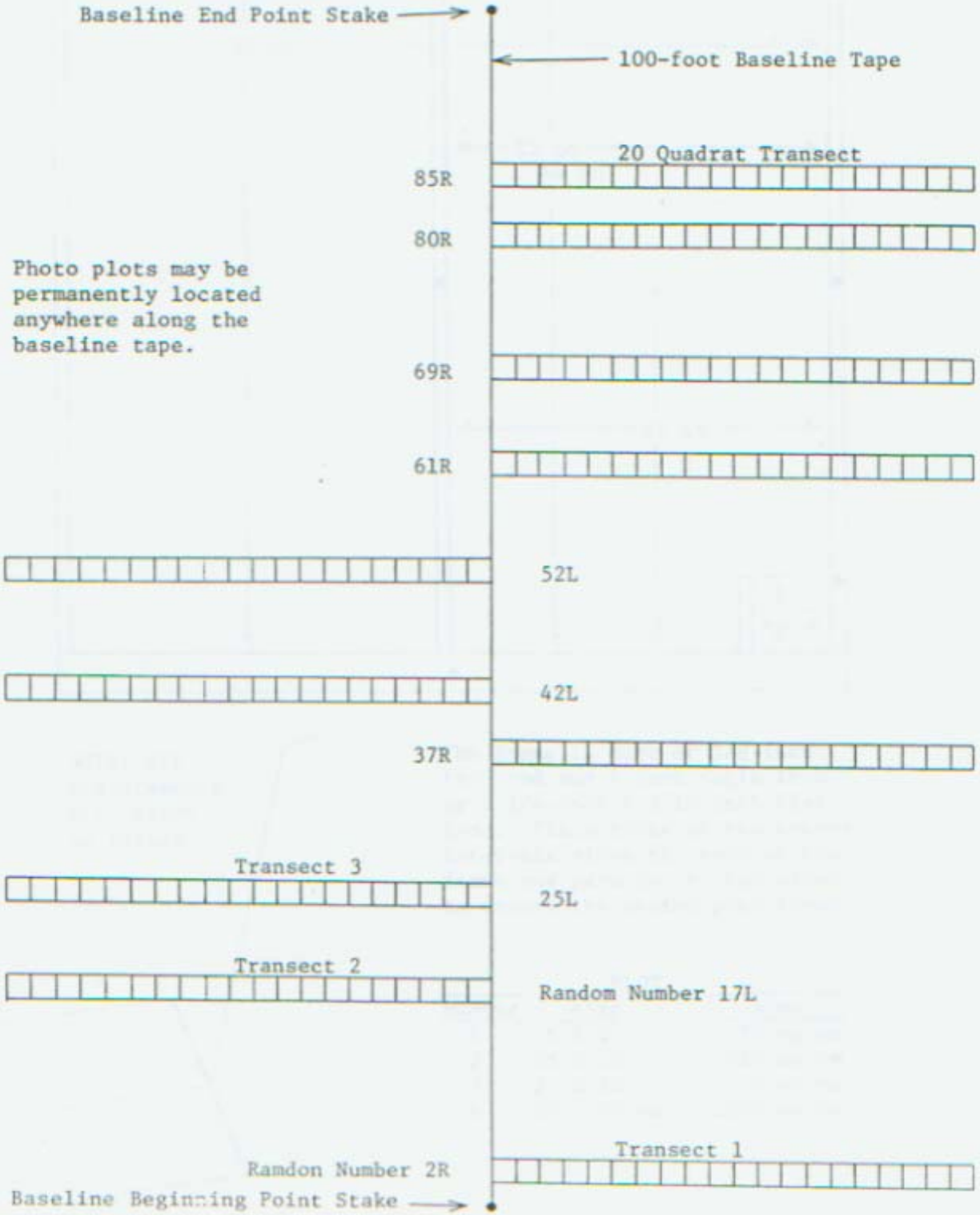
2. Calculating Frequency. The percent frequency by species can be calculated for each transect and/or for the total of all transects.

