CITY OF ROCKS NATIONAL RESERVE

GRAZING MANAGEMENT PLAN

2008 Revision and Update

GRAZING MANAGEMENT PLAN

City of Rocks National Reserve

National Park Service

Idaho Department of Parks and Recreation

Development of a Grazing Management Plan

for City of Rocks National Reserve

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University of Idaho

and

National Park Service

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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 was in private ownership and the boundaries between the reserve and adjacent private and federal lands were 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 (NPS), Idaho Department of Parks and Recreation (IDPR), Bureau of Land Management (BLM), U.S. Forest Service (USFS), private landowners and the livestock permittees grazing in CIRO.

Objectives of grazing management were developed from CIRO Comprehensive Management Plan's 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 BLM and the USFS for those lands they administered prior to establishment of CIRO. Using the CRM process, six individual allotment grazing management plans were developed. A plan to monitor livestock grazing and trend in CIRO was also prepared. The final plan was submitted to the NPS in 1996 and implemented in the 1997 grazing season.

Since 1997 additional private land within the boundary of the CIRO has been purchased by the NPS. Normal procedure is to update NPS plans at 10 year intervals. In 2006 the University of Idaho signed another contract with the NPS to update the grazing plan and include the land acquired since 1997.

The updated 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: City of Rocks National Reserve, livestock grazing, grazing plan, monitoring plan, range management

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All the permittees and private landowners listed in the individual allotment plans

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GRAZING MANAGEMENT PLAN

City of Rocks National Reserve

Authority and Objectives

In establishing the National Reserve in 1988 and 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, are 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 City of Rocks National Reserve (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 CIRO began as early as 1850 and continues through the present. Several of the principal management objectives of CIRO's Comprehensive Management Plan recognized 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. Livestock grazing was a primary use from the wagon train days 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 was the only private use of the lands, public and private, within the Reserve.

Unlike the BLM and USFS, the NPS does not attach grazing permits to a private property base. However, since the BLM and USFS land that was transferred to the NPS was previously attached to private property, the NPS granted the privilege of grazing the newly acquired CIRO allotments to the existing BLM and USFS permittees/lessees. Current lessees have a vested interest in the permit they have been leasing since 1988. For all practical purposes, these lessees are the current permit holders. If the private land the permit was attached to when CIRO was established in 1988 is sold, the CIRO Superintendent reserves the right to re-assign the permit to the current lessee or to another permit holder. The 1988 lessees have been assessed a permit fee equal to the annual rate established by the BLM. However 16 U.S.C. 3a gives the NPS authority to recover cost associated with managing special park uses, such as livestock grazing, through the permit process. It is not the desire of the NPS to assess this financial burden on the lessees who have traditionally grazed livestock at City of Rocks. Except for these original lessees, if a permit holder should sublease their permit, the CIRO Superintendent reserves the right to charge a higher grazing fee to the new lessee. Subleases are only permitted in cases where the current permittee is utilizing private property that was historically attached to the allotment.

It is the intent of the NPS to maintain the historic and traditional livestock grazing at CIRO; therefore, the CIRO Superintendent will (at the written request of the current lessee) transfer their permits to immediate family members/heirs. However, permits may not be transferred or sold by permittees.

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 AUM's may be utilized by one or more of the remaining permittees, as determined by the CIRO Superintendent.

- Existing landowners and permittees within CIRO boundaries have preferential status for future allotment permits.

- Current allotments, which include CIRO and BLM or USFS lands outside the Reserve, will be redefined, where feasible and by mutual agreement with the respective agency, 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 within CIRO was 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 influencing factors were control of fires, greater seed dispersal and an overall climatic shift (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 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 their current numbers of livestock.

MANAGEMENT OBJECTIVES

Approximately half the land area within the CIRO boundary was in private ownership when the Reserve was established in 1988. Since 1988, additional private lands have been acquired by the NPS, with approximately one-third the land within the Reserve still in private ownership. 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. Under the legislation establishing CIRO, the NPS and IDPR assumed management of grazing on publicly owned rangelands within CIRO. There are no boundary fences separating CIRO/USFS administered lands on two allotments, CIRO/BLM lands on two allotments and CIRO/private land on three allotments. Thus, CIRO must coordinate use and management on these allotments with the other respective land management agency and/or private land owner.

Overall management objectives for each agency involved in this plan can be found in their individual planning documents. For NPS and IDPR 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 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. Proposed improvements are recommendations of the author to facilitate best management practices. However, many are expensive and subject to further NEPA processes. It is recognized that budgets, politics and natural events are outside of local control.

DESCRIPTION OF RESOURCES

PHYSICAL FEATURES

The 14,407-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 the present, 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 (now NRCS) completed an Order 3 soil survey of the private lands and those formerly administered by the BLM in CIRO (NRCS 1988). A vegetation inventory and description by habitat type was completed in 1991 by the University of Idaho Department of Rangeland Ecology and Management (Appendix A). A CIRO map by vegetation class/type also can be found in Appendix A.

Some of the lower elevation basins were most likely farmed by early settlers. The vegetation of these areas has few native grasses remaining. Most of the lower elevation rangelands were cleared of brush at one time or another and seeded to introduced grasses. The primary species used was probably one of the wheatgrasses. Most of these areas are now dominated by big sagebrush with an understory of crested wheatgrass. On those areas that were not farmed the understory generally has some native species as well as crested wheatgrass.

Large wildfires in 1999 and 2000 in the southern portion of CIRO have had a noticeable effect on the overstory vegetation. However, much of the CIRO is characterized by a heavy overstory of mountain big sagebrush, Utah juniper and single-leaf pinyon. Historical land management activities, livestock grazing and fire suppression have probably reduced the natural fire frequency in the past 150 years, resulting in the dominance of woody species (Appendix A and Morris 2006). The heavy fuel load provided by woody species contributed to the intensity and thus spread of the wildfires in 1999 and 2000. Without some type of brush and tree control, future uncontrollable wildfire poses a threat to much of CIRO. An accumulation of fine fuel (grasses) increases the chance of wildfire ignition. Livestock grazing can be a useful tool in reducing fine fuel and thus wildfire ignition and rate of spread (Taylor 2007).

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 estimating 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 assessed 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 while optimizing livestock production. 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 determining factor for moving cattle may 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 re-growth, 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 50 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.

A rest-rotation grazing system will be used on the Heath Canyon allotment in CIRO. Developed in the early 1950's on bunchgrass rangeland in northeastern California (Hormay 1970), it has been well proven to be an effective way to improve bunchgrass rangeland.

Two allotments, Trail Canyon and Tracy Lane, in CIRO consist of only one pasture in the allotment. This limits the management options for meeting the physiological needs of the plants. It is recommended that the Tracy Lane allotment be fenced to create two pastures. The recommended grazing management on the other allotment 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.

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 grazing lessee of the Bruesch estate private lands and their public land permits. The allotment grazing plan was developed in cooperation and consultation with these agencies and private land owner/lessee. 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, 29 and 30. (Appendix B). Land ownership and acreage are shown in Table 1.

Table 1. Land ownership in the Graham Creek Allotment.

LAND OWNERSHIP	APPROXIMATE NUMBER OF ACRES
CIRO	3190
Bureau of Land Management	80
U.S. Forest Service	118
Private[1]	135
TOTAL	3523

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

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 and a branch of Circle Creek for approximately 1 mile.

Vegetation in the allotment consists of the following map units: 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. If Cordell stops using the permit, it will revert back to the Bruesch ranch.

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 three pastures (Lloyd, Circle and Indian Grove) is June 1 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 325 AUM's. The BLM permit is for 27 AUM's. 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 AUM's of forage, the overall capacity of the allotment is 420 AUM's or 84 head for five months (Table 2).

Table 2. Season of use and permitted use on the Graham Creek Allotment.

OWNERSHIP	SEASON OF USE	NO. OF CATTLE	AUMS
CIRO	5/1 – 9/30	65	325
Forest Service	6/16 - 9/15	0	0
BLM	5/25 - 6/15 9/16 - 9/20	53 53	23 4
Private	5/1 - 9/30	--	68
TOTAL	5/1 - 9/30	84[1]	420

[1]With 420 AUM's of forage available, the allotment (including BLM and private ground) will carry 84 animal units from May 1 to September 30.

GRAZING MANAGEMENT

Pasture Description

The Graham Creek Allotment is divided into seven pastures by fences and/or topography that provide natural barriers to livestock movement.

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.

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. The Lloyd pasture was formerly a part of the Circle Creek allotment but is now assigned to the Graham Creek Allotment.

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 rotation 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, when the cattle are moved to the Lloyd pasture.

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 is reached, but in a timely fashion to be ready to move out of the West pasture in early June. 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 Lloyd, Circle and Indian Grove pastures will be grazed in a sequential deferred grazing system. The Lloyd pasture will be grazed from on or about June 1 for approximately three weeks, then cattle are moved to the Circle pasture for two to three weeks. Use on the Indian Grove pasture will be from approximately July 15 to September 15. The date of movement from one pasture to the next will be mutually determined by the permittee and CIRO personnel, based on degree of use in the pasture being grazed and range readiness in the next pasture to be grazed. This sequential system will allow the key grass species to reach seed ripe on each of the three pastures most years (Figure 1). Peak standing crop will also have been reached in each pasture.

