



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Carson City District Office
1535 Hot Springs Rd., Ste. 300
Carson City, Nevada 89706-0638



12/15/94
DEC. 15 1994

IN REPLY REFER TO:
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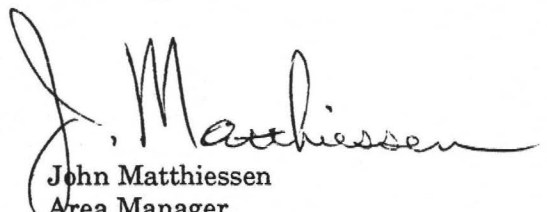
Dear Interested Party:

Enclosed for your review are the Buckeye and Sand Canyon Allotment Evaluations. These are two of the nine allotments contained in the northern Pine Nut Herd Management Area (HMA). In order to allow adequate time for review and comment, the issuance of the remaining allotment evaluations will be spread out over the month of December. Comments on any of the evaluations will not be due until thirty days after the issuance of the last evaluation.

As you may recall from my letter dated February 11, 1994, the Walker Resource Area has been working on the evaluation of monitoring data for grazing allotments in the Pine Nut HMA. During the development of earlier evaluations, a key question asked by the Walker Resource Area Staff was how to meet the requirements of the allotment evaluation process while still recognizing the mandate to manage wild horses within the HMA, not within each allotment. It was decided that the evaluations should not set an Appropriate Management Level (AML) for each allotment but should, instead, set a potential stocking level for each segment of the HMA based on monitoring data and then define an AML for the combined potential stocking levels of all the allotments.

By defining a potential stocking level for each portion of the HMA in lieu of an "AML" for each allotment, provision is made for the movement of horses within the HMA since utilization by wild horses is based on the availability of forage, not on a predetermined number of horses for an allotment. This is the basis for providing nine allotment evaluations before establishing a "due date" for comments. A specific date will be identified in the cover letter which transmits the last evaluation(s).

Sincerely,


John Matthiessen
Area Manager
Walker Resource Area

2 Enclosures:

1. Buckeye Allotment Evaluation
2. Sand Canyon Allotment Evaluation

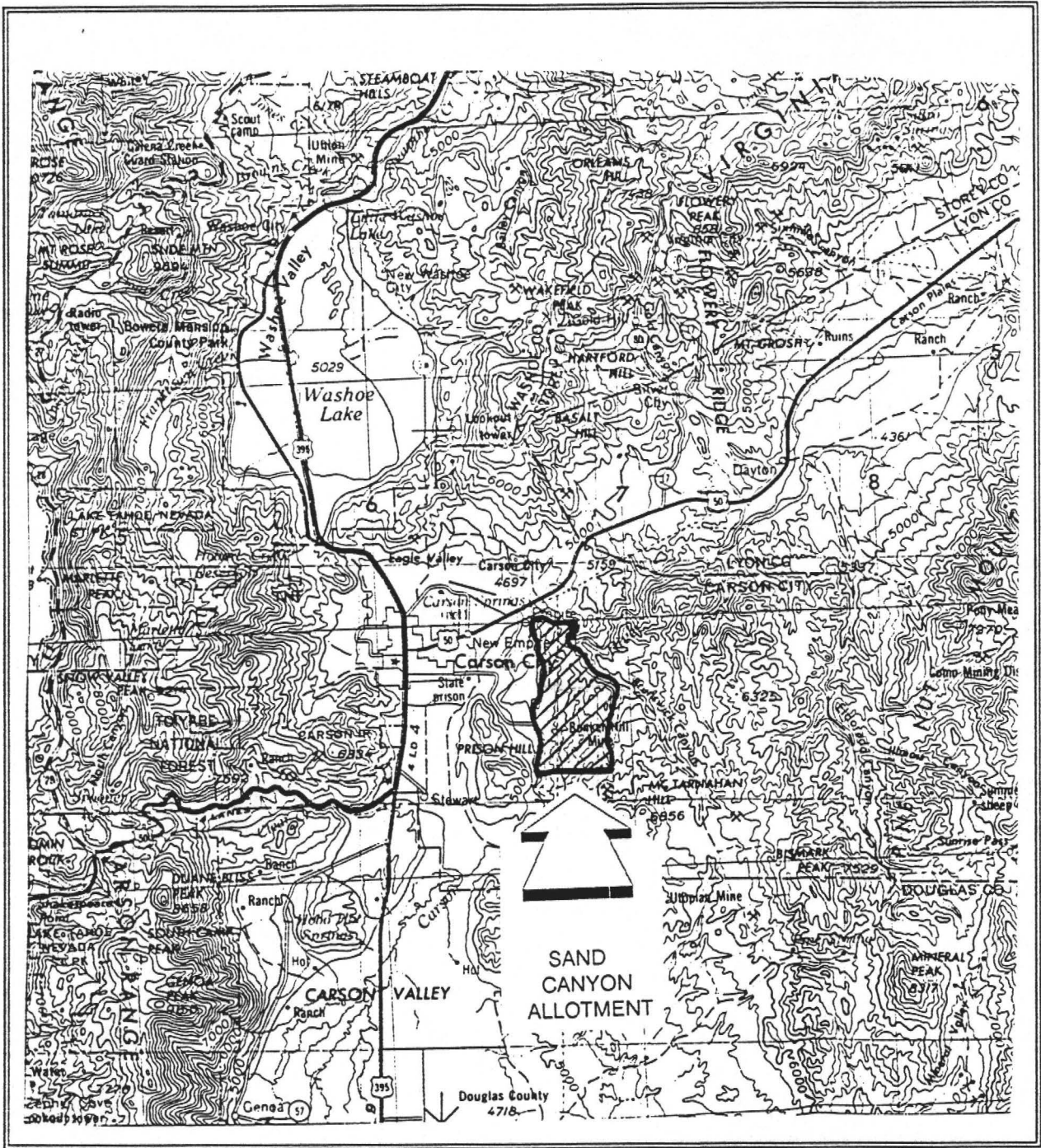
**UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT**

**Carson City District Office
1535 Hot Springs Road, Suite 300
Carson City, Nevada 89706-0638**

**SAND CANYON
ALLOTMENT EVALUATION**

DECEMBER 12, 1994





Map No. 1
 LOCATION OF SAND CANYON ALLOTMENT

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SAND CANYON ALLOTMENT EVALUATION

I. INTRODUCTION

A. Purpose

In June, 1992, the Bureau of Land Management issued its *Strategic Plan for Management of Wild Horses and Burros on Public Lands*. One of the objectives is to establish initial Appropriate Management Levels (AMLs) for all herd areas by 1995. In order to establish an AML for wild horses in the Pine Nut Herd Management Area (HMA), it is necessary to evaluate resource management within all the allotments included within the HMA. One of these is Sand Canyon Allotment.

Specifically, the purpose of the allotment evaluation process is to determine if current grazing practices are consistent with the attainment of Walker Resource Management Plan (RMP) and allotment specific objectives for the Sand Canyon Allotment. If current grazing practices are not consistent with attainment of these objectives, then appropriate changes in management needed to meet these objectives will be identified, and appropriate change in management implemented.

B. Allotment Name and Number: Sand Canyon (03583)

C. Permittee: Donald A. Andersen Estate

D. Evaluation Period: Issuance of Reno Management Framework Plan (MFP) in 1982 to present.¹ Decisions from the Reno MFP were eventually incorporated into the Walker RMP.

E. Selective Management Category: "C"²

II. INITIAL STOCKING RATE

A. Livestock Use

1. Preference

The 1956 range survey for the Sand Canyon Allotment showed 230 AUMs were available for spring cattle grazing. However, 250 AUMs were adjudicated in the Sand Canyon Allotment on April 5, 1963. Although specific documentation could not be located explaining this discrepancy, fewer acres of public land were surveyed in 1956 than what was measured in preparation for this evaluation. Based on recalculation of survey data using the current public land acres, 254 AUMs would have been determined. This preference is currently authorized as follows:

¹ Some data discussed in this evaluation, especially baseline data, was collected prior to 1982.

² "Custodial" management while protecting existing resource values (Final Grazing Management Policy, 1982).

Preference (AUMs)			Kind of Live-stock	Period of Use	Percent Federal Range Use
Active	Suspended	Total			
250	0	250	Cattle	04/01 - 06/15	100%

2. Historical and Current Operations

The early grazing history of the Sand Canyon Allotment is not clear. The grazing permit has been held by the Andersen family since 1951. The current status of the base property is unclear due to Mr. Donald Andersen's estate being in probate.

B. Wild Horse and Burro Use

1. Herd Management Areas (HMAs) in Allotment

The Sand Canyon Allotment is located totally within the Pine Nut Herd Management Area. The allotment accounts for approximately 4% of the area within the HMA.

2. Appropriate Management Levels

The Appropriate Management Level (AML) for the Pine Nut HMA will be based on stocking levels for wild horses determined for all the allotments within the HMA. The stocking level for the Sand Canyon Allotment will be determined through the analysis of monitoring data contained within this document.

C. Wildlife Use

1. Mule Deer (*Odocoileus hemionus*)

a. Existing Numbers

Based on 1991 population estimates from the Nevada Division of Wildlife (NDOW) and predicted distribution data, 2 mule deer use the Sand Canyon Allotment year-round and 10 deer use the allotment in winter. Note that the Reno Grazing Environmental Impact Statement (1982) did not identify reasonable numbers for the allotment. The Pine Nut Habitat Management Plan (revised 1987) showed 0 deer as reasonable numbers for the Sand Canyon Allotment.

b. Key Mule Deer Range

The entire allotment is identified as winter range for mule deer. There is no key mule deer habitat in the allotment.