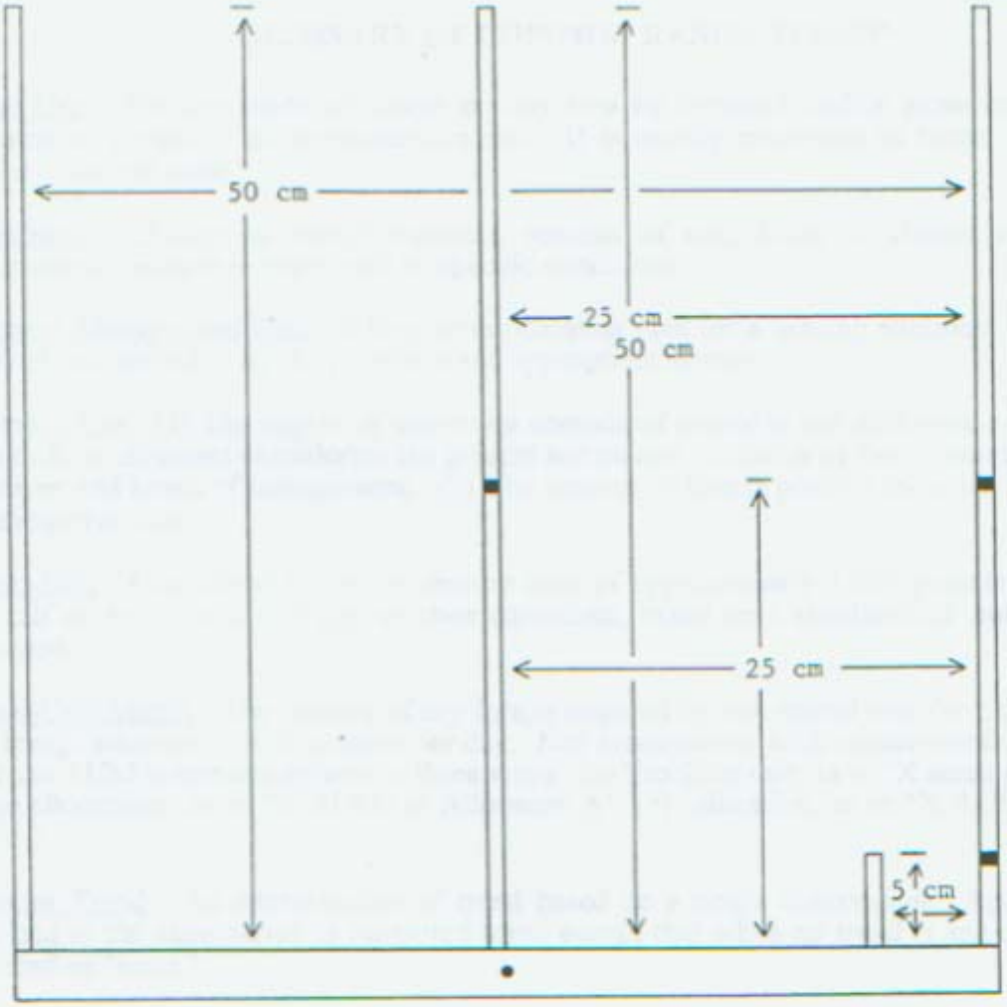
a. Frequency for Each Transect. Calculate the percent frequency of a plant species by plot size on a transect by multiplying the number of occurrences by 10, if there are 10 samples, by 5, if there are 20 samples, or by 2, if there are 50 samples in the transect. Record the percent frequency in the appropriate plot size quadrat by species by transect on the summary form.

b. Frequency for Total of All Transects. Calculate the percent frequency of a plant species by plot size for the total of all transects by adding the occurrences of a species by plot size on all transects, dividing the total by the total number of plots sampled for the study, and multiplying the value by 100. Record the percent frequency in the appropriate plot size quadrat on the summary form.

RANGELAND MONITORING - TREND STUDIES

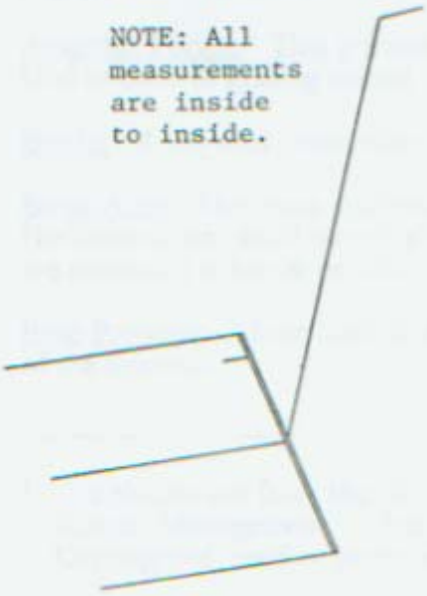
QUADRAT FREQUENCY METHOD STUDY LAYOUT





NOTE: All measurements are inside to inside.

The frame is made of 3/8-inch iron rod and 1-inch angle iron or 1 1/4-inch X 3/16-inch flat iron. Place tines at the proper intervals along the rear of the frame and parallel to the sides to create the nested plot frame.