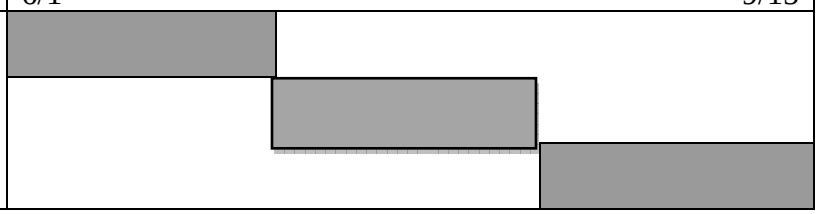
GRAZING TREATMENT	GRAZING PERIOD 6/1 9/15
1. Lloyd pasture 2. Circle pasture 3. Indian Grove pasture	

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

Livestock Movement and Distribution

Allotment fences and water facilities will be maintained by the permittee 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. Salt will be placed at least 100 yards from any water source and moved as necessary to avoid any severe damage to a given area. 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 on an annual basis, 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, however, the locations are now unknown. Two permanent 100 ft transects and trend photo points have been established in the Indian Grove pasture and two in the Lloyd pasture. It is recommended that nested frequency data be taken on the transects, in addition to other monitoring that the NPS may choose to do. Locations of the transects/photo points are on file at CIRO.

EXISTING AND PROPOSED RANGE IMPROVEMENTS

Existing Range Improvements

The existing range improvements are shown on the allotment map.

Proposed Improvements

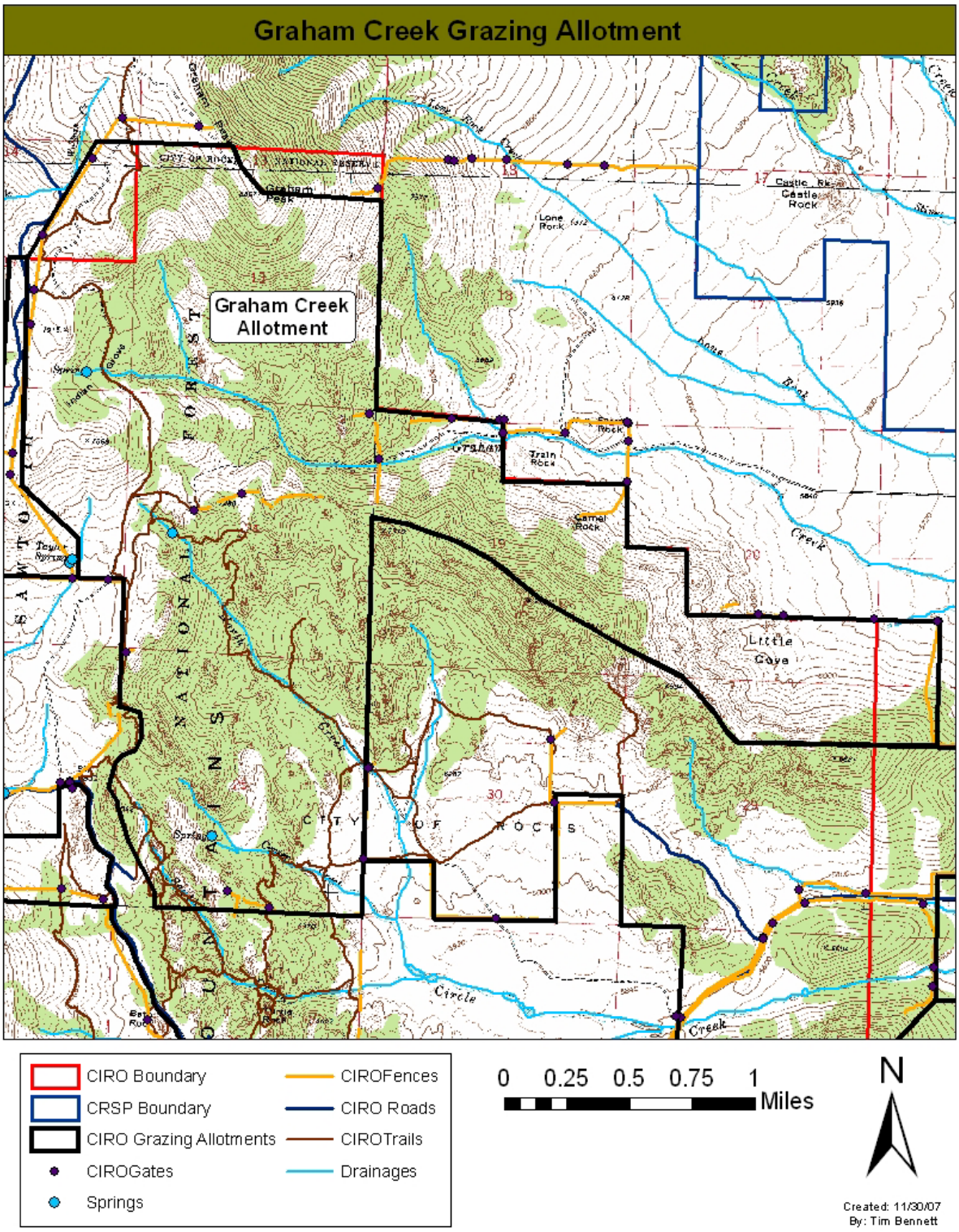
Brush Control. Control of both sagebrush and juniper is needed on 120 acres in the east end of the East Pasture (SW 1/4 SW 1/4 Sec. 21, S 1/2 SE 1/4 Sec. 20) to achieve the natural landscape and increase forage production. Utah juniper has invaded much of the area and sagebrush density has increased. 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.

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. It is recommended that a fence be constructed on the east side of the north branch of Circle Creek in the Lloyd pasture (Sec. 30) and water piped from the creek a short distance to the east of the fence. This would create a small riparian pasture between the new fence and the boundary with the Circle pasture, which could be grazed a few days prior to moving into the Circle pasture. This would not only result in an improvement in proper functioning condition of the creek, but would also provide a better source of water for cattle.

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.

Periodic maintenance of springs, head boxes, pipelines and troughs, with backhoes when necessary, should be allowed.


Graham Creek Grazing Allotment
Graham Creek Allotment
CIRO Boundary
CRSP Boundary
CIRO Grazing Allotments
CIROGates
Springs
CIROFences
CIRO Roads
CIROTrails
Drainages
0 0.25 0.5 0.75 1 Miles
N
Created: 11/30/07
By: Tim Bennett

CIRCLE CREEK ALLOTMENT MANAGEMENT PLAN

GENERAL INFORMATION

The Circle Creek Allotment includes land administered by CIRO, BLM and small areas of private land owned by Ted Tracy and Zon G. Lloyd.

DESCRIPTION OF ALLOTMENT

Location and Area

The Circle Creek Allotment is located in the eastern middle portion of CIRO. In Township 15 S, Range 24 E, it includes portions of Sections 28, 29, 31 and 32 (Appendix B). Land ownership and acreage are shown in Table 3.

Table 3. Land ownership in the Circle Creek Allotment.

LAND OWNERSHIP	APPROXIMATE NUMBER OF ACRES	PERCENT OWNERSHIP
CIRO	845	92.8
BLM[1]	40	4.4
Private	25	2.7
TOTAL	910	

[1]The BLM acreage is an isolated 40 acre crested leased to CIRO.

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.

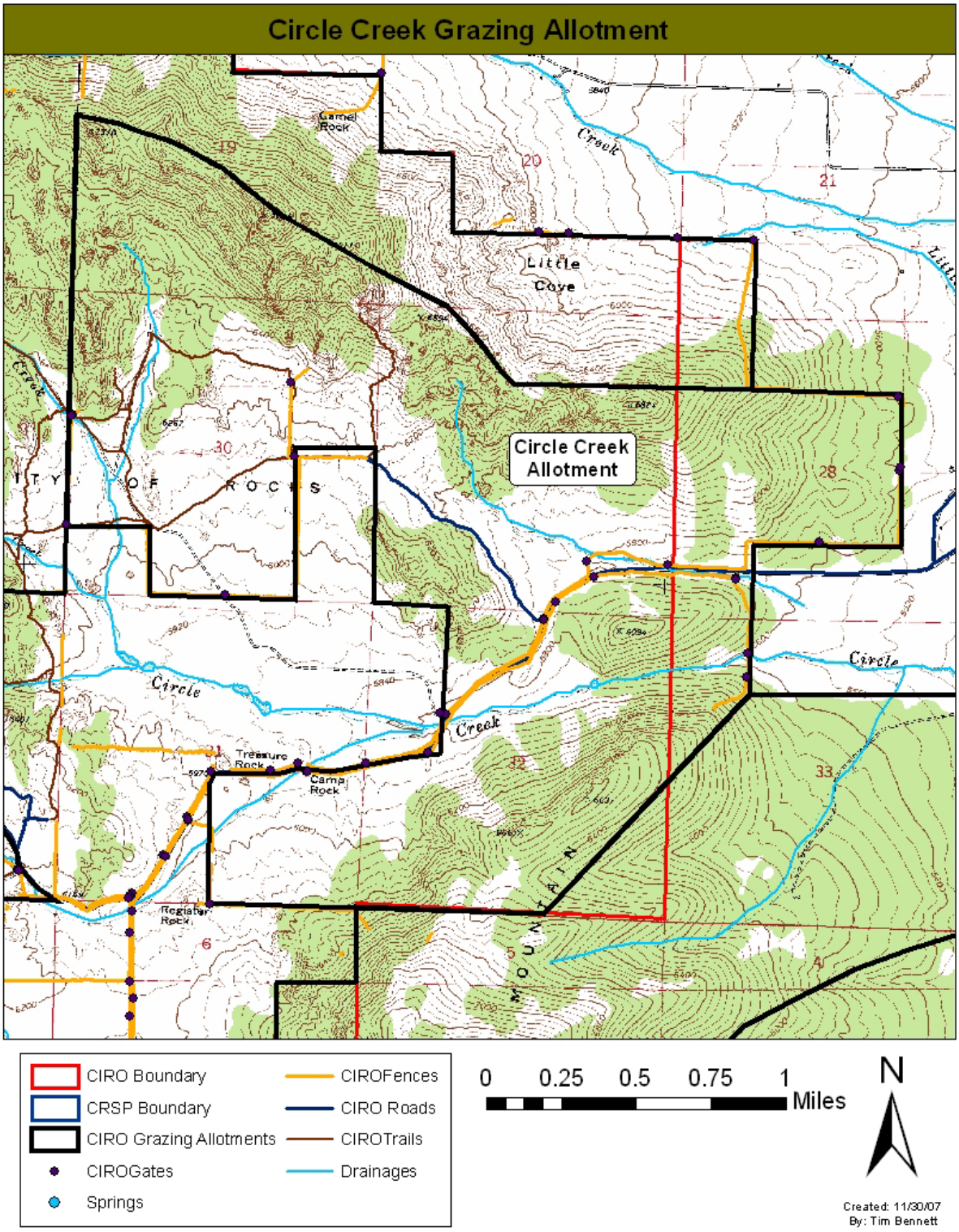
Elevation of the allotment ranges from 5600 to 6400 feet. About one half of the allotment consists of steep, rocky slopes with heavy stands of juniper and pinyon pine. Approximately one mile of Circle Creek runs through the allotment, with 1/4 mile across CIRO land.