2. Other Species

The Sand Canyon Allotment contains animals typical of the northern Pine Nut Mountain Range in addition to species associated with the Carson River. Mammals include coyote (*Canis latrans*), cottontail rabbit (*Sylvilagus nuttalli*), jack rabbit (*Lepus californicus*), mountain lion (*Felis concolor*), gray fox (*Urocyon cinereoargenteus*), beaver (*Castor canadensis*), spotted skunk (*Spilogale putorius*), striped skunk (*Mephitis mephitis*), Raccoon (*Procyon lotor*) and small rodents. Birds include California quail (*Callipepla californicus*) and various species of song birds, water birds and raptors.

III. ALLOTMENT PROFILE

A. Description

The Sand Canyon Allotment is located approximately 2 miles east of Carson City, Nevada, on the northern end of the Pine Nut Mountain Range (refer to Map No. 1, page i). Elevation varies from approximately 4,600 feet along the Carson River to over 5,900 feet at the southeastern corner of the allotment boundary. None of the boundary is fenced. The allotment is located totally within Carson City County.

Due to its close proximity to human habitation, the allotment offers many opportunities for recreation including fishing, hiking, wildlife viewing, horseback riding, and off highway vehicle (OHV) use. Because of this situation, it is also subject to many conflicts associated with urban populations. These include OHVs not using existing roads and trails, illegal dumping, and possible conflicts between public land users and the residential developments occurring on private lands along the western boundary.

The Sand Canyon Allotment is classified as a category C allotment. The reasons as stated in the Reno Grazing Environmental Impact Statement (1982) are as follows:

1. Low production, low potential.
2. Primarily in a non-use status.

B. Acreage

Refer to Map No. 2 for the location of allotment boundaries and property status. Based on the boundaries established in the District Manager's Decision of May 7, 1963, the Sand Canyon Allotment contains 3,588 acres of public land. Of this land, approximately 50 acres near the western boundary have been isolated from the remainder of the allotment due to remnant small parcels of patented lands created by the Small Parcels Act of 1938³. Most of these private parcels are being developed for residential use.

³This act was repealed in 1976 with the passage of the Federal Land Policy and Management Act (FLPMA). These lands were patented before 1976.

Based on the 1963 boundaries, the Sand Canyon Allotment contains approximately 620 acres of patented land. Most of this land is located near the Carson River on the west and north sides of the allotment. Approximately 38 of private land acres are a part of the Anderson Estate, however the permittee controlled lands are separated from the public lands in the Sand Canyon Allotment by the previously mentioned remnant small parcels and other private properties.

C. Allotment Specific Objectives

1. Land Use Plan Objectives

All citations below are from the Reno MFP, issued in 1982.

- a. Allotments in the C category will be managed to prevent resource deterioration.
- b. A Herd Management plan will be developed in the Pine Nut HMA.
- c. 1982 Wild horse numbers will be adjusted as indicated through monitoring or as agreed to by consultation and coordination through a public process.

2. Reno Rangeland Program Summary (RPS) - released May, 1984

The Reno RPS showed no wild horses in the Sand Canyon Allotment. Consequently, no objectives were identified for wild horses.

- a. Grazing will be allowed on a nonrenewable basis for sheep at average of 190 AUMs.
- b. Manage to maintain current condition.
- c. Manage to maintain forage for present demand of wildlife. Eleven AUMs were identified as current demand.

3. Pine Nut Habitat Management Plan (HMP) - revised in 1987

Since the HMP did not identify reasonable numbers for wildlife nor any riparian areas in the Sand Canyon Allotment none of the objectives are pertinent.

D. Key Species Identification

1. Uplands

Based on their importance to livestock and wild horses, late seral perennial grasses are considered key species⁴. These include Indian ricegrass (*Oryzopsis hymenoides*), several species of needlegrass (*Stipa* sp), and in some ecological sites, bottlebrush squirrel-tail (*Sitanion hystrix*).

2. Riparian

Riparian vegetation is important to wildlife, wild horses, livestock and humans. Woody species include Fremont cottonwood (*Populus fremontii*), coyote willow (*Salix exigua*), Pacific tree willow (*Salix lasiandra*). Meadow species include creeping wildrye (*Elymus triticoides*), sedges (including *Carex nebrascensis*), rushes (including *Juncus balticus*), smooth horsetail (*Equisetum laevigatum*), Kentucky bluegrass (*Poa pratensis*). Although Russian olive (*Elaeagnus angustifolia*) is an introduced plant species, it provides cover to many small forms of wildlife such as songbirds. It is a trace species in the total species composition and appears to be increasing along several stretches of the river.

E. Threatened and Endangered Species

No threatened or endangered species have been identified in the Sand Canyon Allotment. No candidate plant species⁵ have been observed in the allotment. The only candidate animal species that may occur in the allotment include the loggerhead shrike (*Lanius ludovicianus*) and spotted bat (*Euderma maculatum*).

Since the loggerhead shrike is common throughout the Resource Area and occurs in a variety of habitats, the possibility that it may occur in the Sand Canyon Allotment is high. The shrike generally prefers open areas for hunting insects, and occasionally small vertebrates. They generally will select nesting sites, which include tall shrubs and trees, near their hunting areas. Based on this description, foraging habitat in the Sand Canyon Allotment would include sagebrush (*Artemisia* sp) dominated plant communities. Since these birds store their prey by impaling them on thorns, the presence of thorny shrubs would be an advantage. Anderson peach-brush (*Prunus andersonii*) is one such plant species found throughout the allotment.

The spotted bat spends daylight hours and reproduces in caves, cliffs and talus slopes. It generally feeds in the vicinity of juniper grasslands and tall sagebrush. All these habitats occur in the Sand Canyon Allotment.

⁴Refer to footnote 11, page 9, for a discussion.

⁵Candidate species include plants and animals on which the currently existing information indicates that listing may be warranted, but which substantial biological information to support a listing is lacking. BLM Manual 6840 requires that management be such as not to require listing of these species.

IV. MANAGEMENT EVALUATION

A. Actual Use

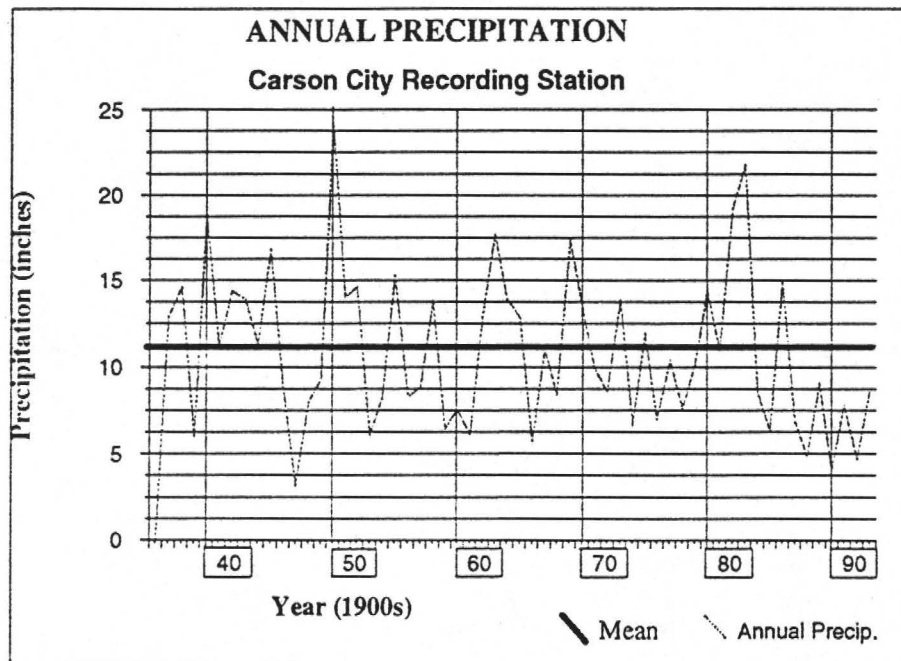
Authorized livestock use is shown below. All use is from cattle. Refer to page 10 for wild horse census data.

Year	AUMs	Use Period
1982	0	
1983	60	04/21/83 - 05/31/83
1984	60	04/01/84 - 05/15/84
1985	0 ¹	
1986	125	04/01/86 - 06/15/86
1987	100	04/01/87 - 06/15/87
1988	88	04/01/88 - 06/15/88
1989	89	04/01/89 - 06/15/89
1990	87	04/01/90 - 06/15/90
1991	0 ¹	
1992	0 ¹	
1993	0	

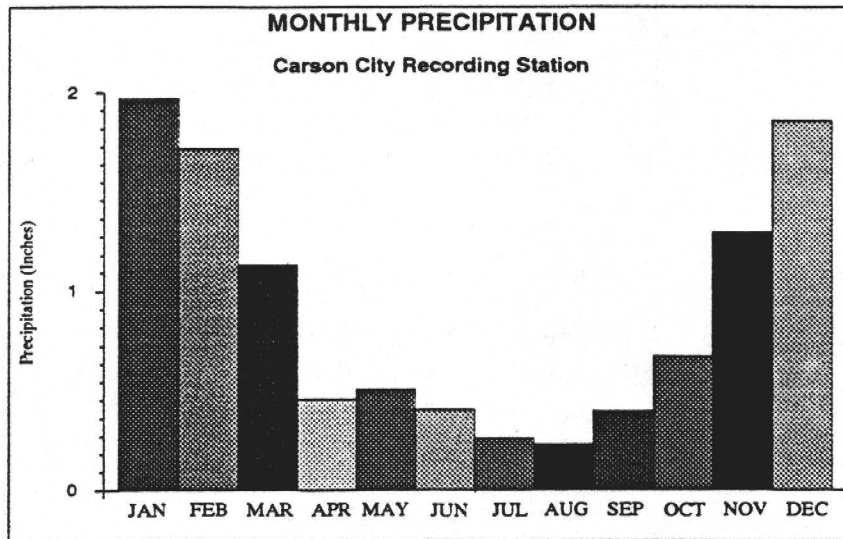
¹Although permittee was licensed, use supervision and use pattern mapping showed no cattle were grazed on public land during the authorized period.

