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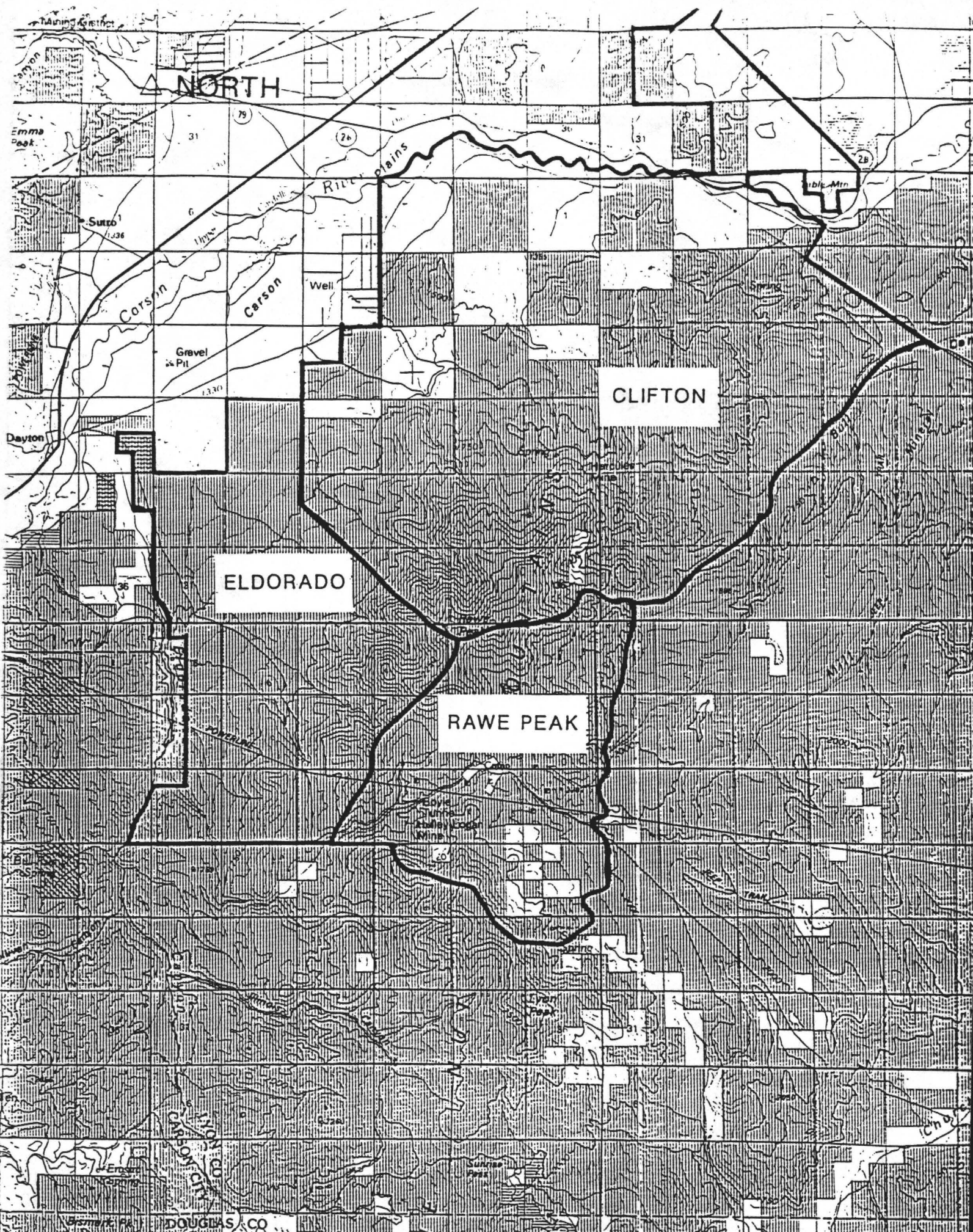
UNITED STATES  
DEPARTMENT OF INTERIOR  
BUREAU OF LAND MANAGEMENT

BUREAU OF LAND MANAGEMENT  
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**ELDORADO CANYON ALLOTMENT EVALUATION**

November, 1994





NORTH

CLIFTON

ELDORADO

RAWE PEAK

DOUGLAS CO



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## I. INTRODUCTION

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 Eldorado Canyon Allotment.