Vegetation on the allotment consists of the following map units: Little Cove, Little East Basin, Circle Creek Basin, and Smoky Mountain (Appendix A). 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 allocated 13 AUM's of use from May 1 to May 10 on the 40 acre isolated tract to J. E. Tracy. When CIRO leased this 40-acre tract, the 13 AUM's from the BLM tract, plus the 10 AUM's assigned to Tracy on the CIRO portion was transferred to the Tracy permit in the Emery Canyon Allotment. Approximately 480 acres in the lower part of section 30 has been transferred to the Graham Creek Allotment and the permitted use assigned to Cordell Sheridan. The remaining portion of the Circle Creek Allotment will be closed to livestock grazing. A CIRO goal is to return the California Trail corridor to its historical condition and appearance.

Removal of all grazing on the Circle Creek Allotment may result in an accumulation of fine litter, making the allotment more susceptible to wildfire. Not only is an accumulation of fine fuel more susceptible to ignition, it will also burn more intensely, making the fire difficult to contain. The CIRO Superintendent may want to consider periodic flash grazing in selected areas to reduce the build-up of fine litter.


Circle Creek Grazing Allotment
Circle Creek Allotment
Little Cove
Camel Rock
Treasure Rock
Camp Rock
Register Rock
CIRO Boundary
CRSP Boundary
CIRO Grazing Allotments
CIROGates
Springs
CIROFences
CIRO Roads
CIROTrails
Drainages
0 0.25 0.5 0.75 1 Miles
N
Created: 11/30/07
By: Tim Bennett

KEMPTON ALLOTMENT GRAZING MANAGEMENT PLAN

GENERAL INFORMATION

Ted Tracy's grazing permit on Circle Creek has been transferred to the Kempton Allotment, following the closure of the Circle Creek Allotment to grazing.

DESCRIPTION OF ALLOTMENT

Location and Area

The Kempton Allotment is located near the center of CIRO in Township16 S, Range 23 E. It includes approximately 100 acres in the western half of Sec. 1, 60 acres in the southeast corner of Sec. 2 and 240 acres in Sec. 12, totaling 400 acres (Appendix B).

Climate, Topography, Vegetation

Precipitation on the Kempton Allotment averages 12 to 14 inches annually. 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 ephemeral 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 Appendix A. Most of the area was plowed and seeded to crested wheatgrass sometime in the past. Mountain big sagebrush has reinvaded 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

Ted Tracy will be the only permittee in the allotment with 84 AUM's of allocated use from June 1 to July 1.

Table 4. Land ownership in the Kempton Allotment.

LAND OWNERSHIP	APPROXIMATE NUMBER OF ACRES	PERCENT OWNERSHIP
CIRO	400	100
TOTAL	400	

GRAZING MANAGEMENT

Pasture Description

The Kempton Allotment currently consists of a small 60-acre pasture and two 160-acre pastures. Two small springs provide a source of water for livestock in the small 60-acre and northern 160-acre pastures. Although there is a pipeline to a trough in the southern 160-acre pasture, it provides very limited water. It may be necessary to haul water to this pasture. To balance carrying capacity of the two northern pastures with the southern pasture, the two northern pastures should be considered one pasture. This will also insure a more reliable water source for the northern 160-acre pasture.

Grazing History

History of grazing on the allotment prior to purchase by CIRO is unknown. Since the early 2000s, the southern pasture was used in alternate years by Gary Jones after a wildfire in 1999 temporarily reduced forage in the Tracy Lane Allotment. The northern pasture was periodically used by Curtis Durfee.

Grazing Systems

A two pasture deferred rotation grazing system will be used, with the south pasture grazed early one year and late the next, alternating this pattern with the north pasture. However, at the current permitted use level, use of the allotment as a single pasture is acceptable if a reliable water source cannot be developed in the southern pasture. Special attention will be given to monitoring use on the riparian areas, with cattle being herded away from these areas when necessary or the riparian areas fenced off if necessary.

Livestock Movement and Distribution

Allotment fences and water facilities will be maintained by the permittee 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. Salt will be placed at least 100 yards from any water source and moved as necessary to avoid severe damage to any given area. 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 the CIRO permit for instructions on permit and billing requirements. Although CIRO issues permits on an annual basis, this is a ten-year plan.

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MONITORING AND EVALUATION

Monitoring procedures for the allotment are described in the section on monitoring. At least two permanent trend photo sites will be established, one in the south unit and one in the north unit.

EXISTING AND PROPOSED RANGE IMPROVEMENTS

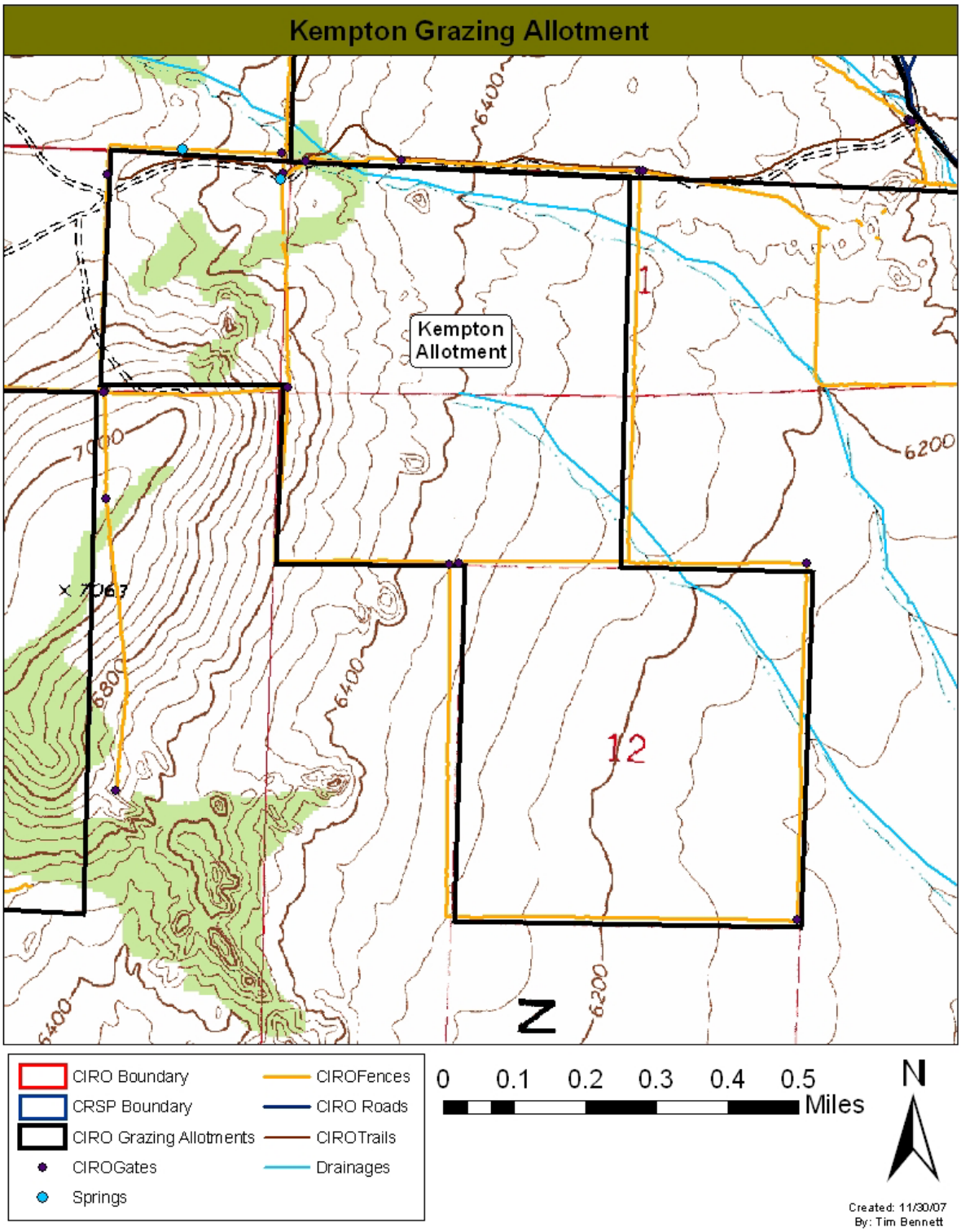
Existing Range Improvements

Some of the perimeter fences need to be repaired or replaced.