PLOT number	size	area
1	5 X 5 cm	25 sq cm
2	25 X 25 cm	625 sq cm
3	25 X 50 cm	1250 sq cm
4	50 X 50 cm	2500 sq cm

APPENDIX E

GLOSSARY OF COMMON RANGE TERMS[1]

Actual Use. The use made of forage on any area by livestock and/or game animals without reference to permitted or recommended use. It is usually expressed in terms of animal unit months or animal units.

Adjustment. Change in animal numbers, seasons of use, kinds or classes of animals, or management practices as warranted by specific conditions.

Allotment Management Plan. A long-term operating plan for a grazing allotment on public land prepared and agreed to by the permittee and appropriate agency.

Allowable Use. (1) The degree of utilization considered desirable and attainable on various parts of a ranch or allotment considering the present nature and condition of the resource, management objectives and levels of management. (2) The amount of forage planned to be used to accelerate range improvement.

Animal-Unit. Considered to be one mature cow of approximately 1,000 pounds, either dry or with calf up to 6 months of age, or their equivalent, based on a standardized amount of forage consumed.

Animal-Unit-Month. The amount of dry forage required by one animal unit for one month based on a forage allowance of 26 pounds per day. Not synonymous with animal-month. abbr. AUM. The term AUM is commonly used in three ways: (a) Stocking rate, as in "X acres per AUM"; (b) forage allocations, as in "X AUMs in Allotment A"; (c) utilization, as in "X AUMs taken from Unit B."

Apparent Trend. An interpretation of trend based on a single observation. Apparent trend is described in the same terms as measured trend except that when no trend is apparent it shall be described as "none."

A.U.M. Abbreviation for animal-unit-month.

Available Forage. That portion of the forage production that is accessible for use by a specified kind or class of grazing animal.

Barrier. A physical obstruction which limits the movement of animals.

Basal Area. The cross sectional area of the stem of stems of a plant or of all plants in a stand. Herbaceous and small woody plants are measured at or near the ground level; larger woody plants are measured at breast or other designated height.

Base Property. Those lands in a ranching enterprise which are owned or under long-term control of the operator.

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[1] Definitions are from the Society for Range Management. 1989. Glossary of Terms Used in Range Management. 3rd Ed. Society for Range Management, Denver, CO. 20p. Copyrighted, used by permission.

Brush Control. Reduction of unwanted woody plants through fire, chemicals, mechanical methods, or biological means to achieve desired land management goals.

Canopy Cover. The percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread of foliage of plants. Small openings within the canopy are included. It may exceed 100%.

Carrying Capacity. The maximum stocking rate possible which is consistent with maintaining or improving vegetation or related resources. It may vary from year to year on the same area due to fluctuating forage production.

Climax. (1) The final or stable biotic community in a successional series which is self-perpetuating and in dynamic equilibrium with the physical habitat; (2) the assumed end point in succession.

Community (Plant Community). An assemblage of plants occurring together at any point in time, while denoting no particular ecological status. A unit of vegetation.

Community Type. An aggregation of all plant communities distinguished by floristic and structural similarities in both overstory and undergrowth layers. A unit of vegetation within a classification.

Continuous Grazing. The grazing of a specific unit by livestock throughout a year or for that part of the year during which grazing is feasible. The term is not necessarily synonymous with yearlong grazing, since seasonal grazing may be involved.

Control (1) (Plant). Manipulation and management for reduction of noxious plants, a term of many degrees ranging from slightly limiting to nearly complete replacement. (2) RESEARCH) Term to designate the standard or no treatment in an experiment in order to evaluate treatment responses.

Controlled Burning. The use of fire as a management tool under specified conditions for burning a predetermined area.

Coordinated Resource Management Planning. The process whereby various user groups are involved in discussion of alternate resource uses and collectively diagnose management problems, establish goals and objectives, and evaluate multiple use resource management.

Cover Type. The existing vegetation of an area.

Critical Area. An area which should be treated with special consideration because of inherent site factors, size, location, conditions, values, or significant potential conflicts among uses.

Deferment. Delay of livestock grazing on an area for an adequate period of time to provide for plant reproduction, establishment of new plants, or restoration of vigor of existing plants.

Deferred Grazing. The use of deferment in grazing management of a management unit, but not in a systematic rotation including other units.

Deferred-Rotation. Any grazing system, which provides for a systematic rotation of the deferment among pastures.

Degree of Use. The proportion of current year's forage production that is consumed and/or destroyed by grazing animals. May refer either to a single species or to the vegetation as a whole.