B. Precipitation

The annual precipitation shown below is from Carson City, Nevada, which is the closest station with consistent and reliable data. It is located at 4,650 feet elevation. The fifty-seven year mean and median annual precipitation is calculated as 11 inches and 10.4 inches respectively.



Note that the Carson City recording station is at a lower elevation than some of the ecological sites in the allotment (refer to Appendix I). Due to the effects of orographic lifting⁶, sites at a higher elevation will have a higher annual precipitation than the Carson City Recording Station. Although the effect was documented throughout the state in the *Nevada Watershed Studies (1963 to 1980)*⁷, the closest recording sites had significantly different precipitation patterns than Sand Canyon Allotment. Therefore linear regression analysis of these studies probably would not be applicable. Below is the fifty-seven year mean monthly precipitation for the Carson City Station.



C. Utilization

Several years of use pattern mapping have been completed for Sand Canyon Allotment. Shown below is data from 1991 to 1993. Based on the presence of animal sign⁸ all use was from wild horses. "%" refers to percentage of allotment in the specific utilization class. The 1993 use mapping is shown on Map No. 3.

Date	Utilization Classes					
	No Use, Slight & Light		Moderate		Heavy and Severe	
	Acres	%	Acres	%	Acres	%
07/17/91	3,503	99	35	<1	0	0
10/26/92	2,535	72	84	34	160	5
10/14/93	3,451	98	87	2	0	0

⁶Orographic lifting: changes associated with the increase in elevation due to the presence of mountains.

⁷Houng-Ming Joung, John H. Trimmer, Richard Jewell (1983). BLM Nevada State Office Technical Publication BLMNVPT830014340

⁸Animal sign includes hoofprints, droppings, and the animal themselves.

Additional observations from the 1993 mapping are presented below.

1. Although wild horses have trailed to the Carson River, no use was found on riparian vegetation. Use shown near the Carson River is on perennial grasses in the big sagebrush (*Artemisia tridentata tridentata* and *A. t. wyomingensis*) dominated plant communities adjacent to the riparian communities.
2. Bottlebrush squirreltail was used as a key species over much of the allotment since it was the only perennial grass at large enough numbers to obtain an adequate sample.
3. A small basin in the higher portion of the allotment that showed moderate use had a good stand of needle-and-thread (*Stipa comata*) and Indian ricegrass. Both species were healthy with vigorous growth. The areas up slope were dominated by pinyon and juniper, which had very little perennial grasses in the understory.

D. Trend

A quadrat frequency study was established in the Sand Canyon Allotment in 1982. However, the witness posts and end stakes eventually disappeared. Since this is a "C" allotment with low priority compared to other grazing allotments in the Walker Resource Area, the study was never replaced⁹.

However, photo plots were established in the allotment in 1976 and photographs have been taken frequently since then (the most recent being 1993). Locations of the plots are shown on Map No. 2. Two photo points are recorded at least every three years: a close-up of a five-foot square plot and a wide angle photograph of the area in vicinity of the plot. Observations are summarized below. Note that the density of annual plant species can vary significantly from year to year due to fluctuation of seasonal precipitation. It is more important to observe the long term changes of perennial plant species.

1. Photo Plot No. 1. By 1980, the desert needlegrass (*Stipa speciosa*) in the vicinity of the plot had disappeared and the dead crowns were beginning to break down. The needlegrass appeared to have died out due to a buildup of dead material in the crowns rather than from overgrazing. Big sagebrush (*Artemisia tridentata*) has increased steadily since 1976. Antelope bitterbrush had vigorous leader growth in 1993. Many annual plants were observed in 1993, however this may be attributed to changes in seasonal precipitation and temperatures.
2. Photo Plot No. 2. By 1980, Indian ricegrass had completely disappeared from the plot. The size and number of pinyon and juniper trees on the distant hills has

⁹The Nevada Rangeland Monitoring Handbook (1984) states that "relocation of the [frequency study] baseline is of paramount importance" (page 28). The baseline could not be relocated using photographs and therefore would have needed to be reestablished. Although these procedures recommend that minimum monitoring data include frequency trend, it also states in relation to implementation and maintaining of monitoring: "budgetary constraints may preclude attaining this goal and necessitate setting priorities and concentrating efforts on allotments where management changes are needed and/or being implemented" (page 2).

increased since 1976. Big sagebrush, rabbitbrush (*Chrysothamnus* sp) and green ephedra (*Ephedra viridis*) has increased near the plot.

E. Ecological Status

In 1979, a vegetation inventory was completed in the Sand Canyon Allotment. Weight estimate data was collected on all species of grasses, forbs and shrubs to determine species composition of the existing plant communities (refer to Appendix I). Unfortunately, percent composition was not determined for tree species, even when they were listed as occurring on the site. Based on tree-line depicted on USGS 7.5 minute series maps¹⁰, timber covered approximately 44% of public land (1,564 acres) in the Sand Canyon Allotment in 1982 (i.e., three years after the survey). This would indicate that percent composition of tree species was an important aspect of existing plant community. Interestingly, the Carson City County Soil Survey, issued in 1979, did not recognize that any of the soils in Sand Canyon Allotment will support ecological sites with potential natural communities (PNCs)¹¹ dominated by pinyon-juniper.

F. Wildlife Habitat

Aside from the monitoring that has already been discussed, no additional monitoring has been conducted to determine specific aspects of change relative to wildlife habitat suitability. Relative to mule deer, availability of forage does not appear to be a limiting factor. Bitterbrush, a key forage species, which is represented throughout the allotment, has shown only light use over the last three years. This is based on personal observations.

¹⁰1987 Provisional Edition by United States Geological Survey. Information compiled from aerial photos taken in 1982.

¹¹Note that the Bureau currently uses concepts and terminology prescribed in the BLM Manual Handbook H-4410-1, *National Range Handbook* (NRH), released on 7/12/84. H-4410-1 definition of Potential Natural Community (PNC): "The biotic community (potential natural plant community and wild animal community) that would become established if all successional sequences were completed without interferences by man under the present environmental conditions". It is important to remember that the existing vegetation may be quite different from the PNC due to such factors as improper grazing, mechanical vegetative manipulation, etc. A plant community that has not achieved PNC is a seral plant community. If all plants were killed within an ecological site, the plant community that first appears would probably be composed of plant species very different from those in the PNC (probably annual grasses and forbs). This would be described as a early seral plant community. As the early seral plant species are replaced by plants found in the PNC (late seral plant species), the plant community undergoes a process referred to as plant succession. This includes four seral stages (early seral, mid seral, late seral, and finally, PNC). These stages are usually determined by the similarity of plant species to those found in the PNC (0-25% = early seral, 25-50% = mid seral, 50-75% = late seral, 75%-100% = PNC). The present state of vegetation in relation to PNC (i.e., the seral stage) is referred to as ecological status. Note that this is a very simplified explanation of a very complex process that is influenced by many factors. One of these influences is wild fires caused by lightning storms during the hot and dry periods of the year, which was a natural element in many plant communities prior to human influences. Therefore, the PNC for ecological sites that evolved under the presence of wild fires would be composed of fire tolerant plant species. Removal of this element (i.e., fire prevention) may cause the fire tolerant species to be replaced by more competitive fire sensitive species and the plant community would move away from PNC. Appendix III discusses this in relation to the pinyon - juniper plant communities.

G. Riparian Habitat

No perennial springs have been located in the Sand Canyon Allotment. Approximately 0.6 mile of the Carson River adjoins public land in the allotment. This river was evaluated in 1993 based on the definition of healthy and functioning riparian areas described in the *Riparian - Wetland Initiative for the 1990's*¹². Procedures were adapted from TR 1737-5 (*Riparian and Wetland Classification Review*) and TR 1737-9 (*Process for Assessing Proper Functioning Condition*). Riverine vegetation was stratified into channel and flood plain cross sections. Each of these cross sections contained several ecological sites in various seral stages, which were considered together in determining functionality.

In 1993, all plant communities along the portion of the Carson River adjoining public land were identified as in proper functioning condition except the streambank community, which was identified as functional, but at risk. The early seral wet meadow (ecological site 026XY003NV)¹³ should be closely observed. Due to the area's popularity as a fishing spot, trails due to excessive human foot traffic were forming on slopes immediately adjacent to the river. Although the plant community contained enough deep-rooted perennial plants in 1993 to maintain soil stability, these trails may eventually result in large areas of bare soil which would be susceptible to erosion during high water events.

H. Wild Horse Habitat and Numbers

Shown below is census data specific to the Sand Canyon Allotment.

Year	Wild Horse Numbers	AUMs
1989	20	240
1992	42	504
1993	10	120

Census and removal data available for the entire HMA is shown below (i.e., some data was not stored in a form where numbers could be tabulated for individual allotments).

¹²BLM, 1991. Pages 6 to 8.

¹³It is important to remember that seral stage does not determine whether a riparian area is healthy and functioning. BLM Technical Reference 1737-5 states: "Riparian health has been related to ecological site status in recent years. This is a dangerous and functionally impossible view of how riparian systems operate". This same idea was recognized in the *Riparian - Wetland Initiative for the 1990's*, which states (emphasis added): "The overall objective is to achieve an advanced ecological status, except where resource objectives, including proper functioning condition, would require an earlier successional stage."

Year	Numbers Counted during Census	Numbers removed during major Gathers
1984	664	235
1985		335
1986	273	233
1989	279	
1990	351	
1992	467	
1993	491	

V. CONCLUSIONS

The accomplishment of the objectives shown in Section III C (Page) are discussed below. Objectives have been grouped due to similarities.

A. Utilization Trend, and Condition

Allotments in the C category will be managed to prevent resource deterioration. Reno MFP

Manage to maintain current condition. Reno RPS

Based on observations of the two photo plots, trend is downward. Specifically, late seral perennial grasses are disappearing. Therefore the above objectives are not being meet.