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 southern end of the allotment and to implement a two pasture deferred-rotation grazing system, a dependable source of water must be developed in the southern half. There is a spring in the pasture that may have the potential to be developed. 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). All springs and the riparian areas around the springs should be fenced, head boxes put in and water piped to troughs away from the springs.


Kempton Grazing Allotment
Kempton Allotment
1
12
6400
6200
7000
6800
7063
CIRO Boundary
CRSP Boundary
CIRO Grazing Allotments
CIROGates
Springs
CIROFences
CIRO Roads
CIROTrails
Drainages
0 0.1 0.2 0.3 0.4 0.5
Miles
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Created: 11/30/07
By: Tim Bennett

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. Ted Tracy and Curtis Durfee 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 Carole 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: 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 (Appendix A). The riparian areas are primarily of the riparian-sagebrush and riparian-bluegrass types

Permittee and Permitted Use

Permittees on the Emery Canyon Allotment are Ted Tracy and Curtis Durfee. The allotment is divided into two pastures, Emery Creek and Bath Rock. Season of use is July 1 to mid August. The current carrying capacity of the allotment is 242 AUM's; with 167 AUM's in the Emery Creek pasture and 75 AUM's in the Bath Rock pasture. Season of use and permitted use are shown in Table 5. The Forest Service has allocated l7 AUM's 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[1]	#Cattle
Emery Creek	Ted Tracy	7/1 - 8/15	81
	Curtis Durfee	7/1 – 7/31	22
Bath Rock	Ted Tracy	7/1 – 8/15	81
	Curtis Durfee	7/1 – 7/31	22
TOTAL			103

[1]Because of a difference in carrying capacity, the grazing period and AUM's use in Bath Rock will have to be less than the grazing period and AUM's use in Emery Canyon.

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, Emery Creek and Bath Rock as shown on the allotment maps.

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 benefitted 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 with season of use from July 1 to August 15. The Emery Creek pasture will be grazed late in odd-numbered calendar years and early in even years. The Bath Rock pasture will be grazed early in odd years and late in even years (Table 7). However, the order of the rotation can be changed as circumstances may warrant by mutual agreement between the permittees and CIRO.

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

PASTURE NAME	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
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 pasture 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 by the permittees 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. Salt will be placed at least 100 yards from any water source and moved as necessary to avoid any severe damage to a given area. 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 on an annual basis, 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. 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

Existing Range Improvements

The existing range improvements are shown on the allotment map.

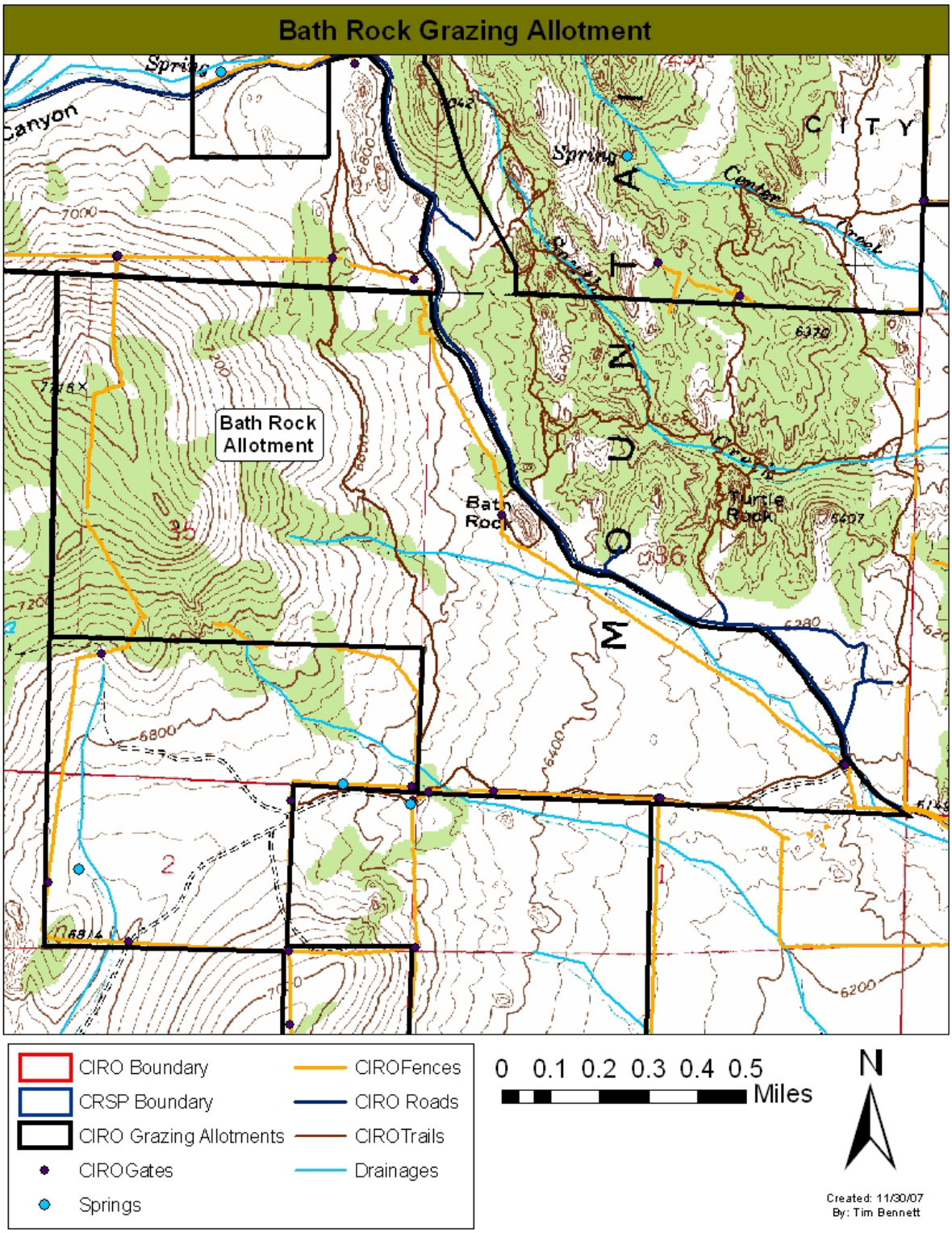
Proposed Improvements

Brush Control. Control of a dense stand of mountain big sagebrush along the west and north boundaries of the Carole 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), Carole Taylor (private land) and the BLM which has land just to the west of the allotment.

Water Development. Water is more of a limiting factor on the allotment, especially during and following a drought, than is forage production. A bigger water trough between the Emery Canyon pasture and the private Carole Taylor property is needed.

Fencing. If additional water can be developed in the upper end of the Emery Creek pasture, consideration should be given to putting in a permanent fence and cattle guard from the west side of the Carole Taylor property to the west boundary of the allotment just north of the riparian area in Emery Canyon. The small area between this fence and Bath Rock could be grazed a few days each year as a riparian pasture.

Consideration should also be given to fencing Tea Kettle spring in the Bath Rock pasture and piping water to a trough outside the riparian area. The spring in the center of the allotment should also be fenced and water piped to a bigger trough on the outside, in place of the small tub there.


Bath Rock Grazing Allotment
Bath Rock Allotment
Bath Rock
Turtle Rock
Spring
Canyon
Center Creek
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MOUNTAI
CIRO Boundary
CRSP Boundary
CIRO Grazing Allotments
CIROGates
Springs
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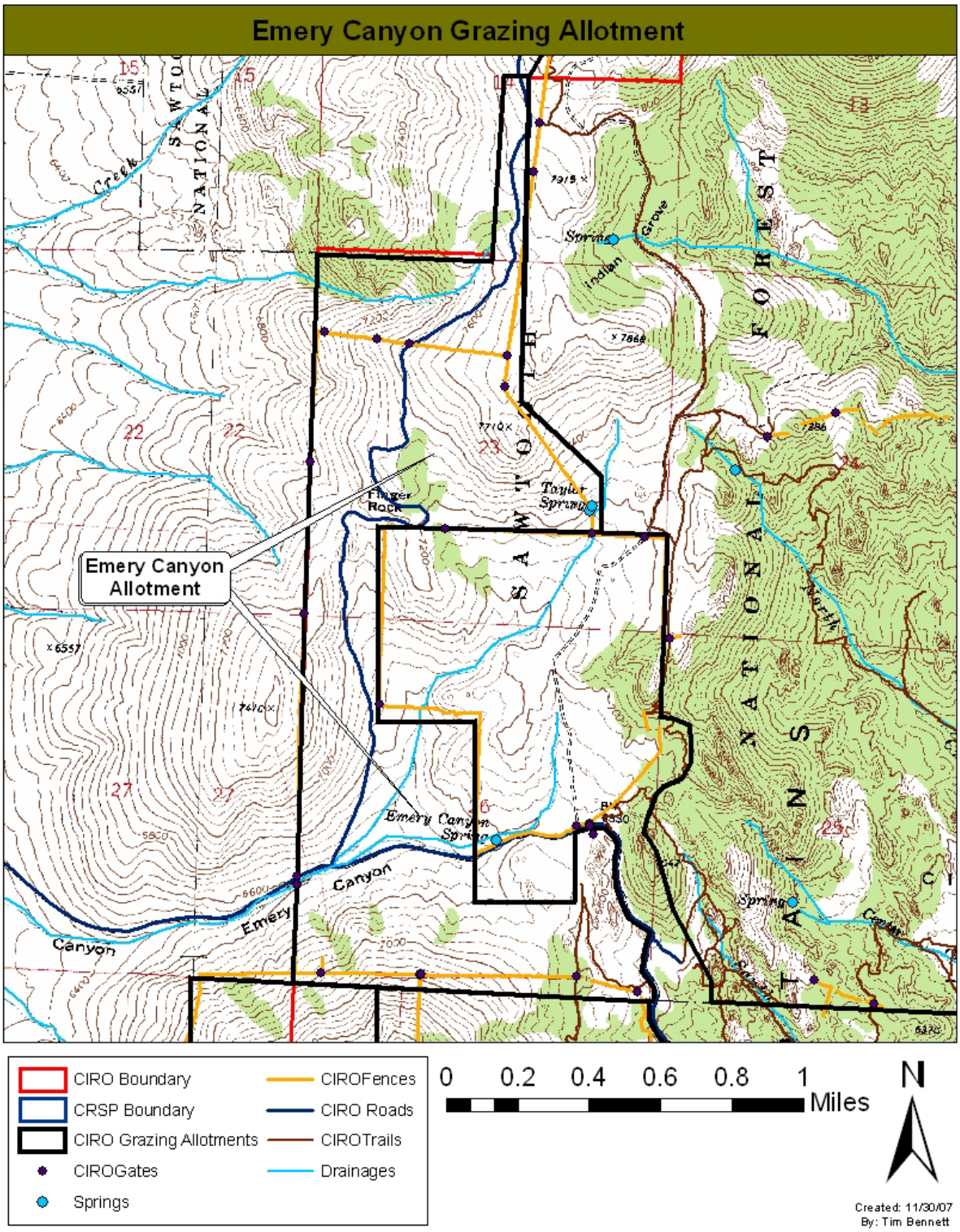
Created: 11/30/07
By: Tim Bennett