Specifically, the purpose of the allotment evaluation is to determine if current grazing practices are consistent with attainment of Land Use Plan (LUP) and allotment specific objectives. If current grazing practices are not consistent with attainment of these objectives, appropriate changes in management will be identified and implemented. The allotment is classified as category C. The evaluation period is from 1986 to 1993.

The Eldorado Canyon Allotment (03532) was placed in the "C"<sup>1</sup> category because sixty percent of the allotment has low production potential and thirty-eight percent has moderate potential, but is within an overstory of Pinyon-Juniper. Based upon information gathered in the late seventies, ninety-four percent of the acreage is classified as early seral and the remaining six percent is classified as unsuitable for grazing.

## II. INITIAL STOCKING LEVEL

### A. Livestock Use

#### 1. Preference (AUMs)

There is currently no adjudicated grazing preference.

#### 2. Other Information

The allotment is located approximately two miles southeast of Dayton, Nevada. It is bounded on the west by Eldorado Canyon, which is partially fenced, and on the east by Rawe Peak (northern end of the Pinenut Mountains). The northern boundary is partially fenced and separates public land from private land. The northeastern and eastern boundary is also partially fenced. The southern boundary is unfenced (Refer to Map No. 1, Appendix A).

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<sup>1</sup> "Custodial" - manage in a custodial capacity, while protecting existing resource values.

Public land within the allotment totals 10,261 acres. The allotment is rated at 100% public land. There are no fenced pastures.

In 1962, based on the 1961 Range Survey, 962 AUM's of grazing privileges for sheep use were adjudicated to Walter Herman. The season of use was 12/1 to 2/28 and 3/1 to 5/31. Between 1962 and 1967 nonuse was licensed to Herman. In 1968 privileges were leased to Stoddard Jacobsen for winter sheep use. No information concerning 1969 is available. In 1970 the allotment was leased to Borda Brothers. From 1971 to 1973 it was leased to Roberts Sheep Company. In 1974 Herman applied to reinstate his grazing permit. At this time he had leased his base property. A request was made to convert use from sheep to cattle. However, Mr. Herman had failed to apply for use for two consecutive years. Based upon this information, the Bureau rejected his application and closed the Herman file. Between 1975 and 1982 there is no record of authorized grazing. Temporary non-renewable use was authorized in the allotment in 1983, 1988, and 1990. Since 1990 no grazing use has been made.

Documented improvements within the allotment are:

<u>BLM Job Number</u>	<u>Name</u>	<u>Completion Date</u>
4281	Eldorado Spring #1	1972
6628	Nettle Spring Protection	1992
6602	Eldorado Canyon Fence	1993

Locations are shown on Map No. 2, Appendix A.

B. Wild Horse and Burro Use

1. Management Levels

The Reno Grazing Environmental Impact Statement (1982) and the Rangeland Program Summary, Reno Planning Area (1984), identified 228 AUMs as the existing demand for wild horses in the allotment. The Appropriate Management Level (AML) for the Pine Nut Herd Management Area (HMA) will be based on stocking levels for wild horses determined for all the allotments within the Herd Management Area. The stocking level for Eldorado Canyon Allotment will be determined through the analysis of monitoring data contained within this document.



2. Herd Management Area within the Allotment.

The Pine Nut Herd Management Area encompasses all public land within the allotment with the exception of a small parcel in the northwest corner. The allotment comprises ten percent of the total acreage contained within the Herd Management Area (Refer to Map No. 3, Appendix A).

C. Wildlife Use

1. Mule Deer (*Odocoileus hemionus*).

a. Existing Demand

Existing demand for mule deer taken from the Reno Grazing Environmental Impact Statement (1982) and the Rangeland Program Summary, Reno Planning Area (1984), was identified as 185 AUMs.

b. Key and Crucial Areas

A small segment of key mule deer winter range is located in the western portion of the allotment in the vicinity of Eldorado Canyon. The central portion of the allotment is identified as winter range. The higher elevations located in the southeastern portion of the allotment are classified as key summer range (Refer to Map 4 in Appendix A).