This appears to be due to a build-up of dead material and lack of reproduction rather than over-utilization by wild horses or livestock. In the case of Photo Plot No. 2, this may also be due to shrub and tree competition. Based on the calculations in Appendix II, an equal division of forage would result in approximately 95 AUMs each for wild horses and livestock.

B. Authorizing Livestock Use.

Grazing allowed on nonrenewable basis for sheep at average of 190 AUMs. Reno RPS

The above objective was based on the assumption that cattle grazing would eventually be converted to sheep use due to the unfenced nature of the allotment. This is a reasonable assumption in light of the development of private lands on the western boundary. To keep the cattle on public lands, it would be necessary to initially construct approximately six miles of fence along the western boundary between the developed private lands and public lands (more fencing may be required later). Since this a low priority allotment with few AUMs available to livestock, it would not be economical for the Bureau or permittee to construct and maintain this fence.

C. Wild Horses

A Herd Management plan will be developed in the Pine Nut HMA. Reno MFP

1982 Wild horse numbers will be adjusted as indicated through monitoring or as agreed to by consultation and coordination through a public process. Reno MFP.

This evaluation is the first step in developing management direction for the Sand Canyon Allotment, including management of wild horses. Once evaluations for the allotments in the Pine Nut HMA have been submitted for public review, Multiple Use Decisions (MUDs) will be issued. The Wild Horse Management Decision portion of all the MUDs will then be incorporated into a herd management area plan for the Pine Nut HMA.

Wild horse numbers (i.e., the appropriate management level) will be established for the entire Pine Nut HMA and will be based on the stocking levels determined for all the allotments in the HMA. The stocking level reflects the amount of forage (AUMs) for wild horses as determined through monitoring; numbers are not important on an allotment basis. This concept recognizes the mandate that horses are to be managed within their herd areas in balance with their habitat. The stocking level as calculated in Appendix II is 95 AUMs.

However, forage does not seem to be a limiting factor for wild horses in this allotment. It is a reasonable assumption that conflicts between the expanding human population and wild horses will result before the wild horses have exceeded a thriving ecological balance with their environment. It must be acknowledged that the Bureau is required to remove wild horses when they graze on the adjacent private lands upon the request of private land owners (Title 43, Code of Federal Regulations, §4720.2-1).

Although the horses may drink from the Carson River, no adverse impacts to riparian vegetation or soil stability were observed in 1993.

D. Wildlife and Riparian Habitat

Manage to maintain forage for present demand of wildlife. Eleven AUMs were identified as current demand in 1984. Reno RPS

As stated in the Evaluation (Section IV.F), availability of forage is not considered a limiting factor for resident and wintering deer. Utilization of bitterbrush, a key mule deer forage species, has remained light over the past few years. Urban expansion in the nearby area and the associated increase in traffic, poses a more significant conflict for wildlife. It is believed that habitat fragmentation and the intensity of human use are the two primary factors affecting the usability of the habitat by wildlife.

All riparian habitat was identified as proper functioning condition except the wet meadow habitat immediately adjacent to the Carson River, which was identified as functional, but at risk. The main threat to this site was heavy human foot traffic along the river bank.

E. Threatened and Endangered Species

There are no threats to the loggerhead shrike and spotted bat posed by wild horses or livestock. Management of horses and cattle should result in no significant changes to the suitability of the shrike's habitat. The biggest threat would result from loss of open areas due to the increasing density of pinyon - juniper trees and increasing urbanization of the area. OHV traffic in April may impact nesting birds.

VI. TECHNICAL RECOMMENDATION

In determining long term and short term allotment objectives for the Sand Canyon Allotment, it must be realized that this is a developing urban area. As Carson City continues its expansion, the public lands in this allotment will become valuable as open space for residents. Therefore it is recommended that the Sand Canyon allotment be managed primarily for recreation and wildlife.

A. Short Term Objectives

- 1. The active livestock preference should be cancelled in the Sand Canyon Allotment. This would not preclude the occasional use of livestock for specific vegetative manipulation purposes (e.g., noxious weed control, trampling seed into the soil on barren areas, etc.).
- 2. Wild horses should be allowed to graze in the Sand Canyon Allotment under the following constraints:
 - a. Utilization shall not exceed the Allowable Use Level of 55%
 - b. No damage attributable to wild horses shall occur on riparian habitat along the Carson River.
 - c. Wild horses will be removed upon request in writing from private land owners in accordance to Title 43, Code of Federal Regulations, §4720.2-1.

Although the potential stocking level was calculated for wild horses at 95 AUMs, conflicts between wild horses and private land owners will probably occur before the wild horse population has exceeded the thriving ecological balance.

B. Long Term Objectives

Appendix I shows the plant communities that would have occurred without human intervention (i.e., the potential natural communities or PNC). However, management toward a PNC over the entire Sand Canyon Allotment may not be desirable nor support the concept of multiple use management. As an example, since pinyon and juniper woodland has potential economic, aesthetic, cultural and recreational values, it is important to manage for a long term ecosystem to include pinyon-juniper woodland. Based on the data analyzed in this evaluation, none of the soils in Sand Canyon Allotment would support a PNC dominated by pinyon and/or juniper. Of course Sand Canyon is only one of twelve allotments in the Pine Nut Mountain Range.

Therefore, it is recommended that a proposed landscape description be developed that will include a variety of plant communities. Management could then be directed to achieving the desired landscape. This should be done on a larger scale than individual allotments such on a mountain range and/or watershed basis. It will be important to include public input and may require a land use plan amendment.

As an aid to developing landscape goals, a review of current research relating to single-leaf pinyon and Utah juniper is presented in Appendix III.

APPENDIX I
SAND CANYON ALLOTMENT
ECOLOGICAL SITE INVENTORY

1 Ecological Site Number	2 Ecological Site Name	3 Potential Dominant Plant Species	4 Potential Yield (lb/ac)			5 Elevation Range (feet)	6 Ecolog- ical Status	7 Public Land Acres	8 % of Allot.
			Fav.	Nor.	Unf.				
026XY010NV	Loamy 10-12" P.Z.	STTH2, ARTRW, ELCI2, PUTR2	900	700	600	5500 - 6500	Late Seral	62	1.73
							Mid Seral	138	3.85
							Early Seral	990	27.59
SubTotal for Ecological Site =							1,190	33.17	
026XY015NV	Shallow Loam 10-12" P.Z.	STTH2, ARTRW, SIHY, ORHY	700	600	450	5000 - 6000	Early Seral	2,096	58.42
026XY016NV	Loamy 8-10" P.Z.	STTH2, ARTRW, SIHY, ORHY	800	600	400	4400 - 5500	Early Seral	218	6.08
026XY022NV	Stony shallow loam 8-10" P.Z.	STSP3, ARTRW, EPVI, SIHY	600	450	300	4500 - 5500	Early Seral	84	2.34

Total Public Land Acres = 3,588

Explanation of Data in Appendix I

Column Number	Description																								
1	Ecological Site Number. This number can be used to reference a site to the Soil Conservation Service Site Descriptions for Major Land Resource Area (MLRA) number 026. The data used in columns 2 to 5 are derived from these descriptions.																								
2	Ecological Site Name. "PZ" means Precipitation Zone and is measure in inches.																								
3	<p>Potential Dominant Plant Species. These are the major plant species found in the Potential Natural Community (PNC). Plant codes are identified below.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: left;">Plant Code</th> <th style="text-align: left;">Scientific Name</th> <th style="text-align: left;">Common Name</th> </tr> </thead> <tbody> <tr> <td>ARTRW</td> <td><i>Artemisia tridentata wyomingensis</i></td> <td>wyoming big sagebrush</td> </tr> <tr> <td>ELCI2</td> <td><i>Elymus cinereus</i></td> <td>basin wildrye</td> </tr> <tr> <td>EPVI</td> <td><i>Ephedra viridis</i></td> <td>green ephedra</td> </tr> <tr> <td>PUTR2</td> <td><i>Purshia tridentata</i></td> <td>Antelope bitterbrush</td> </tr> <tr> <td>SIHY</td> <td><i>Sitanion hystrix</i></td> <td>bottlebrush squirreltail</td> </tr> <tr> <td>STSP3</td> <td><i>Stipa speciosa</i></td> <td>desert needlegrass</td> </tr> <tr> <td>STTH2</td> <td><i>Stipa thurberiana</i></td> <td>Thurber needlegrass</td> </tr> </tbody> </table>	Plant Code	Scientific Name	Common Name	ARTRW	<i>Artemisia tridentata wyomingensis</i>	wyoming big sagebrush	ELCI2	<i>Elymus cinereus</i>	basin wildrye	EPVI	<i>Ephedra viridis</i>	green ephedra	PUTR2	<i>Purshia tridentata</i>	Antelope bitterbrush	SIHY	<i>Sitanion hystrix</i>	bottlebrush squirreltail	STSP3	<i>Stipa speciosa</i>	desert needlegrass	STTH2	<i>Stipa thurberiana</i>	Thurber needlegrass
Plant Code	Scientific Name	Common Name																							
ARTRW	<i>Artemisia tridentata wyomingensis</i>	wyoming big sagebrush																							
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STSP3	<i>Stipa speciosa</i>	desert needlegrass																							
STTH2	<i>Stipa thurberiana</i>	Thurber needlegrass																							
4	Yield, measured in pounds per acre. This is the amount of live matter that will be produced during a growing season. The three figures are for favorable, normal and unfavorable years.																								
5	Elevation range where the specific ecological site may be found																								
6	Ecological Status identified during the inventory.																								
7	Public land acres covered by the specific ecological site, dominant plant species, and ecological status.																								
8	Percentage of the allotment covered by the specific ecological site, dominant plant species, and ecological status.																								