Emery Canyon Grazing Allotment
Emery Canyon Allotment
Finger Rock
Taylor Spring
Indian Grove Spring
Emery Canyon Spring
Spring
Emery Canyon
CIRO Boundary
CRSP Boundary
CIRO Grazing Allotments
CIROGates
Springs
CIROFences
CIRO Roads
CIROTrails
Drainages
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Miles
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Created: 11/30/07
By: Tim Bennett

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 William D. Jones, who are also the permittees. The allotment grazing plan was developed in cooperation and consultation with these agencies, private landowners 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 7.

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 William D. 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 make 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 (Appendix A). 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 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 8).

Carrying capacity of the allotment is currently 196 AUM's. With 40 percent of the allotment area within CIRO, 40 percent of the total use (79 AUM's) was allocated to CIRO and 60 percent (117 AUM's) 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
	William D. Jones	6/1 - 6/30	28.4	22
BLM	Curtis Durfee	6/5 - 10/1	39.4	47
	William D. Jones	6/1 - 6/30	28.4	32
TOTAL		6/1 - 10/4		132

[1]Allocation of AUM's 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 as shown on the Allotment map.

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 have 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. The long narrow pasture with mixed ownership, steep topography and limited water sources greatly limits management options.

The possibility of splitting the pasture in half with an east-west fence above Trail Creek was considered. This would require approximately one mile of fence over steep topography. While this would be of some benefit to the resources on both sides of the fence, the cost to benefit ratio may be prohibitive. Additional water facilities would also be needed.

It is recommended the current system of season-long use be continued. However, CIRO, BLM, private land owner and permittees should see if other grazing management options can be developed, such as splitting the allotment into two or more pastures or developing a rotation system with another allotment(s).

Livestock Movement and Distribution

Allotment fences and water facilities will be maintained by the permittees 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. Salt will be placed at least 100 yards from any water source and moved as necessary to avoid any severe damage to a given area. 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 on an annual basis, this is a ten-year plan. The annual grazing plan should be coordinated with the BLM.

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 of the NW 1/4 of Section 14 in 1984. This study site is now on CIRO land and it should continue to be monitored. Other permanent trend photo points will also be located on the allotment.

EXISTING AND PROPOSED RANGE IMPROVEMENTS

Existing Range Improvements

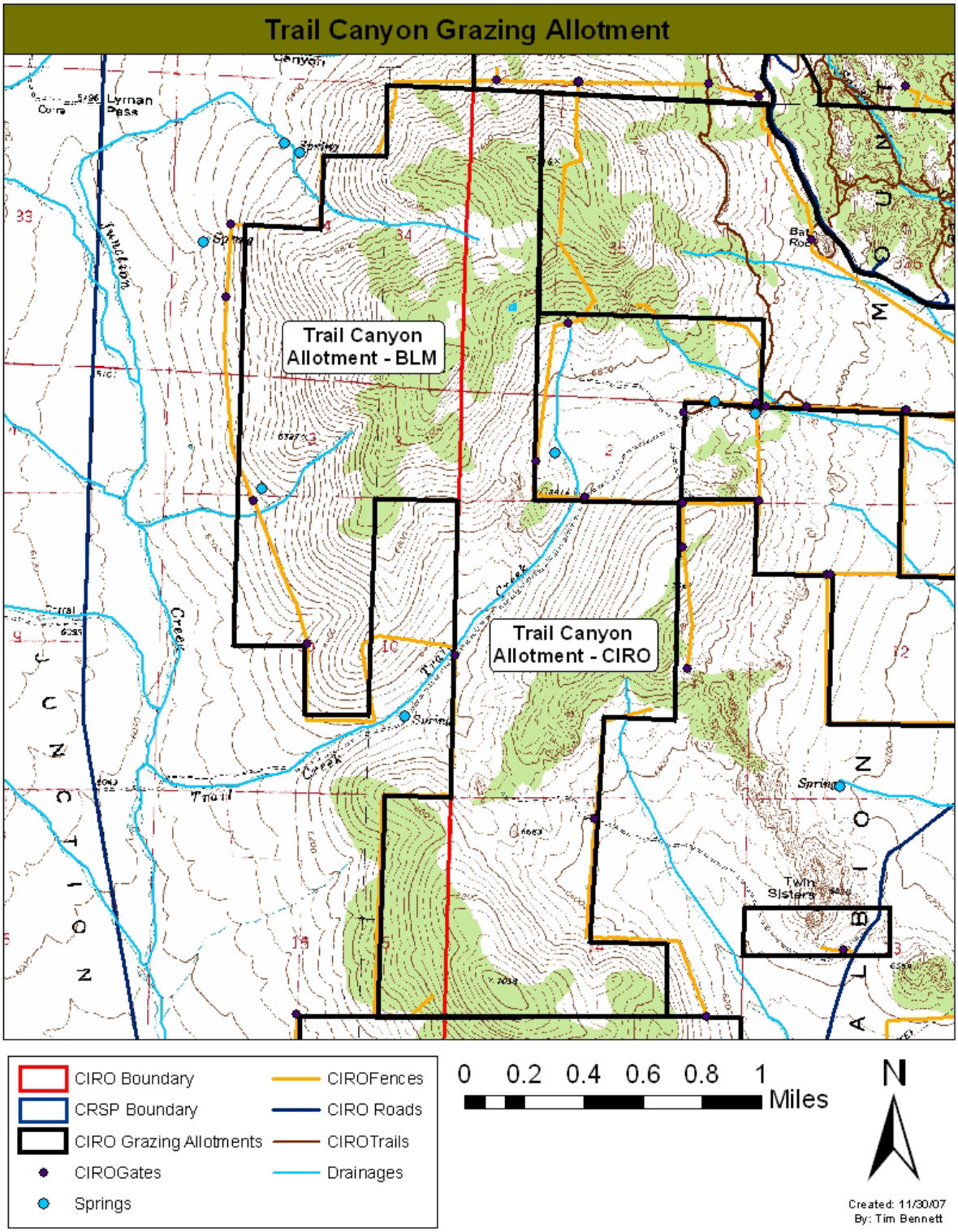
The existing range improvements are shown on the Allotment map.

Proposed 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. Additional water developments would improve livestock distribution. There is potential for development of a spring in the northern end of the allotment. Fencing of springs, development of head boxes and piping the water from the head box to troughs should be done.


Trail Canyon Grazing Allotment
Trail Canyon Allotment - BLM
Trail Canyon Allotment - CIRO
Lyman Pass
Spring
Trail Canyon Creek
Twin Sisters
CIRO Boundary
CRSP Boundary
CIRO Grazing Allotments
CIROGates
Springs
CIROFences
CIRO Roads
CIROTrails
Drainages
0 0.2 0.4 0.6 0.8 1
Miles
N
Created: 11/30/07
By: Tim Bennett

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 9.

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 (Appendix A). Most of the forage in the allotment is produced on a 240 acre crested wheatgrass seeding. When the original grazing plan was completed in 1996, sagebrush and juniper dominated over half the allotment, reducing forage production. In 1999 a wildfire burned most of this area resulting in greatly increased forage production on both the native and seeded vegetation.

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 authorized use on the allotment is 77 AUM's, although the carrying capacity is much higher since the 1999 fire. Season of use and permitted use are shown in Table 10.

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 AUM's 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. Currently, the only water source on the allotment is on the BLM portion of 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. With the only water source on one end of the allotment, livestock distribution has been a problem. Use has been concentrated on the west end of the crested wheatgrass seeding. For the past several years CIRO allowed the permittee to make alternate year use on this allotment with the southern pasture in the Kempton Allotment.

Grazing Systems

It is proposed that the allotment be divided into two pastures along the CIRO boundary with the BLM and a deferred rotation grazing system initiated. Season of use on the allotment would remain the same with one pasture grazed early and the other pasture late. The next year the order of use would be reversed. Since the size and thus carrying capacity of the BLM pasture is approximately 36% of the allotment and the CIRO pasture is 64%, the number of days grazing in the two pastures would be approximately 10 days in the BLM pasture and 20 in the CIRO pasture. However, actual rotation dates should be decided on a yearly basis. Until the allotment is divided as described, it will be grazed from May 5 to June 4 as a one-pasture unit. Distribution of cattle can be controlled to some extent by access to water.