2. Wildlife - General

Upland and non-game wildlife occupy the allotment, though not in abundant numbers. Some of the more common furbearing species are coyote (*Canis latrans*), bobcat (*Felis rufus*), badger (*Taxidea taxus*), and the kit fox (*Vulpes macrotis*).

Upland game species include mountain cottontail (*Sylvilagus nuttallii*), desert cottontail (*Sylvilagus audubonii*), mourning dove (*Zenaidura macroura*), California quail (*Lophortyx californicus*), and chukar (*Alectoris chukar*).

Raptors include the prairie falcon (*Falco mexicanus*), red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*), and American kestrel (*Falco sparverius*).

Also present is a host of small mammals, birds, and reptiles.

### III. ALLOTMENT PROFILE

#### A. Description

##### 1. Topography

Elevations range from approximately 4377 feet to 7555 feet. This increase is gradual until reaching the base of the Pine Nut Mountains. A substantial portion of the allotment is alluvial fan. Surface rock is common, making overland travel by vehicle difficult to impossible with the exception of existing roads.

##### 2. Soils/Range Sites (For locations, Refer to Map No. 5, Appendix A)

Field work for the soil survey was done between 1968 and 1979. Statements in the document are based on information in 1980.

### ELDORADO ALLOTMENT LYON COUNTY SOIL SURVEY

<u>SMU<sup>2</sup></u>	<u>SOIL NAME</u>	<u>RANGE SITE</u>
242	DEVADA	CLAYPAN 10-12 PZ (26-23)
311	FULSTONE	CLAYPAN 8-10 PZ (26-25)
314	FULSTONE (4-15% SLOPES)	CLAYPAN 8-10 PZ (26-25)
372	HYLOC ISTER	LOAMY 12-14 PZ (26-05)
471	OPPIO	LOAMY 10-12 PZ (26-10)
	NOSRAC	LOAMY 12-14 PZ (26-05)
491	OTOMO	GRAVELLY LOAM 4-6 PZ (27-18)
441	LUNDER	CLAYPAN 10-12 PZ (26-23)
572	RENO	CLAYPAN 8-10 PZ (26-25)
831	ISTER	LOAMY 12-14 PZ (26-05)
	HYLOC LUNDER	CLAYPAN 10-12 PZ (26-23)
841	BRADSHAW	MAHOGANY SLOPE 14-18 PZ (26-09)
	HARTIG	LOAMY 12-14 PZ (26-05)

##### 3. Water Resources

The allotment contains four sources of water. Nettle's Spring, located in T 16 N, R 22 E (unsurveyed), was fenced in 1992. Eldorado Spring

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<sup>2</sup> SMU refers to Soil Mapping Unit.



#1, located in T 16 N, R 22 E (unsurveyed), was developed in 1972. Sheep troughs are still located at the site. A third water source, located in T 16 N, R 22 E (unsurveyed), was also developed for sheep and is not functional. A small pool of water is available and being heavily used. A reservoir, located in T 15 N, R 22 E, Section 16, NWNW, remains in good condition and holds water year-round in normal years (Refer to Map No. 6, Appendix A).

4. Vegetation

The allotment is split between two dominant vegetation types. The first occurs on the alluvial fan and is characterized by low sage (*Artemisia arbuscula*). Associated perennial grass species, which are scarce, are Thurber's needlegrass (*Stipa thurbianna*), squirreltail (*Sitanion hystrix*), Indian ricegrass (*Oryzopsis hymenoides*), Sandberg's bluegrass (*Poa secunda*), and scattered patches of galleta grass (*Hilaria jamesii*). Cheatgrass (*Bromus tectorum*) is common.

The second is a pinyon (*Pinus monophylla*) /juniper (*Juniperus osteosperma*) site. Pinyon is the dominant species. This occurs on uplands and more mountainous sections of the allotment. Associated species are low sage, squirreltail, Sandberg bluegrass, bitterbrush (*Purshia tridentata*), mountain mahogany (*Cercocarpus sp.*), and cheatgrass.