Density. The number of individuals per unit area. It is not a measure of cover. However, in the past the term "density" has been used to mean cover.

Desirable Plant Species. Species which contribute positively to the management objectives.

Desired Plant Community. A plant community which produces the kind, proportion, and amount of vegetation necessary for meeting or exceeding the land use plan/activity plan objectives established for an ecological site(s). The desired plant community must be consistent with the site's capability to produce the desired vegetation through management, land treatment, or a combination of the two.

Deteriorated Range. Range where vegetation and soils have significantly departed from the natural potential. Corrective management measures such as seeding would change the designation from deteriorated range to some other term.

Diversity. The distribution and abundance of different plants and animal communities within an area.

Drift Fence. An open-ended fence used to retard or alter the natural movement of livestock; generally used in connection with natural barriers.

Dry Meadow. A meadow dominated by grasses which is characterized by soils which become moderately dry by mid-summer.

Ecological Site. A kind of land with a specific potential natural community and specific physical site characteristics, differing from other kinds of land in its ability to produce vegetation and to respond to management.

Ecological Status. The present state of vegetation and soil protection of an ecological site in relation to the potential natural community for the site. Vegetation status is the expression of the relative degree of which the kinds, proportions, and amounts of plants in a community resemble that of the potential natural community.

Effective Precipitation. That portion of total precipitation that becomes available for plant growth. It does not include precipitation lost to deep percolation below the root zone or to surface runoff or to evaporation or which falls during the dormant season unless stored in soil for later use during the growing season.

Flexibility. Characteristics of a management plan which allow it to accommodate changing conditions.

Forage. Browse and herbage which is available and may provide food for grazing animals or be harvested for feeding. To search for or consume forage.

Frequency. The ratio between the number of sample units that contain a species and the total number of sample units.

Full Use. The maximum use during a grazing season that can be made of range forage under a given grazing program without inducing a downward trend in range condition or ecological status.

Geographic Information System (GIS). A spatial type of information management system which provides for the entry, storage, manipulation, retrieval, and display of spatially oriented data.

Grazing Distribution. Dispersion of livestock grazing within a management unit or area.

Grazing License or Permit. Official written permission to graze a specific number, kind, and class of livestock for a specified period on a defined allotment or management area.

Grazing Management Plan. A program of action designed to secure the best practicable use of the forage resources with grazing or browsing animals.

Grazing Period. The length of time that animals are allowed to graze on a specific area.

Grazing Season. (1) On public lands, an established period for which grazing permits are issued. May be established on private land in a grazing management plan. (2) The time interval when animals are allowed to utilize a certain area.

Grazing System. A specialization of grazing management which defines the periods of grazing and non-grazing.

Grazing Unit. An area of rangeland, public or private, which is grazed as an entity.

Ground Cover. The percentage of material, other than bare ground, covering the land surface. It may include live and standing dead vegetation, litter, cobble, gravel, stones and bedrock. Ground cover plus bare ground would total 100 percent.

Growing Season. In temperate climates, that portion of the year when temperature and moisture permit plant growth. In tropical climates it is determined by availability of moisture.

Habitat. The natural abode of a plant or animal, including all biotic, climatic and edaphic factors affecting life.

Habitat Type. The collective area which one plant association occupies or will come to occupy as succession advances. The habitat type is defined and described on the basis of the vegetation and its associated environment.

Herding. The handling or tending of a herd.

Invader. Plant species that were absent in undisturbed portions of the original vegetation of a specific range site and will invade or increase following disturbance or continued heavy grazing.

Key Area. A relatively small portion or a pasture of management unit selected because of its location, use or grazing value as a monitoring point for grazing use. It is assumed that key areas, if properly selected, will reflect the overall acceptability of current grazing management over the pasture or unit as a whole.

Key Species. (1) Forage species of sufficient abundance and palatability to justify its use as an indicator to the degree of use of associated species. (2) Those species which must, because of their importance, be considered in the management program.

Monitoring. The orderly collection, analysis, and interpretation of resource data to evaluate progress toward meeting management objectives.

Multiple Use. Use of range for more than one purpose, i.e., grazing of livestock, wildlife production, recreation, watershed and timber production. Not necessarily the combination of uses that will yield the highest economic return or greatest unit output.

Pasture. (1) A grazing area enclosed and separated from other areas by fencing or other barriers; the management unit for grazing land. (2) Forage plants used as food for grazing animals. (3) Any area devoted to the production of forage, native or introduced, and harvested by grazing. (4) A group of subunits grazed within a rotational grazing system.