Livestock Movement and Distribution

Allotment fences and water facilities will be maintained by the permittee 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. Salt will be placed at least 100 yards from any water source and moved as necessary to avoid any severe damage to a given area. 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 on an annual basis, this is a ten-year plan. The annual grazing plan should be coordinated with the BLM.

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. This study site is now on CIRO land and it should continue to be monitored, if it can be located. Two additional permanent photo trend transects have been established on the CIRO portion of the allotment, one on the native range site and the other on the crested wheatgrass seeding. It is recommended that nested frequency data be taken on the transects, in addition to other monitoring that the NPS may choose to do. Locations of the transects/photo points are on file at CIRO.

EXISTING AND PROPOSED RANGE IMPROVEMENTS

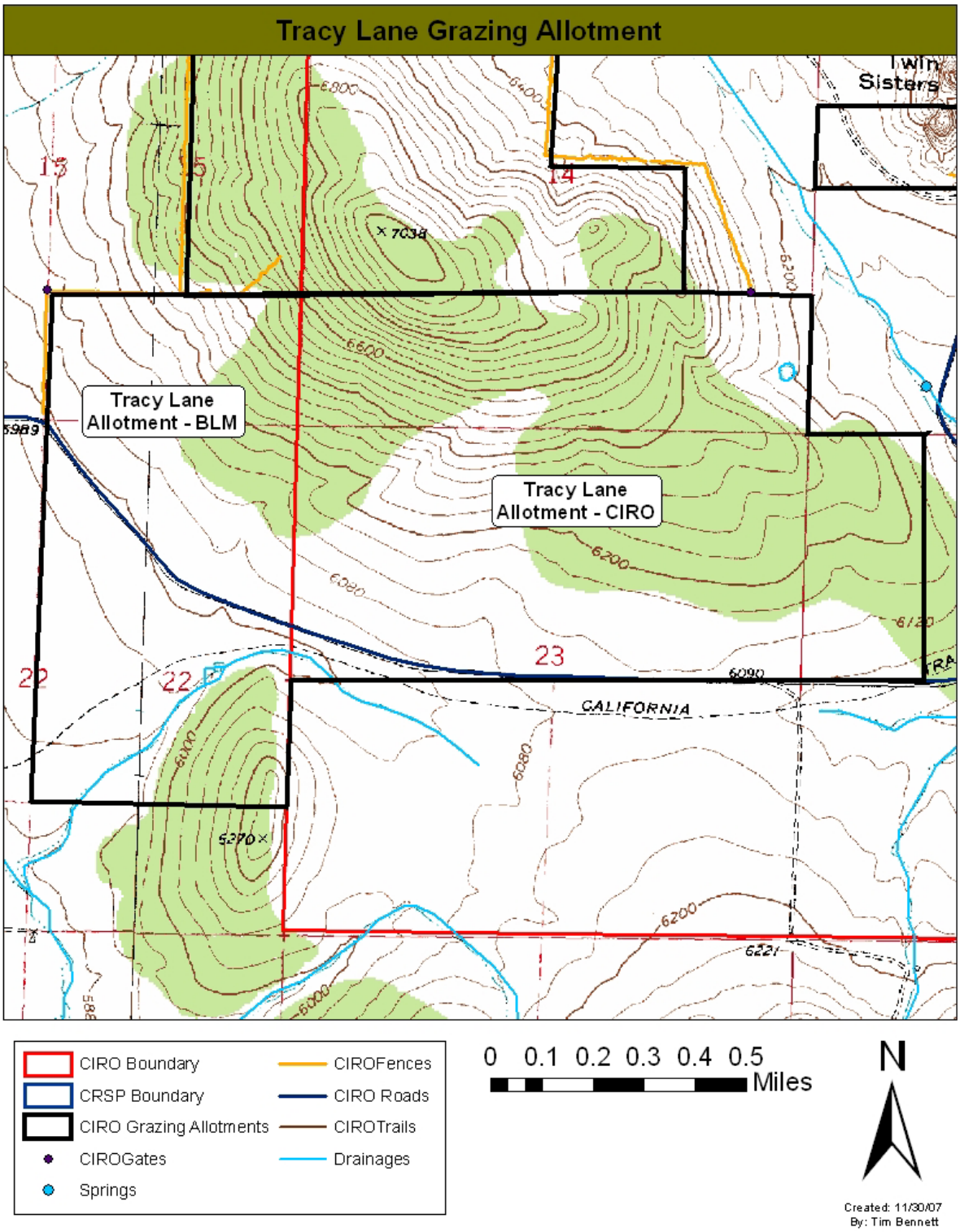
Existing Range Improvements

The existing range improvements are shown on the Allotment map.

Proposed Improvements

Fencing. A north/south fence from the road to the steep terrain creating a natural barrier should be constructed in the near future along the CIRO/BLM property line, with a cattle guard installed on the road, creating two pastures in the allotment. In addition to the cattle guard planned in conjunction with that fence, a cattle guard should be installed on the main road in the southeast corner of the allotment.

Water Development. A water trough should be installed at the Juniper Group Camp the spring of 2007. However, it is recommended that the pipeline be extended to the northwest so the trough is farther away from the road. Otherwise, livestock may concentrate along the road. This trough will facilitate division of the allotment into two pastures and initiation of a deferred-rotation system. Improvement of the stock pond in the NE corner of the allotment would also help with livestock distribution.


Tracy Lane Grazing Allotment
Tracy Lane Allotment - BLM
Tracy Lane Allotment - CIRO
Twin Sisters
CALIFORNIA
CIRO Boundary
CRSP Boundary
CIRO Grazing Allotments
CIROGates
Springs
CIROFences
CIRO Roads
CIROTrails
Drainages
0 0.1 0.2 0.3 0.4 0.5
Miles
N
Created: 11/30/07
By: Tim Bennett

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 240 acres of CIRO and BLM land are grazed. The only permittee on the allotment is Olen Ward, who was subleasing to Bruce Durfee prior to the establishment of CIRO. Both have done 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 Health 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]	1080	39.4
BLM[1]	645	23.5
PRIVATE[2]	1015	37.1
TOTAL	2740	

[1]Only 240 acres out of the 1725 acres of federal land are grazed.
[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 around 12 to 16 inches. With most of the forage being produced by crested wheatgrass, 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 240 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, Smoky Mountain, Twin Sisters Rocks and Emigrant Creek Basin. Prior to the wildfires in 1999 and 2000, these vegetation units were dominated by juniper and pinyon pine and provided little forage. Due to the steep terrain they 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. The crested wheatgrass seedings on the private land provide most of the forage in the allotment.

Permittee and Permitted Use

Bruce Durfee is the only permittee on the allotment. Although the NPS does not attach permits to a private property base, for all practical purposes the Heath Canyon Allotment is attached to the Olen Ward ranch. This is because of his private land and BLM permit that are fenced within the allotment. If Bruce Durfee stops using the permit, it will revert back to the Olen Ward ranch. The permit for the 240 acres of suitable federal range provides for 21 AUM's, 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 240 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 in early May. Replacement heifers are added in early June. 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 to be a good steward of the land and with only 240 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 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 the flexibility to change periods of use and order of rotation. The permittee will make an effort to lessen impacts on areas of concentrated recreational use, especially around the Twin Sisters.

When grazing in pastures that include CIRO land, fences and water facilities will be maintained by the permittee on those lands 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. Salt will be placed at least 100 yards from any water source and moved as necessary to avoid any severe damage to a given area. 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 the permittee.

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 on an annual basis, this is a ten-year plan.