Appendix II

Sand Canyon & Buckeye Allotments

Stocking Level Calculations

Shown below are the series of calculations used to derive the potential stocking level for wild horses and livestock in the Sand Canyon and Buckeye Allotments. Since wild horses continuously move from one allotment to the other in this portion of the HMA, the stocking levels are calculated together. Stocking levels are determined using the Potential Actual Use formula from BLM Technical Reference (TR) 4400-7, *Rangeland Monitoring Analysis, Interpretation, and Evaluation* (November, 1985), Appendix 2, pages 54 - 56:

$$\frac{\text{Actual Use (AUMs)}}{\text{Average Utilization (\%)}} = \frac{\text{Potential Actual Use (AUMs)}}{\text{Desired Average Utilization (\%)}}$$

The formula compares the percent *Average Utilization* (calculated in Sections A and B, below) to the *Actual Use* of the grazing animal(s) that resulted in that utilization (Section C). Based on this comparison, the *Potential Actual Use* necessary to achieve the *Desired Average Utilization* (Section D) can algebraically be determined (Section E). The potential actual use at the desired utilization level would be the desired stocking level for the Sand Canyon and Buckeye Allotments.

- A. Use Pattern Mapping Data. Acreages shown below are taken from the 1993 use pattern mapping. Although the "No Use" category is shown to account for the total acreage in the allotment, this acreage was not used in calculations relating to wild horses. Being free-roaming creatures of habit, the wild horses did not use these portions of the allotment due to topographical restrictions, fear of predation, and/or lack of forage due to dense pinyon-juniper overstory. Therefore, these areas are considered to be ungrazable by wild horses. Note that 50 acres has been isolated from the remainder of the allotment and therefore is not considered in these calculations (refer to "Acreage", page 3).

No livestock was authorized to graze in 1993, therefore all use is by wild horses.

Utilization Class	Class Mid-point (y)	Acres in Sand Canyon Allot. by Class (x ¹)	Acres in Buckeye Allot. by Class (x ²)	Total Acres by Class (x ¹ + x ²)	Weighted Acres (x ¹ + x ²) * y
Slight	10%	2,148	5914	8092	806.2
Light	30%	233	1006	1239	371.7
Moderate	50%	87	5468	5555	2777.5
Heavy	70%	0	396	396	237.6
Severe	90%	0	0	0	0
TOTALs		2,468	12784	15252	4193

- B. Average Utilization. The source for the weighted average formula used below is from the BLM Technical Reference TR 4400-7¹.

$$\text{Average Utilization} = \frac{\sum (\text{Acres per Util. Class} \times \text{Class Midpoint})}{\sum \text{Acres}}$$

$$\text{Average Utilization} = \frac{\sum(x * y)}{\sum(x)} = \frac{4.193}{15252} = 27.49\%$$

- C. Wild Horse Actual Use. 49 head of wild horses were counted in the Sand Canyon and Buckeye Allotments in 1993. Based on yearlong grazing, wild horse actual use for the allotment is calculated as follows:

$$49 \text{ wild horses} \times 12 \text{ months} = 588 \text{ AUMs}$$

- D. Desired Utilization in HMA. Since these calculations are based on yearlong use of the allotments (i.e., during critical growth periods of plant species) it is appropriate to use the yearlong AUL for perennial grasses (55%) shown in the *Nevada Rangeland Monitoring Handbook* (September, 1984), page 23. An equal division of forage between wild horses and livestock would result in the following desired use level:

$$\frac{55\% (\text{yearlong use level})}{2} = 27.5\%$$

- E. Potential Actual Use (AUMs) Calculation for Sand Canyon and Buckeye Allotments. The potential actual use (i.e., potential stocking level) of wild horses and livestock necessary to bring the average utilization to 55% is calculated below.

$$\begin{aligned} \frac{\text{Actual Use (AUMs)}}{\text{Average Utilization (\%)}} &= \frac{\text{Potential Actual Use (AUMs)}}{\text{Desired Average Utilization (\%)}} \\ \frac{588 \text{ AUMs (from C, above)}}{27.49\% \text{ (from B, above)}} &= \frac{\text{Potential Actual Use}}{27.5\% \text{ (from D, above)}} \\ 588 \text{ AUMs} &= \text{Potential Actual Use (Potential Stocking Level)} \end{aligned}$$

- F. Separating AUMs by Allotment. The AUMs are separated below based on acres grazed by wild horses as determined from use pattern mapping data (refer to Section A, page II -1)

$$\text{Potential Stocking Level (Section E)} \times \frac{\text{Acres grazed in Allotment}}{\text{Total acres grazed}} = \text{Allotment AUMs}$$

¹Rangeland Monitoring Analysis, Interpretation, and Evaluation (November, 1985) Appendix 1, page 52 & 53.

588 AUMs X $\frac{2,468 \text{ Acres (Sand Canyon Allot.)}}{15,252 \text{ Acres}}$ = 95 AUMs (Sand Canyon Allot.)

588 AUMs X $\frac{12,784 \text{ Acres (Buckeye Allotment)}}{15,252 \text{ Acres}}$ = 493 AUMs (Buckeye Allotment)

APPENDIX III

SINGLELEAF PINYON AND UTAH JUNIPER IN THE NORTHERN
PINE NUT MOUNTAINS OF NEVADA

In preparation for evaluations on several grazing allotments located in the northern Pine Nut Mountain Range of Nevada, it was necessary to review the current research relating to singleleaf pinyon pine (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*). This report is the culmination of that research.

I. Prehistorical and Historical Overview

A. Prehistory

Single-leaf pinyon pine migrated into the Great Basin between 5,000 to 7,000 years ago, when temperatures reach their maximum during the current (Holocene) epoch [Tausch, Wigand, and Burkhardt (1993)]. Very little documentation could be located when pinyon actually reached the Pine Nut Mountains. Utah juniper has existed in the vicinity much longer than pinyon. Research of a pack rat midden site in western Nevada showed that Utah juniper was present in every sampled stratum of the 30,000 years of the record for this site.

Young (1983) asserted that ecosystems currently dominated by pinyon and juniper evolved under episodes of periodic burning. These fires, which occurred at frequencies between ten and thirty years apart, would have restricted the trees to shallow, rocky soils in rough terrain. This idea is reflected in the climax plant community concept as it is used by the Soil Conservation Service to determine the differences in range sites and woodland suitability groups (Brackley, 1987). Wright et al (1979), on the otherhand, maintained that fire cannot be seperated from drought and competition with grasses as a controlling factor in the distribution of pinyon and junipers, especially junipers. This concept would support a more dynamic environment where trees would expand their distribution during wet years, but decrease their distribution during drought periods and/or period of increased fire activity.

Prior to the first settlers immigrating from the east, the native human population (Washoe Tribe) relied on pinyon nuts harvested in the Pine Nut Range as a major food source. Tribe members would camp in the mountains during the harvest season, removing cones from trees by flailing with long poles. More persistent cones were removed with a primitive 'hook' at the end of the flailing poles. Care was taken to avoid damaging trees during the harvest. Undergrowth was removed around the trees to aid in harvesting and to prevent the spreading of forest fires (Goodwin and Murchie, 1980). John C. Fremont contacted Washoe Tribe in 1844 near Topaz Lake in Antelope Valley, who harvested nuts from the southern

Pine Nut Range. The entry in Fremont's Journal from January 25, 1844 contains the following:

"These (the pinyon nuts) seemed to be a staple of the country, and whenever we met an Indian, his friendly salutation consisted of offering a few nuts to eat and trade..."

Although documentation exists to the importance of pine nut harvesting to the native population in the southern Pine Nut Range, very little information could be found of the importance of pinyon pine in the northern portion. Cultural Resource records at the Carson City District have very few prehistoric sites associated with the northern Pine Nuts.

B. Discovery of the Comstock Lode

With the discovery of the Comstock Lode, pinyon and juniper in the vicinity of Virginia City was harvested extensively for fuel, being almost depleted by the 1860s (Van Hooser and Casey, 1987). Once this occurred, wood was harvested from the Sierra Nevadas and probably, to a large degree, throughout the northern Pine Nut Range. The Pine Nut Mountains also supported the needs of communities such as Carson City (1851 to present), Dayton (1853 to present), and Como (1879 to 1881)¹.

A map of the "Washoe" region from 1862 (Paher, 1970, page 42) described the lower and mid fans south of Dayton as "Sage Lands". The northern Pine Nut Mountains were described as "Sparsely Timbered with Scrubby Pine & Cedar". Cadastral Survey plats from between 1861 and 1881 generally described the habitat in the vicinity of Sunrise Pass as "Mountains with Pine and Cedar Timber". Based on the surveyors notes and "Timber Line" drawn on the plats, stands of "Heavy Nut Pine Timber" was frequently interrupted by openings. Due to their location next to roads, some of these openings were presumably from timber harvesting.

Photographs from 1902 in the vicinity of Como (Paher, 1970, page 72) showed very few old pinyon and juniper trees, although young trees were visible. This could be the results of the harvesting during the mining boom.

C. Post Mining Boom

A twenty year depression between 1880 to 1900 resulted in a decline in population and mining activities (Pendleton et al, 1982), which in turn probably resulted in

¹Dates of communities from Pendleton et al, 1982.

a decline in wood harvesting in the northern Pine Nut Range. The heavy livestock grazing in the late 1800s and early twentieth century reduced grass competition and fuel for fires, resulting in an increase in pinyon and juniper.

II. Impacts of Pinyon - Juniper Overstory to Understory Plant Species

Effects on understory decline due to increasing singleleaf pinyon pine and Utah juniper cover was documented by Everett and Sharrow (1983). These effects include the following:

- A. The ability of pinyon to utilize soil moisture before many of the understory species breaks dormancy and the ability of the taproot to draw moisture at greater levels than most understory species gives an extreme competitive advantage.
- B. Duff accumulation inhibits the establishment of understory species.
- C. Shading and/or toxic influences reduces understory species.
- D. As pinyon - juniper cover increase, understory cover decreases as a whole.