<u>TYPE</u>		<u>ACRES/PUBLIC DOMAIN</u>
4ARTR	Big Sagebrush	240
4ARAR	Low Sagebrush	6374
9PIMO	Pinyon	2101
7W	Unsuitable	1573
TOTALS		10288

This information is taken from the 1962 Range Survey. The official allotment acreage is now recognized at 10,261 acres.

5. Key Species

a. Uplands

No key areas have been established. Sporadic use of the

allotment has been made by domestic sheep with low sagebrush being their primary forage. Year-round use is made by wild horses. Grass species are primarily used by wild horses.

b. Riparian

Vegetation associated with the springs are composed of cottonwood (*Populus sp.*), willow (*Salix sp.*), rushes (*Juncus sp.*), wild rose (*Rosa sp.*) and sedges (*Carex sp.*). Watercress (*Nasturtium officinale*) is also present in the shady areas where overland flow occurs.

6. Threatened and Endangered Species

a. Vegetation

There are no threatened, endangered, or candidate plant species known to inhabit the allotment.

b. Wildlife

Category 2<sup>3</sup>, Candidate species, as defined by the U.S. Fish and Wildlife Service, that may occur in the allotment are the pygmy rabbit (*Brachylagus idahoensis*), spotted bat (*Euderma maculatum*), and the loggerhead shrike (*Lanius ludovicianus*). While they are not listed as threatened or endangered, in order to avoid further jeopardizing their existence, the Bureau treats candidate species the same as threatened or endangered. No other threatened, endangered, or sensitive animals are known to inhabit the allotment.

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 allotment is high. The shrike generally prefers open areas for hunting insects, and occasionally small vertebrates. They generally will select nesting sites, which includes tall shrubs and trees, near their hunting areas. Based on this description, foraging habitat in the allotment would include old burns. Since these birds store prey on thorns, the presence of thorny shrubs would be an advantage. Anderson peach-brush (*Prunus andersonii*) is one such plant species found

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<sup>3</sup>Category 2: Taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.



in the allotment.

The spotted bat spends daylight hours and reproduces in caves, cliffs and talus slopes. It generally feeds on flying insects in the vicinity of juniper grasslands and tall sagebrush. The pygmy rabbit reproduces and feeds in sagebrush/grasslands and riparian habitats. Since these habitats occur throughout the Pine Nut Range, there is a possibility that both species occur in the allotment.

## B. Allotment Specific Objectives

The objectives listed below were taken from the Reno Grazing Environmental Impact Statement (August, 1982), Management Framework Plan, Major Land Use Decision Summary and Environmental Impact Statement Record of Decision (December, 1982), Rangeland Program Summary, Reno Planning Area (May, 1984), Walker Resource Management Plan, Record of Decision (1986), and the Pine Nut-Markleeville Habitat Management Plan (Revised, 1987).

### 1. Livestock

- a. Provide for 600 AUMs of livestock use.
- b. Utilize the allotment occasionally to take pressure off of other allotments on a temporary non-renewable basis.
- c. Assure ecological condition does not decline. With the exception of wild horse use, maintain existing situation through custodial management. Allotments in Category C will receive such management as is necessary to prevent resource deterioration.

### 2. Wildlife

- a. Manage so that mule deer habitat does not decline. Manage big game habitat to fair or good condition to support big game populations. Improve bitterbrush production and seedling establishment within key deer winter range. Existing demand of 185 AUMs.
- b. Protect and improve riparian areas to good or better condition class with special emphasis on mule deer and sage grouse key areas by May 1989 within the Pine Nut Planning Unit.

3. Wild Horses

- a. Initially manage wild horses and burros in current herd use areas at present estimated population levels. Existing demand of 228 AUMs. The 1982 wild horse numbers will be adjusted as indicated through monitoring or as agreed to by consultation and coordination through a public process.
- b. Develop Herd Management Area Plan (HMAP) for the Pine Nut Herd Management Area.