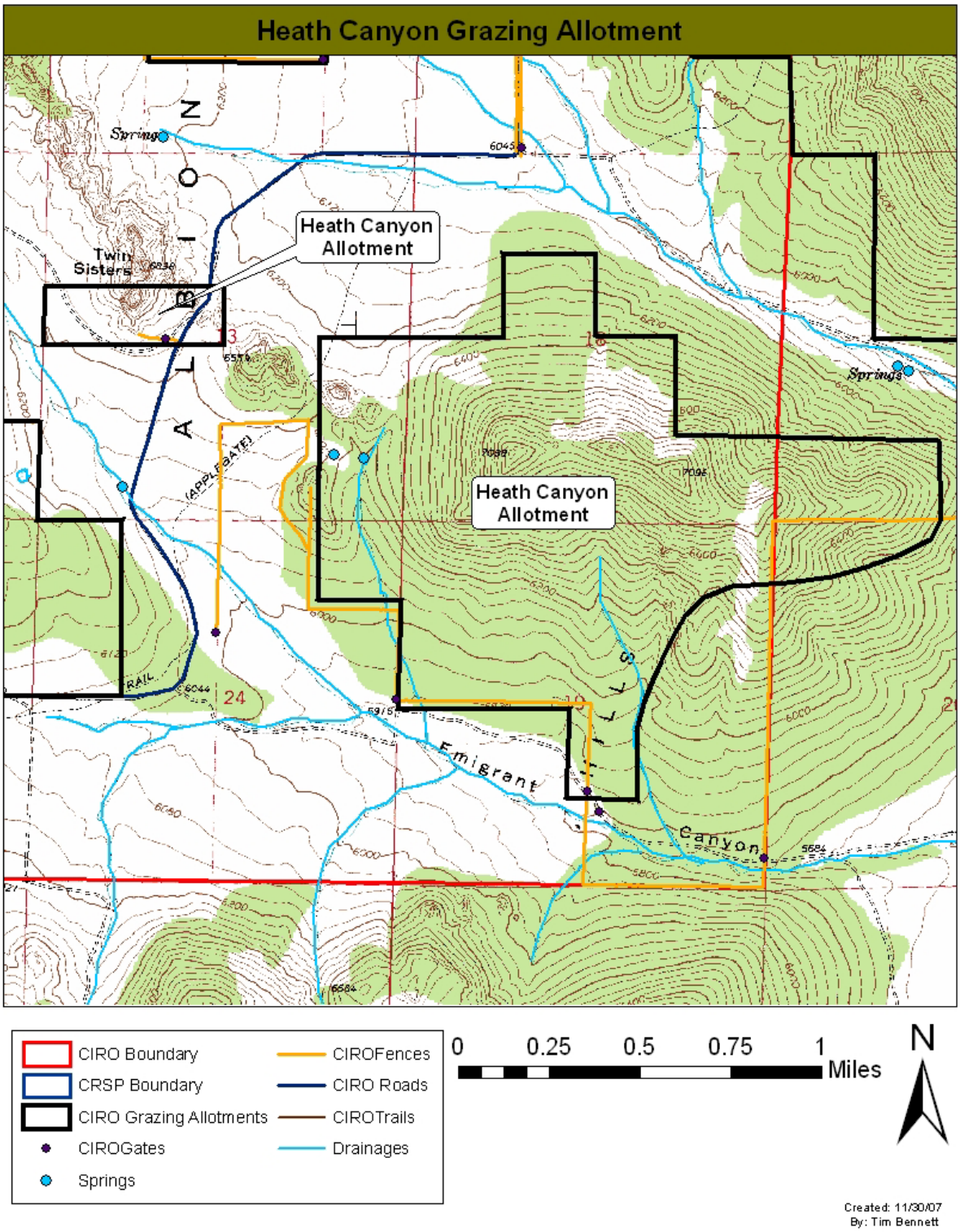
MONITORING AND EVALUATION

Because of the small acreage of CIRO land grazed, only one permanent trend study site will be located on the allotment. Monitoring by CIRO will consist of collection of actual use data, monitoring the trend study site and visual inspection of the allotment as needed. Such inspections should be done with the permittee and/or land owner.

EXISTING AND PROPOSED RANGE IMPROVEMENTS

Proposed Improvements

In 2007, Olen Ward recommended the existing fence between his private land and CIRO southeast of the Twin Sisters Group Camp be replaced with a new fence. The CIRO and Olen Ward should coordinate replacement of the existing fence in the near future.


Heath Canyon Grazing Allotment
Heath Canyon Allotment
Heath Canyon Allotment
Twin Sisters
Spring
Springs
Emigrant
Canyon
CIRO Boundary
CRSP Boundary
CIRO Grazing Allotments
CIROGates
Springs
CIROFences
CIRO Roads
CIROTrails
Drainages
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Miles
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Created: 11/30/07
By: Tim Bennett

ISOLATED TRACTS OF CIRO

There are five 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 13. 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
SW 1/4 SW 1/4 Sec. 29, T 15 S, R 24 E	Private	40	Ungrazed
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 one grazed area is too small to justify special attention by CIRO. 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 little or no grazing use made of these areas, they too do not warrant special attention. Monitoring of these tracts should consist of an occasional visual inspection by CIRO.

It is recommended CIRO consider installing a water trough in the southeast corner of CIRO near the spring, allowing this area to be used as emergency feed (i.e. a grass bank) by CIRO permittees when conditions on their allotments warrant a rest, such as after a wildfire.

MONITORING AND EVALUATION

The purpose of monitoring is to determine if ongoing management actions are having the desired effect 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 appropriate agencies. 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. Ideally, a precipitation gauge should be located in or near each pasture. 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 to make 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 noted 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. It is especially useful to map utilization patterns when a change in grazing system or range improvements, such as livestock water facilities, pasture divisions or brush control is made. Such changes can affect livestock grazing patterns.

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, 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.

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 constraints may preclude additional sites. 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 location, layout and photos of existing trend study sites are on file with CIRO. Sites that represented the predominant range sites in each pasture that showed use by cattle were selected. A 100 ft. long transect using a rebar stake at each end was established at each monitoring site. The transects were set up on a roughly south to north direction. The exposed ends of the stakes were painted bright red for easy visibility. The exposed ends of the rods should have a cap on them or bent into a loop, to avoid injury to animals that might step or fall on them. A steel post was driven in-line with the transect approximately 50 feet south of the south stake for ease of locating the study site. A 3 ft by 3 ft photo plot was established at the north end of the transect, with the stake and 2 large spikes permanently marking 3 corners of the plot. The stake is in the lower right corner and the spikes in the lower and upper left corners when looking down the transect from north to south.

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. The CIRO and permittees should cooperate in the establishment of permanent photo points and taking the pictures.

Trend photos should be taken at least once a year at the end of the grazing season (1st week of October). However, permittees should be encouraged to take photos of the photo points/plots at the time they put animals in a pasture and when they take them out. This provides an excellent record of use on the pasture. Diligently taking the photos annually is the key to obtaining reliable records of what is happening on the range. Field notes 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 are also useful.

Details on how to construct a 3 ft x 3 ft photo plot frame can be found in USDI-BLM (1985). Plot photos should be taken such that the plot frame is visible, but minimizing anything outside the plot. To minimize shadows, taken the photo from the north side of the plot. A photo should be taken looking down the transect from each end of the transect, by standing right behind the stake. The allotment and pasture name, location of the study site, photo identification (plot, general view and direction of the photo), and the date should be recorded.

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 60-80% of the time. A detailed description of these procedures, taken from the BLM monitoring handbook (USDI-BLM 1984), is in Appendix C. The nested frequency transects should be read at 3-5 year intervals.

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, 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.

It is recommended that CIRO personnel and permittees make a joint inspection of each pasture and/or allotment annually at the end of the grazing season. The following survey form or similar written record should be used. If both the CIRO and the permittee(s) are in agreement with the documented survey, they should indicate so with their signatures.

CIRO Post-Grazing Annual Pasture Survey

Allotment:_____ Pasture:_____ Date:_____

CIRO Observer:_____ Permittee(s) Present:_____

Precipitation (inches or cm): Annual:_____ Spring:_____ Summer: _____

Actual Use:
Permittee:_____ Date in:_____ Date out:_____ No. Animals:_____ AUMS:_____
Permittee:_____ Date in:_____ Date out:_____ No. Animals:_____ AUMS:_____

Overall Upland Utilization: Light use _____ Correct use _____ Heavy use _____
Riparian Area Utilization: Light use _____ Correct use _____ Heavy use _____
Was a utilization map made? Yes ____ No ___ (If so attach it to this form)
Other Use Observed: Wildlife _____ Recreation _____ Insects _____

Trend Photos Taken? Yes ____ No ____ Nested Frequency Read? Yes_____ No _____

Trend Interpretation: Upward _____ Downward _____ Not Apparent _____

Overall Range Health Assessment: _____
_____
_____
_____
_____

Areas of Concern (distribution problems, fencing/water issues, salt location, noxious weed infestations, etc.) _____
_____
_____
_____
_____

Changes Needed Next Grazing Season: _____
_____
_____

Notes & Other Suggestions: _____
_____
_____
_____
_____
_____
_____
_____

COOPERATIVE RESPONSIBILITIES

The CRM process does not stop at the time a plan is completed. The success of a plan is dependent on how well it is carried out. For this plan to work the permittee(s) and agencies should make a commitment to carry out 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, cattle guards, wells, waterholes, and pipelines in working condition that the operator has agreed to maintain in writing.

3. Cooperate in the construction of new livestock-benefitting 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.

National Park Service and/or Idaho Department of Parks and Recreation 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 joint allotment plans.

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

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APPENDIX A

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 developed until this work is completed. 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*.

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 has 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 reinvaded 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.

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

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 visually 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 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 Smoky 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 Smoky 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.

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. Smoky 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.

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.

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. Smoky 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. In 1991, direct evidence of recent fires within CIRO was 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.

Morris (2006) reported there had been four significant fires at least partially in CIRO since 1991. In 1992 a fire of unknown origin burned 50 acres in Emery Canyon. A human caused fire burned an additional 52 acres in Emery Canyon in 1996 (both fires were in the SW ¼ , Sec. 26, T 15 S., R 23 E). In 1999 a much larger fire of unknown origin burned 565 acres in the southwest corner of CIR0 (Sec. 13, 14, 23, 24, T 16S, R 23E. The largest known fire in CIRO occurred in 2000 from natural causes. It started south of the reserve on BLM ground and burned 17,605 acres total with 2090 acres on CIR0 (Sec. 13 and 24, T 16S, R 23 E, Sec. 18 and 19, T 16S, R 24 E).

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 rare occasions, however, fires would be of sufficient intensity to burn more extensive amounts of these types of vegetation.