Everett and Sharrow (1985) found in studies from west central Nevada that grass cover, yield and nutrient content increased substantially following single-leafed pinyon and Utah juniper harvesting on north and west facing aspects, but minimal response was observed on south aspects. Based on this, tree harvesting for the purpose of improving livestock forage should not be done on south aspects. They also concluded that nitrogen levels in grasses were adequate for livestock during the summer on tree-harvested sites, but nitrogen and phosphorus levels in grasses were inadequate for deer on both harvested and non-harvested sites. Of course, overstory removal would also result in an increase in forbs and shrubs. Transition zones near the edge of wooded areas produced the best quality and quantity of grass. Although this research was directed toward livestock production, the results should be directly applicable to habitat managed for wild horses and many species of wildlife.

Tausch, Nabi, and West (1977) monitored singleleaf pinyon and Utah juniper sites throughout the Great Basin. They noted that there appears to be four stages in the takeover of an understory. The first step is seedling establishment until trees are about the size of the largest shrubs. Trees may not be noticeable in this stage. The second stage is when the trees reach one to two meters (approx. 3 to 6 feet). At the end of this stage, about 1/3 or less of the understory productivity has been lost. The plant community is completely dominated by trees by the end of the third stage, and 2/3s to over 3/4s of the understory productivity has been lost. According to Tausch, Nabi and West, stage one was completed between 1860's and 1890's and stage two was completed

on more productive sites between 1940's and 1950's (this seems to concur with information under Section I of this report). They also state:

Much of the remainder of the Great Basin woodlands where invasion is taking place are moving into stage three and are now undergoing a rapid decline in understory productivity. By the year 2000, all but the more marginal sites of pinyon-juniper woodlands in the Great Basin will have lost most of their productive capability, if present trends continue. Tausch, Nabi and West (1977), page 29.

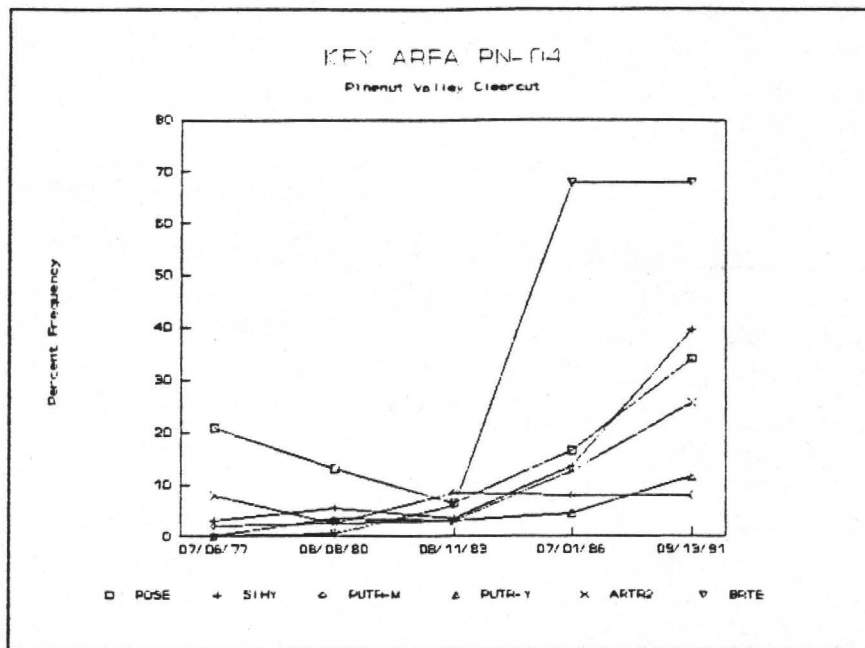
The effects of overstory removal in the Pine Nut Mountains was monitored on a 10 acre experimental pinyon - juniper clearcut done in 1977. Quadrat frequency study data was collected in accordance to procedures adapted from Tueller, etal (1972)². The results are shown in Table 1 and Figure 1. Note that the 1977 recording was done immediately prior to the cut.

Table 1--Major Plant Species at Key Area PN04 (Pinenut Valley Clearcut).

Plant Code	Common Name	Scientific Name
ARTR2	big sagebrush	<i>Artemisia tridentata</i>
BRTE	cheatgrass brome	<i>Bromus tectorum</i>
POSE	Sandberg bluegrass	<i>Poa secunda</i>
PUTR-M	antelope bitterbrush - mature	<i>Purshia tridentata</i>
PUTR-Y	antelope bitterbrush - young	<i>Purshia tridentata</i>
SIHY	bottlebrush squirreltail	<i>Sitanion hystrix</i>

Figure 1.--Frequency study results for Key Area PN04 (Pinenut Valley Clearcut).

²Procedures eventually included in BLM Technical Reference 4400-4 (Trend Studies) 1985, pages 29 - 35.



Note that the frequency initially declined or remained static on all species except mature bitterbrush. Based on Carson City and Yerington precipitation data, this coincides with a short drought between 1977 and 1979. After 1983 (a peak precipitation year), Sandberg bluegrass, bottlebrush squirreltail, big sagebrush and cheatgrass showed dramatic increases. Although mature bitterbrush frequency leveled out, young bitterbrush plants increase.

The beneficial effects of reduced overstory competition could be easily negated by improper management of wild horses and livestock. This is quite evident in quadrat frequency and key area utilization data from a chaining and seeding the Sunrise Allotment. Monitoring results showed that significant reductions in crested wheatgrass (*Agropyron cristata*, *A. desertorum*, or crosses) coincided with heavy and severe use levels due primarily to wild horses³.

III. Impacts of Fire on Pinyon - Juniper Community

Based on Wright, et al (1979), pinyon and juniper less than 4 feet in height were killed during spring fires when temperatures were 70 to 74° F. (21 to 23° C.), relative humidity of 20 to 40 percent and wind speeds were 10 to 20 miles/hour. June fires when temperatures were 97° F. resulted in 100 percent kill on trees less than 4 feet, but was no more effective in killing taller trees than the spring burn. Fine fuels in the understory (approximately 600 to 800 lbs/acre) are necessary to carry the fires, which means that the

³This is discussed in the Sunrise Allotment Evaluation completed by the Walker Resource Area on January 11, 1994.

reduced understory from dense stands of pinyon and juniper (495 to 988 trees / acre) may result in reduced tree kill. In this situation, winds greater than 35 mi/h would be required. The "White Pine County Formula" was developed to determine whether pinyon - juniper stands will burn or not:

$$\text{Index} = \text{Maximum wind (mi/hr)} + \text{Shrub and tree cover (\%)} + \text{Air temperature (°F.)}$$

An index higher than 110 will result in the fire being carried and large pinyon and juniper trees being killed. If the index is above 130, the conditions are too dangerous to burn. Pure stands of juniper are more difficult to kill than mixed stands of pinyon and juniper.

However, if fire prescriptions are developed for the northern Pine Nut Mountains, it is important to consider the impacts to other plant species. Tables 2 and 3 are summaries of fire effects on major plant species found in the Pine Nut Mountains. This data is based on information from Wright, et al (1979).

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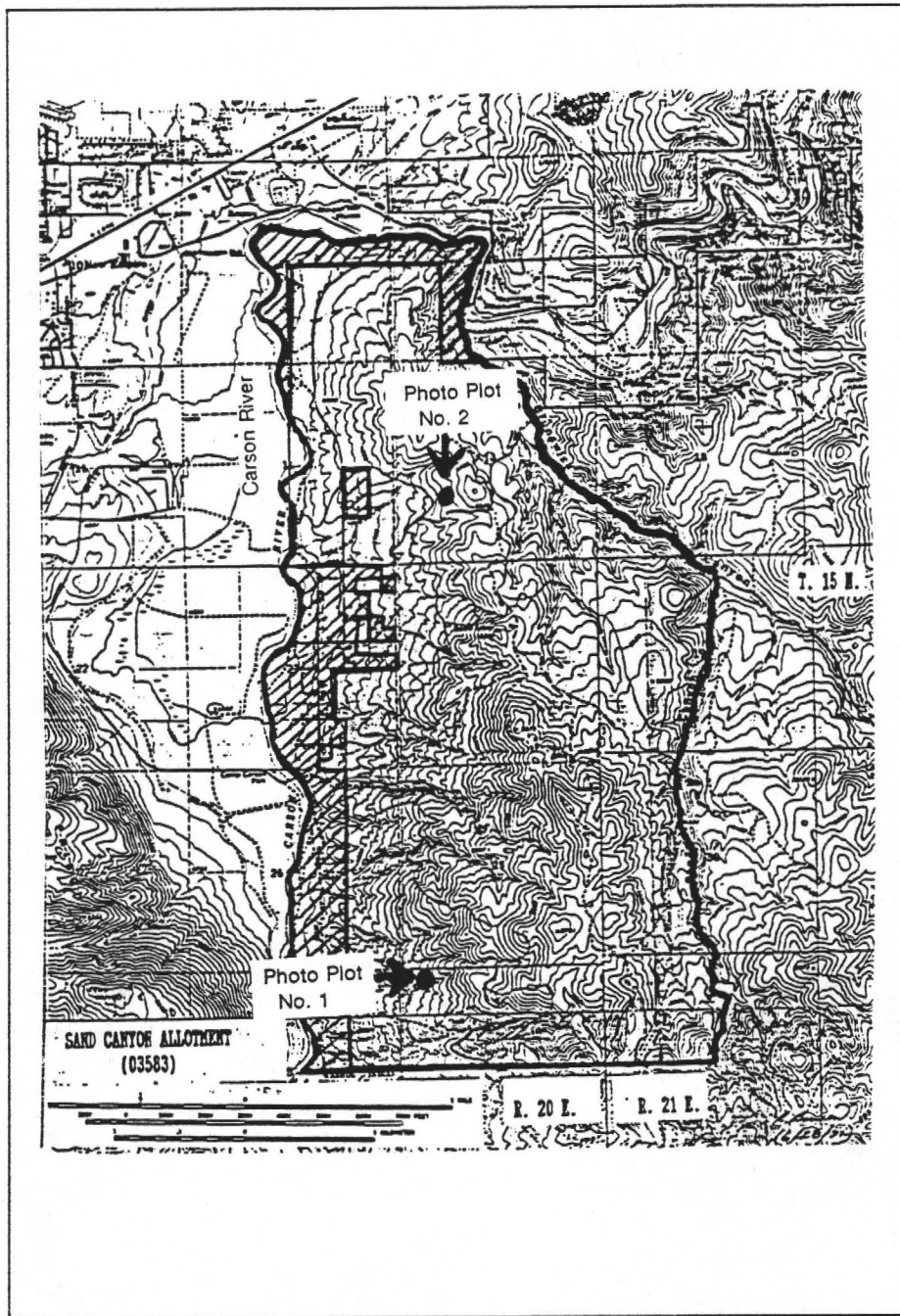
Table 2.--Summary of fire effects on major plant species found in the Northern Pine Nut Mountains of Nevada. Information contained in this table is from Wright, et al (1979).