Permittee. One who holds a permit to graze livestock on state, federal, or certain privately-owned lands.

Photopoint. An identified point from which photographs are taken at periodic intervals.

Potential Natural Community. The biotic community that would become established on an ecological site if all successional sequences were completed without interferences by man under the present environmental conditions.

Range. Any land supporting vegetation suitable for grazing including rangeland, grazeable woodland and shrubland. Range is not a use. Modifies resources, products, activities, practices, and phenomena pertaining to rangeland.

Range Condition. A generic term relating to present status of a unit of range in terms of specific values or potentials.

Range Improvement. (1) Any structure or excavation to facilitate management of range or livestock. (2) Any practice designed to improve range condition or facilitate more efficient utilization of the range. (3) An increase in the grazing capacity of range, i.e., improvement of rangeland condition.

Range Management. A distinct discipline founded on ecological principles and dealing with the use of rangelands and range resources for a variety of purposes. These purposes include use as watersheds, wildlife habitat, grazing by livestock, recreation, and aesthetics, as well as other associated uses.

Range Readiness. The defined stage of plant growth at which grazing may begin under a specific management plan without permanent damage to vegetation or soil. Usually applied to seasonal range.

Range Site. Synonymous with ecological site when referring to rangeland.

Rangeland. Land on which the native vegetation (climax or natural potential) is predominantly grasses, grass-like plants, forbs, or shrubs.

Resource Value Rating (RVR). The value of vegetation present on an ecological site for a particular use or benefit. RVR's may be established for each plant community capable of being produced on an ecological site, including exotic or cultivated species.

Rest. Leaving an area ungrazed thereby foregoing grazing of one forage crop. Normally rest implies absence of grazing for a full growing season or during a critical portion of plant development; i.e., seed production.

Rest Period. A time period of no grazing included as part of a grazing system.

Rest-Rotation. A grazing management scheme is which rest periods for individual pastures, paddocks or grazing units, generally for the full growing season, are incorporated into a grazing rotation.

Riparian Zone. The banks and adjacent areas of water bodies, water courses, seeps and springs whose waters provide soil moisture sufficiently in excess of that otherwise available locally so as to provide a more moist habitat than that of contiguous flood plains and uplands.

Rotation Grazing. A grazing scheme where animals are moved from one grazing unit (paddock) in the same group of grazing units to another without regard to specific graze; rest periods or levels of plant defoliation.

Salting. (1) Providing salt as a mineral supplement for animals. (2) Placing salt on the range in such a manner as to improve distribution of livestock grazing.

Seral. Refers to species or communities that are eventually replaced by other species or communities within a sere.

Species Composition. The proportions of various plant species in relation to the total on a given area. It may be expressed in terms of cover, density, weight, etc.

Stocking Rate. The number of specific kinds and classes of animals grazing or utilizing a unit of land for a specified time period.

Succession. The progressive replacement of plant communities on a site which leads to the potential natural plant community; i.e., attaining stability. Primary succession entails simultaneous successions of soil from parent material and vegetation. Secondary succession occurs following disturbances on sites that previously supported vegetation, and entails plant succession on a more mature soil.

Suitability. (1) The adaptability of an area to grazing by livestock or wildlife. (2) The adaptability of a particular plant or animal species to a given area.

Suitable Range. Range accessible to a specific kind of animal and which can be grazed on a sustained yield basis without damage to the resource.

Trend. The direction of change in ecological status or resource value rating observed over time. Trend in ecological status should be described as toward, or away from the potential natural community, or as not apparent. Trend in a resource value rating for a specific use should be described as up, down or not apparent.

Turnout. Act of turning livestock out on the range at the beginning of the grazing season.

Unsuitable Range. Range which has no potential value for, or which should not be used for, a specific use because of permanent physical or biological restrictions. When unsuitable range is identified, the identification must specify what use or uses are unsuitable.

Use. (1) The proportion of current year's forage production that is consumed or destroyed by grazing animals. May refer either to a single species or to the vegetation as a whole. (2) Utilization of range for a purpose such as grazing, bedding, shelter, trailing, watering, watershed, recreation, forestry, etc.

Utilization. Use.

Vegetation Type. A kind of existing plant community with distinguishable characteristics described in terms of the present vegetation that dominates the aspect or physiognomy of the area.

Vigor. Relates to the relative robustness of a plant in comparison to other individuals of the same species. It is reflected primarily by the size of a plant and its parts in relation to its age and the environment in which it is growing.

Wet Meadow. A meadow where the surface remains wet or moist throughout the growing season, usually characterized by sedges and rushes.