4. Monitoring

- a. Continue rangeland and watershed monitoring to determine if management objectives are being met and what future adjustments in grazing use are necessary. Continue to monitor to ensure livestock, wild horses and mule deer use will not result in deterioration of ecological condition and vegetation production or create multiple-use resource conflicts.
- b. If monitoring programs indicate there are significant resource problems developing, the allotment could be redesignated as Category I.

IV. MANAGEMENT EVALUATION

A. Summary of Studies Data

1. Actual Use

a. Livestock

OPERATOR	NUMBER OF LIVESTOCK	TYPE OF LIVESTOCK	PERIOD OF USE	% PUBLIC LAND	AUMs
FIM, INC.	1650	SHEEP	4/18/88 to 5/19/88	100	347
FIM, INC.	1700	SHEEP	4/20/90 to 5/20/90	100	347

Use was confined to the alluvial fan and along Como Road.

These areas are easily accessible, along the trailing route for sheep, and within the service area of existing waters. No other livestock use has occurred during the evaluation period.

b. Wild Horses

Aerial census data was collected for the allotment in 1989, 1990, 1992, and 1993.

CENSUS YEAR	CENSUS DATES	TOTAL	AUMS
1989	9/6	49	588
1990	12/4 & 6	29	348
1992	7/23 & 24	8	96
1993	7/8 & 9	37	444

Use is concentrated in the open areas of the allotment, primarily the alluvial fan. Tree cover, steepness, and lack of diverse forage inhibit use of the southeastern and southern portion of the allotment.

c. Wildlife

The allotment is contained within Nevada Division of Wildlife (NDOW) Unit 291, Pinenut Range, Carson City, Douglas and Lyon Counties. Population estimates for this unit provided by Nevada Division of Wildlife is as follows:

1993	932 head
1992	1311 head
1990	942 head

Census information prior to 1990 was not available for Unit 291.

Allotment specific information provided by the Nevada Division of Wildlife for 1991 estimated 30 mule deer were year-round residents and an additional 50 mule deer were using the area during the winter. This equates to a total annual demand of 165 AUMs. Only this one year of allotment specific information was available.

## 2. Precipitation

Carson City, Nevada is the closest weather station to the allotment. It is located at 4650 feet elevation. Depending upon the path, intensity, and duration of storms, the Pine Nut Mountains and the Sierra Nevada's can influence precipitation amounts in the allotment. Therefore the data presented provides the reader with an idea of what may have occurred during the evaluation period. The higher elevations receive larger amounts of precipitation than what is recorded at the station. The fifty-seven year mean and median precipitation is calculated as 11 inches and 10.4 inches respectively.

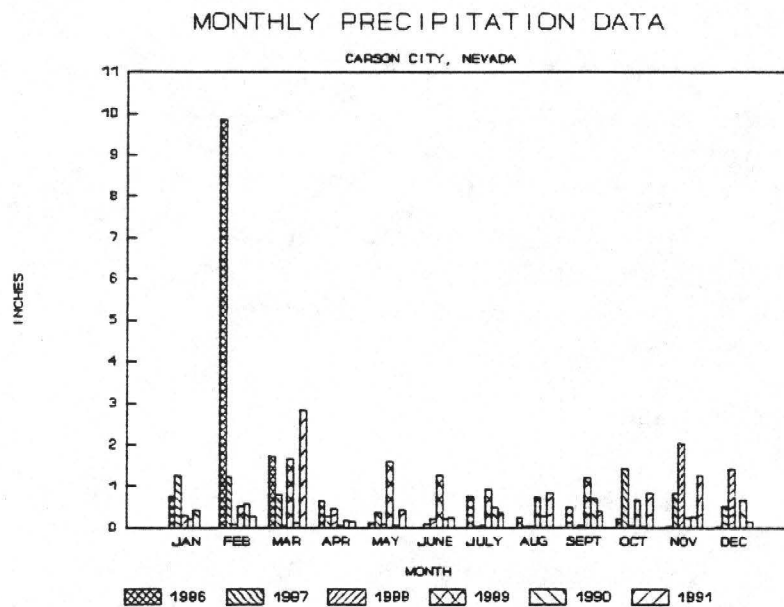
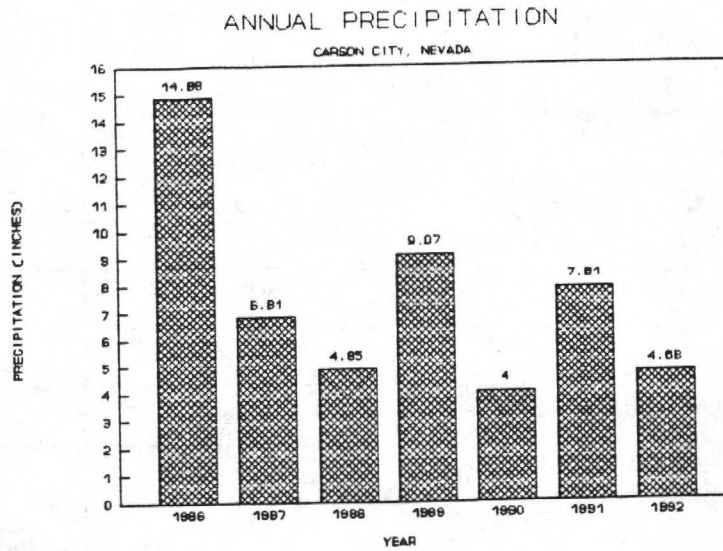