Species	Sprouting Ability	Response to fire	Recovery Time (Years)	Remarks
SHRUBS				
Antelope bitterbrush (<i>Purshia tridentata</i>)	Weak Sprouter	Severely Damaged by summer and fall burns	30 - 40	Effect determined by growth form; decumbent form sprouts vigorously, columnar form is a weak sprouter. If plants sprout, they will recover in 9 to 10 years. Spring burns enhance sprouting but fall burns are best for reproduction from seed. Burn when soil is wet.
Big sagebrush (<i>Artemisia tridentata</i>)	Non-sprouter	Severely harmed	30	Good seed crop before burning hastens recovery. Effective control requires burning before seed-set.
Low sagebrush (<i>Artemisia arbuscula</i>)	Non-sprouter	Rarely burned.		May be used as a fuel break.
Rubber rabbitbrush (<i>Chrysothamnus nauseosus</i>) & Douglas rabbitbrush (<i>C. viscidiflora</i>)	Vigorous sprouter	Enhanced	20 - 25	May be killed if burned after heavy grazing or burned in early summer.
Horsebrush (<i>Tetradymia</i> sp)	Vigorous sprouter	Enhanced	30 - 35	Toxic, increases fivefold within 12 years.
Snowberry (<i>Symphoricarpos</i> sp)	Sprouter	Unharmed	10 - 15	Enhanced by cool fires but harmed by hot fires.
Curleaf mountain mahogany (<i>Cercocarpus ledifolius</i>)	Sprouter	Moderately harmed	Not available	More information is needed.
Serviceberry (<i>Amelanchier</i> sp)	Sprouter	Slightly harmed	30 - 50	Highly adaptable to fire; soil being moist at the time of the burn is important. Usually poor reproduction from seed.
Ocean-spray (<i>Holodiscus</i> sp)	Sprouter	Enhanced	20 - 30	
Rose (<i>Rosa</i> sp)	Sprouter	Enhanced	15 - 30	
GRASSES				
Nevada bluegrass (<i>Poa nevadensis</i>)	N/A	Slight damage	1 - 3	The bluegrasses are generally small plants and fire damage is minimal with late summer and fall burns.
Sandberg bluegrass (<i>Poa secunda</i>)		Undamaged	1 - 3	

Species	Response to Fire	Recovery Time (Years)	Remarks
GRASSES (Cont.)			
Cheatgrass (<i>Bromus tectorum</i>)	Undamaged	1	Any reduction to cheatgrass stands is usually short lived.
Indian ricegrass (<i>Oryzopsis hymenoides</i>)	Slight damage	2 - 4	Good resistance to burning but slow to increase in density.
Needle-and-thread (<i>Stipa conata</i>)	Severe damage	4 - 8	Needle grass are generally the least fire-resistant bunchgrasses. Large plants are damaged more than small plants. A 50 percent reduction in basal area should be anticipated among the various size plants in a given area.
Thurber needlegrass (<i>Stipa thurberana</i>)	Severe damage	4 - 8	
Bottlebrush squirreltail (<i>Sitanion hystrix</i>)	Slight damage	1 - 3	One of the most fire resistant bunchgrasses, although burning in a dry year can reduce basal area. Bottlebrush squirreltail can increase several years after burning.
Crested wheatgrass (<i>Agropyron cristata</i> , <i>A. desertorum</i> & crosses)	Undamaged	1 - 2	Wheatgrasses are difficult to burn in seeded monocultures.
Riparian wheatgrass (<i>Agropyron dasystachyum riparium</i>)	Undamaged	1 - 2	
Western wheatgrass (<i>Agropyron smithii</i>)	Undamaged	1 - 2	

Table 3.-- Response of forbs in Northern Pine Nut Mountain to fall burning. From Wright, et al (1979)

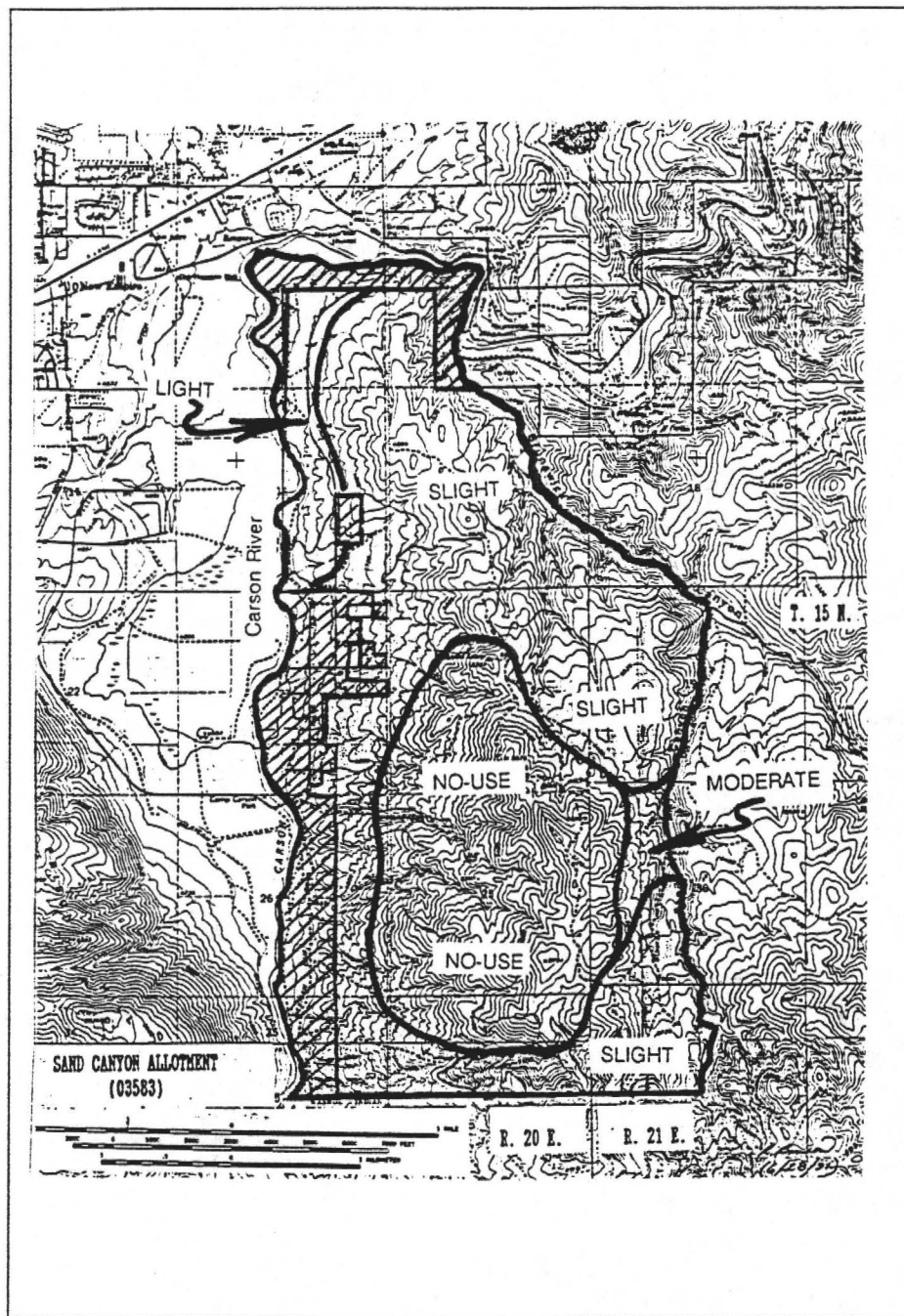
Severely Damaged	Slightly Damaged	Undamaged
None listed in Wright et al are found in Pine Nut Mountains	Milkvetches (<i>Astragalus</i> sp) Pinnate tansymustard (<i>Descurania pinnata</i>) Globemallows (<i>Sphaeralcea</i> sp) Tapertip hawkbeard (<i>Crepis acuminata</i>) Tumblemustard (<i>Sisymbrium altissimum</i>)	Arrowleaf balsamoroot (<i>Balsamorhiza sagittata</i>) Common sunflower (<i>Helianthus annuus</i>) Coyote tobacco (<i>Nicotiana attenuata</i>) Foothill deathcamas (<i>Zigadenus paniculatus</i>) Longleaf phlox (<i>Phlox longifolia</i>) Russian thistle (<i>Salsola kali</i>) Common yarrow (<i>Achillea millefolium</i>) Wild onion (<i>Allium</i> sp)



Map No. 2:
SAND CANYON ALLOTMENT

Scale 1 : 62,500

 Private Land



Map No. 3:
10/14/93 USE PATTERN MAPPING

Scale 1 : 62,500

 Private Land

**SAND CANYON ALLOTMENT EVALUATION
ERRATA AND ATTACHMENTS**

Insert the attached Sections VII and VIII after page 14. In the Table of Contents, insert the following under Section VI:

VII. CONSULTATIONS	15
VIII. MANAGEMENT ACTIONS SELECTED	17

VII. Consultations

On July 19, 1993, a letter was sent to persons and organizations that have shown interest in resource management in the Walker Resource Area. The purpose of the letter was to gather additional information and to determine who would be interested in participating in the evaluation process on nine allotments in the northern Pine Nut Mountain Range. Sand Canyon was among these allotments.