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

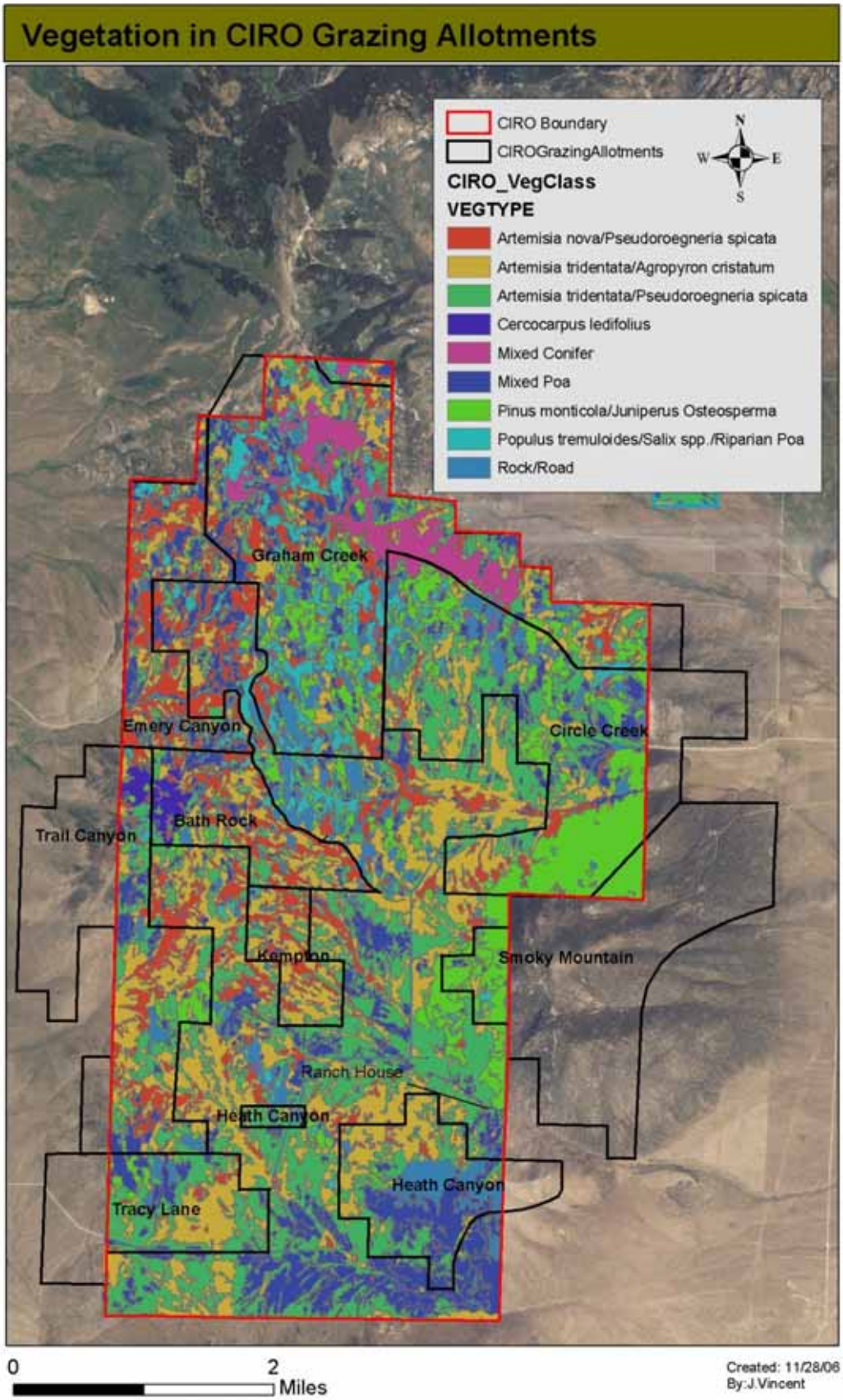
1) Utah juniper has expanded into sagebrush grassland vegetation where the two types were adjacent to each other. This can be observed in the early stages on the northwest and west sides of Smoky Mountain (SW1/4, Sec. 31, T 15S, R 24E, and Sec. 7, T 16S, R 24E) and on the northwest side of Southwest 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.

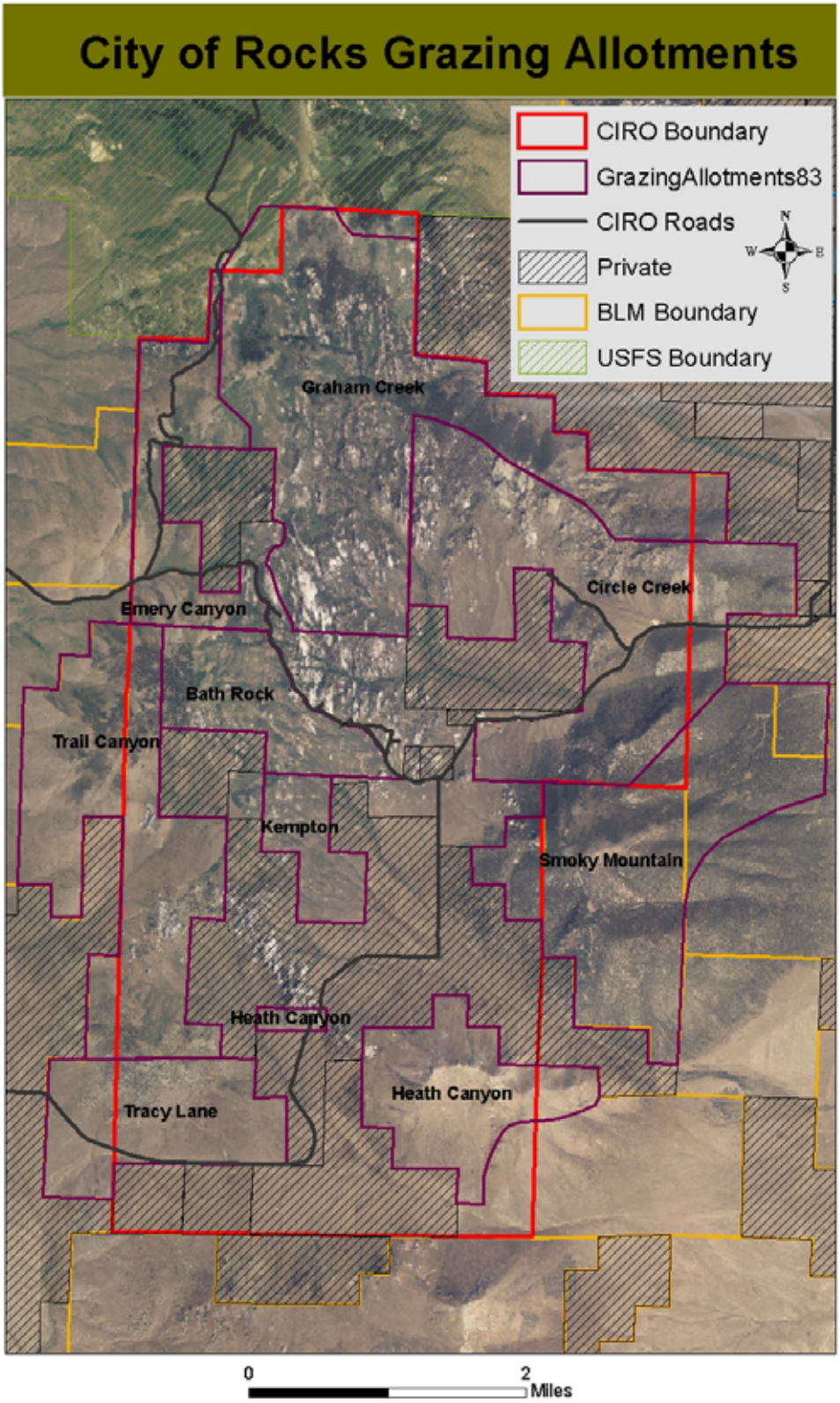
The CIRO has a Fire Management Plan, however, prescribed burns are currently prohibited. The influence of fire will be necessary if CIRO wishes to maintain the natural appearance of the landscape. This can be done by initiating a prescribed fire program (those fires which are planned for a particular 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 affect the other activities occurring within 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. The use of prescribed fire in CIRO should be reconsidered by the NPS.

The development of a juniper or pinyon-juniper over-story 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.


Vegetation in CIRO Grazing Allotments
CIRO Boundary
CIROGrazingAllotments
CIRO_VegClass
VEGTYPE
Artemisia nova/Pseudoroegneria spicata
Artemisia tridentata/Agropyron cristatum
Artemisia tridentata/Pseudoroegneria spicata
Cercocarpus ledifolius
Mixed Conifer
Mixed Poa
Pinus monticola/Juniperus Osteosperma
Populus tremuloides/Salix spp./Riparian Poa
Rock/Road
N
W
E
S
Graham Creek
Emery Canyon
Circle Creek
Trail Canyon
Bath Rock
Kempton
Smoky Mountain
Ranch House
Heath Canyon
Heath Canyon
Tracy Lane
0
2
Miles
Created: 11/28/06
By:J.Vincent

APPENDIX B


City of Rocks Grazing Allotments
CIRO Boundary
GrazingAllotments83
CIRO Roads
Private
BLM Boundary
USFS Boundary
N
W
E
S
Graham Creek
Circle Creek
Emery Canyon
Bath Rock
Trail Canyon
Kempton
Smoky Mountain
Heath Canyon
Heath Canyon
Tracy Lane
0
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Miles

APPENDIX C

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.

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

6. Photo Identification Label

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

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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. 13

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:

    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 attached Nested Frequency 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.

Nested Frequency

Page ____ of ____

Study Number	Date	Examiner	Allotment Name & Number	Pasture

Transect Location	Number of Quadrats	Quadrat Size

Plant Species	Quadrats																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Frequency Summary by Plot Size							
1		2		3		4	
Hits	% Freq	Hits	% Freq	Hits	% Freq	Hits	% Freq

Cover Summary	
Vegetation (Basal)	
Hits	%Cover
Vegetation (Canopy)	
Hits	%Cover
Litter	
Hits	%Cover
Bare Ground	
Hits	%Cover
Gravel/Stone	
Hits	%Cover
Crytogamie crust	
Hits	%Cover

Observations/Comments

Notes (Use other side or another page)

Canopy* Dont record ground cover under canopy hits of shrubs under 10ft in height

APPENDIX D

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. 20 p. 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 in 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.