Figure 1 CARSON CITY WEATHER STATION (MONTHLY DATA)





**Figure 2 CARSON CITY WEATHER STATION (ANNUAL DATA)**

3. Use Pattern Mapping

Use pattern mapping data was gathered in the allotment four times during the evaluation period (Refer to Map Nos. 7-10, Appendix A). Data collected in 1988 and 1990 was for livestock use, however wild horse use occurred in these areas also. Use outside of the surveyed area was made by wild horses but was not measured.

Data collected in 1992 and 1993 was specific to wild horses, no livestock was made. Results are as follows:

	1988 LIVESTOCK	1990 LIVESTOCK	1992 WILD HORSES	1993 WILD HORSES
UTILIZATION CLASS				
SEVERE	560	280	0	49
HEAVY	690	1690	0	1156
MODERATE	1780	800	1250	2601
LIGHT	0	0	1660	2517
SLIGHT	0	330	2170	152
NO USE	7231	7161	5181	3786
TOTAL ACRES	10261	10261	10261	10261

As a result of terrain (steepness/rock), lack of desirable forage, and pinyon woodlands, the southeastern and a portion of the southern part of the allotment, totalling approximately 30% of the allotment, is not used or accessible by livestock or wild horses.

#### 4. Trend

Two photo trend plots are located within the allotment (Refer to Map No. 11, Appendix A). No trend plots are located in the steeper, more heavily tree covered areas of the allotment which is the key summer mule deer range.

Plot #1 - Photographs were taken in 1975, 1976, 1977, 1979, 1980, 1983, 1986, 1990, and 1993. Photo comparison within the plot reveals that the grass component is declining. Shrubs appear to have declined in vigor. The panoramic photo's give the appearance of pinyon encroachment.

Plot #2 - Photographs were taken in 1975, 1976, 1977, 1979, 1980, 1983, 1990, and 1993. Photo comparison within the plot reveals the grass and shrub components have declined slightly. The panoramic photo's give the appearance of pinyon encroachment.

5. Ecological Condition

Information provided in the Reno Grazing Environmental Impact Statement (1982) shows that 9,609 acres were in poor ecological condition ( this is synonymous to early seral classification) and 652 acres were unsuitable. Trend was identified as being downward.