Sections I (Introduction) through VI (Technical Recommendations) of the Sand Canyon Allotment evaluation were sent out for public review on December 15, 1994. Fifteen copies were sent to the Nevada State Clearinghouse for distribution among state agencies. In addition, the following were sent copies of this evaluation.

Buckeye Ranch	Nevada Humane Societ
Nevada Wildlife Federation	The Wildlife Society
Natural Resources Defense Council	Sierra Club, Toiyabe Chapter
Carson City District Grazing Advisory Board	Nevada Cattlemen's Association
Resource Concepts Inc.	Nevada Woolgrowers Association
Rutgers University, S.I. Newhouse Center of Law and Justice	Washoe Tribe
The Honorable Barbara Vucanovich	Bureau of Indian Affairs, Western Nevada Agency
The Honorable Richard Bryan	L.I.F.E Foundation
Paul Clifford	The Honorable Harry M. Reid
Craig C. Downer	Nevada Humane Society
American Mustang and Burro Assoc.	Steven Fulstone
Animal Protection Institute	Edie Wilson
U.S. Fish and Wildlife Service, Reno Field Office	Humane Society of Southern Nevada
	D.A. Anderson Estate
	Wild Horse Organized Assistance

Comments were received by the Nevada Division of Wildlife (hence forth referred to as NDOW, or simply "the Division"), Commission for the Preservation of Wild Horses (hence forth referred to as "the Commission") and Wild Horse Organized Assistance (WHOA). Other comments that relate to the health of the land or address the evaluation of this health are discussed below.

Comment: This allotment is obviously a low priority and received considerable non-use by livestock in recent years. It is interesting to note the condition of bitterbrush during the summer and fall months. This may explain the better condition and vigor of bitterbrush on Sand Canyon Allotment compared to the adjacent Buckeye Allotment. (NDOW)

Response: It was noted on page 8 of this evaluation in reference to Photo Plot No. 1 that antelope bitterbrush had vigorous leader growth in 1993. Many annual plants were also observed in 1993, which would tend to show that site specific climatological factors were favorable in 1993. This may be the reason for the vigorous leader growth in 1993 (i.e., not necessarily non-use by livestock). An effect that can be

disappearance of needlegrass due to a buildup of dead material in the crowns. This may also be the reason for a lack of reproduction by perennial grasses and forbs. In order to prevent surface erosion, it may be necessary in the future to promote an increase of perennial grasses and forbs through the use of controlled livestock impacts.

Comment: Data presented in this document suggest that wild horses are not having any adverse impacts to public land. We do not agree with the procedures, assumptions and data that determined the appropriate management level in the Buckeye and Sand Canyon Allotment Evaluation. However, we do support the retirement of the grazing permit to avoid any potential conflict or over allocation of the available forage on this allotment. (Commission)

The comments from WHOA were essentially the same as the Commission's.

Response: The recommendation to cancel active preference was not based on a lack of forage. As Carson City continues to expand, the public lands will become much more valuable as open space for residents. Therefore it was recommended that the Sand Canyon Allotment be managed primarily for recreation and wildlife. Although the permit may be cancelled, this does not preclude the authorization of livestock on public lands. As illustrated in the previous response and as stated on page 13 of this evaluation, it may be necessary to graze livestock in order to accomplish environmental goals.

Similarly, forage may not be the limiting factor for wild horses in this portion of the HMA. Conflict between wild horses and private land owners will probably occur before the wild horse population has exceeded the thriving ecological balance. If these conflicts result in written complaints from the land owners, we are required to take action under the BLM regulations.

VIII. Management Actions Selected

Due to the necessity of implementing the wild horse decisions on a herd management area basis, only one PMUD will be issued for all nine allotment in the Pine Nut HMA.

All short term technical recommendations will be included within the Proposed Multiple Use Decision (PMUD). It was decided by the Carson City District staff that, because of the potential economic, aesthetic, cultural and recreational values associated with pinyon - juniper woodlands, the long term management of the woodlands in the Pine Nut Mountains should be addressed in the upcoming land use plan amendment. At the time of this writing, an amendment team had been formed and letters had been sent out to the public soliciting comments.

effective date of the Final Multiple Use Decision (1995). The reduction will be implemented as follows:

1995 From 552 AUMs to 386 AUMs

1997 From 386 AUMs to 220 AUMs

1999 From 220 AUMs to 54 AUMs

In accordance with §4110.3-2(c), 498 AUMs will be suspended.

B. In accordance with §4130.6-1(a), the authorized season of use will be changed from 5/16 - 7/31 to 11/1 - 3/31.

C. In accordance with §4110.3 and §4130.6-1(a), if sheep are grazed rather than cattle, the active preference for sheep will be initially established at 301 AUMs. This preference will remain in effect for five years, after which time a final active preference will be established based on additional monitoring data.

RATIONALE

Insufficient forage is available to provide 552 AUMs for livestock. The influence of pinyon-juniper woodlands severely restricts the areas that produce forage and are usable by cattle. The ability of these woodlands to out-compete other vegetation and intercept/utilize precipitation has resulted in declines of desirable forage for livestock, wild horses, and wildlife. In order to balance grazing with forage production, adjusting the livestock active preference was necessary.

The existing livestock authorized period of use occurs during the active growing season. Wild horse use also occurs throughout the active growing season. This concentration of use, coupled with the problems associated with the influence of the pinyon-juniper woodlands, has resulted in the loss of desirable forage.

Adjusting livestock numbers will, in part, begin to allow those areas that are usable an opportunity to recover. Use can be made by livestock during plant dormancy when they are least vulnerable. Snow, when available, will further help by providing the opportunity to distribute livestock.

SAND CANYON ALLOTMENT LIVESTOCK GRAZING MANAGEMENT DECISION

Decisions relating to the grazing of livestock on public lands in the Sand Canyon Allotment are as follows:

A. In accordance with §4110.3, the active livestock preference is cancelled.

B. In accordance with §4130.4-2, livestock grazing will be authorized on a temporary non-renewable basis.

C. In accordance with §4130.6-2, utilization shall not exceed the Allowable Use Level of 55%. This applies to livestock and wild horses.

RATIONALE

The area adjoining the allotment is a developing urban area. As Carson City continues to expand, the public lands will become valuable as open space for residents. It has become impractical as a cattle allotment.

However, it may be in the best interest of the public to use intensively managed livestock grazing as a tool in accomplishing specific environmental goals (e.g., noxious weed control, trampling seed into the soil on barren areas, stimulating decadent vegetation, etc.). Authorizing grazing use on a temporary non-renewable basis is at the discretion of the authorized officer. If the authorized officer determines that livestock grazing, as applied for, would not meet an objective(s), the application would not be authorized. If the authorized officer determines that a modification to the application would meet objective(s), use would be authorized accordingly.

SUNRISE ALLOTMENT LIVESTOCK GRAZING MANAGEMENT DECISION

Decisions relating to the grazing of livestock on public lands in the Sunrise Allotment are as follows:

A. In accordance with §4110.3-2(b) and §4130.6-1(a), the active preference for livestock will be adjusted from 1092 AUMs to 159 AUMs. In accordance with §4110.3-3(a) &(b), this reduction in active preference will be phased in over a five year period, beginning with the effective date of the Final Multiple Use Decision (1995). The reduction will be implemented as follows:

1995 From 1092 AUMs to 781 AUMs
1997 From 781 AUMs to 470 AUMs
1999 From 470 AUMs to 159 AUMs

In accordance with §4110.3-2(c), 933 AUMs will be suspended.

B. In accordance with §4130.6, the following terms and conditions will apply:

1. Specific areas within the allotment will be grazed for two weeks or less each year.
2. During most years, these two week grazing authorizations will occur between 3/15 - 6/15.
3. At the discretion of the authorized officer, grazing can occasionally be authorized after 6/30.
4. The allowable use level of 27.5% is established for use on perennial grasses and 22.5% on bitterbrush by livestock.
5. No livestock grazing will be authorized until utilization levels by wild horses are below the allowable use level for grasses and/or bitterbrush.



COMMISSION FOR THE
PRESERVATION OF WILD HORSES

255 W. Moana Lane

Suite 207A

Reno, Nevada 89509

February 10, 1995
(702) 688-2626

Mr. John Singlaub
District Manager
Carson City District
Bureau of Land Management
1535 Hot Springs Road
Carson City, Nevada 89706-0638

Subject: Sand Canyon Allotment Evaluation

Dear Mr. Singlaub:

The Commission for the Preservation of Wild Horses appreciates your consultation concerning the Pine Nut Wild Horse Herd. To avoid duplication, we refer you to previous comments concerning the Buckeye Allotment Evaluation and Pine Nut Wild Horse Herd Gather Plan.

Data presented in this document suggest that wild horses are not having any adverse impacts to public land. We do not agree with the procedures, assumptions and data that determined the appropriate management level in the Buckeye and Sand Canyon Allotment Evaluation. However, we do support the retirement of the grazing permit to avoid any potential conflict or over allocation of the available forage on this allotment.

Sincerely,

A handwritten signature in cursive script that reads "Catherine Barcomb".

Catherine Barcomb
Director

2/16/95

February 10, 1995

Mr. John Singlaub
District Manager
Carson City District
Bureau of Land Management
1535 Hot Springs Road
Carson City, Nevada 89706-0638

Subject: Sand Canyon Allotment Evaluation

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Data presented in this document suggest that wild horses are not having any adverse impacts to public land. We do not agree with the procedures, assumptions and data that determined the appropriate management level in the Buckeye and Sand Canyon Allotment Evaluation. However, we do support the retirement of the grazing permit to avoid any potential conflict or over allocation of the available forage on this allotment.

Sincerely,

DAWN Y. LAPPIN
Director