ELDORADO - VEGETATION INVENTORY WRITE-UP SUMMARY (SVIM-1979)

<u>SWA NO.<sup>4</sup></u>	<u>RANGE SITE NO.</u>	<u>COND.CLASS</u>	<u>ACRES</u>	<u>CODE</u>	<u>ACRES</u>
X001	26-25	Poor	108		
X002	26-25	Poor	80		
X003	26-25	Poor	2174		
X004	26-25	Poor	345		
X005	26-25	Poor	21		
X006	26-25	Poor	399		
X007	26-25	Poor	1914		
X007	26-25	Poor	478		
X008	26-15	Poor	142		
X009	26-25	Poor	207		
X010	WOODLAND	Poor	187	RO <sup>5</sup>	21
X011	WOODLAND	Poor	431	RO	108
X012	WOODLAND	Poor	66		
X013	WOODLAND	Poor	2967	RO	523
X014	26-25	Poor	45		
X014	26-05	Poor	45		

6. Wildlife Habitat

Habitat condition rating for key winter and summer mule deer ranges has not been established for the allotment. Both of these areas have received no use from livestock. Wild horses tend to concentrate in the lower elevational areas away from woodland sites.

7. Riparian/Fisheries Habitat

There is no fisheries habitat in the allotment. Water sources, excluding the fencing around Nettle's spring, are classified as nonfunctional or functional-at risk. These classifications are based upon write-ups

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<sup>4</sup> SWA stands for Site Write-up Area. This is where the studies information was gathered.

<sup>5</sup> This stands for Rock Outcrop. These areas are unusable.

completed in 1993, using the criteria established in BLM Technical Reference 1737-9, **RIPARIAN AREA MANAGEMENT**, *Process for Assessing Proper Functioning Condition*, 1993. The potential exists for marked improvement. Uncontrolled use, specifically year-round use by wild horses, does not allow the sites an opportunity to recover.

8. Wild Horse and Burro Habitat

With the exception of a small area in the northwest corner of the allotment, the balance of the public land acreage is contained within the Pine Nut Herd Management Area (Refer to Map No. 3, Appendix A). Use by wild horses is spread throughout the accessible areas of the allotment. Concentration areas are located in the eastern portion of the allotment around the springs and in the extreme southern portion of the allotment.

V. CONCLUSIONS

A. Livestock

1. Provide for 600 AUMs of livestock use.

Livestock use during the spring of 1988 and 1990 averaged 347 AUMs. This allotment has experienced a floating number as far as the AUM figure is concerned. The 600 AUMs identified in the Rangeland Program Summary (RPS) was a target level. The RPS also showed an initial stocking level of 300 AUMs. The 1962 Range Survey identified 948 AUMs available for sheep. Mr. Herman was adjudicated 962 AUMs of use in 1962. Currently within the licensing procedures, a maximum of 400 AUMs is allowed. If the objective (600 AUMs) was to maximize livestock production, it could be said that the objective was not met. The true intent of the objective was to provide up to 600 AUMs on a temporary non-renewable basis, to occasionally take pressure off of other allotments. Therefore it is concluded that the objective was met.

2. The allotment will be used occasionally to take pressure off of other allotments on a temporary non-renewable basis.

Use in 1988 and 1990, on a temporary non-renewable basis, was authorized for the specific purpose of reducing pressure on another allotment. Use did not exceed the 600 AUM target level and the allotment remains unadjudicated.



This objective has been met.

3. Assure ecological condition does not decline. With the exception of wild horse use, maintain existing situation through custodial management. Allotments in Category C will receive such management as is necessary to prevent resource deterioration.

Custodial livestock management has been applied throughout the history of the allotment. As described under Section II. 2., minimal licensed use has occurred since 1962.

Ecological condition appears to be declining. Photo plot interpretation reveals that the likely trend is downward. Grass species seem to be declining in frequency. Shrub species appear to have declined in vigor. Three factors are contributing to this situation; 1) The extended dry period has affected plant production/health; 2) Year-round use by wild horses, particularly during the growing period, is keeping the grasses in a reduced state of vigor, and; 3) In the higher elevations of the allotment, pinyon has limited the amount and variety of other types of vegetation. Interception of precipitation and competition for sunlight/nutrients provide the trees an advantage over all other types of vegetation. Panoramic photo's taken of the areas surrounding the trend plots show that the understory vegetation is decreasing as the trees increase.

This portion of the objective has not been met.

#### B. Wildlife

1. Manage so that mule deer habitat does not decline. Manage big game habitat to fair or good condition to support big game populations. Improve bitterbrush production and seedling establishment within key deer winter range.

The discussion under 1.c. above points out problems that exist within the allotment pertaining to vegetative trend. The location of the photo trend plots is confined to the winter use area for mule deer in the allotment. The existing demand identified in the Land Use Plan was 185 AUMs. This was a target level identified for the purpose of future evaluation. Specific information dealing with mule deer numbers for the allotment identified in 1991 that approximately 165 AUMs are being harvested annually. This equates to 89% of the target level.

It was pointed out earlier that Habitat Rating Conditions for key mule deer summer and winter range contained within the allotment has never been established. Based upon observations in the key summer use area of this allotment and the adjacent Rawe Peak allotment, it is reasonable to say that adequate habitat doesn't exist to support a healthy population of deer during the period of use. This situation cannot be attributed to livestock grazing. Since the adjudication of grazing privileges in 1962, use has been essentially non-existent. Wild horses continue to concentrate on the alluvial fan which includes the winter use area. This continual use has led to declines in the grass component and surely resulted in increased pressure on shrub species. The majority of the mule deer key summer area is primarily woodlands. A small amount of key winter range exists.

Range sites that contain bitterbrush as a minor/major component of the vegetative production (community) are located primarily in the higher elevations of the allotment and associated draws within the lower elevational areas of the allotment. The appearance of the mature plants reveal that they are not being adversely impacted by livestock or wild horses. The lack of young plants is a concern. Observations over the years point to the fact that wild horses seldom utilize bitterbrush. Sheep use has been confined to the alluvial fan in proximity to waters. The encroachment of pinyon is the major threat to bitterbrush production and ultimately survival.

Practices that have been in place for years seem to present the following problems:

- a. The age grouping and diversity of bitterbrush is very poor.
- b. The vigor of the plants present, in many instances is poor.
- c. The density/frequency of plants is erratic.
- d. There is a discernible lack of seedlings.
- e. Fuel loading in the mule deer key summer range is of concern. The potential exists for a "hot" fire. This would result in a loss of almost all vegetation.

Practices that have been in place for years seem to have derived the following benefits:

- a. Livestock use has not been authorized on an annual basis but only on an occasional temporary non-renewable basis.
- b. Fire suppression activities have prevented the loss of vegetation ("hot fire").
- c. The existing density of woodlands provides an abundance of hiding/escape/thermal cover.

Practices that could be implemented that would benefit the allotment are:

- a. Woodland management through periodic prescribed burning.
- b. Some limited opportunity exists for woodcutting and Christmas tree harvesting.
- c. Cutting of trees, with stacking of limbs, to open areas for more diverse vegetative production. This would provide habitat/escape cover for small mammals and birds.

This portion of the objective is not being met.

The extreme western edge of the allotment in the vicinity of Eldorado Canyon contains a minute amount of key winter range. This area is not being impacted at all by livestock or wild horses. Based on professional judgement, the area rates in fair condition.

This portion of the objective is being met.

2. Protect and improve riparian areas to good or better condition class with special emphasis on mule deer and sage grouse key areas by may 1989 within the Pine Nut Planning Unit.

The unfenced spring sources are being adversely impacted, primarily by wild horses. Bare ground dominates the area directly around the waters. Riparian vegetation is being used at a severe level. The riparian area to the west of Nettle's spring lacks diversity in vegetation, essentially with only mature cottonwood and willow being present. No reproduction is occurring. It has been classified as non-functional. Invasion of rabbitbrush (*Chrysothamnus nauseosus*) surrounding this source is a major problem. A pocket of pinyon surrounds the area and

is encroaching on the source.

The water source located below Nettle's spring has been classified as functional at risk. Approximately 70 linear feet, influenced by flowing water, is open to grazing and being used at a severe level. Above and below this area, riparian vegetation is in very good condition. A diverse composition of species is present and there is a good mix of vertical/horizontal cover.

This portion of the objective is not being met.

In addition to the above objectives, there are no known threats to the loggerhead shrike and spotted bat posed by wild horses or livestock. Management of horses and livestock should result in no significant changes to the suitability of either of these animal's habitat. The greatest threat would result from the loss of open areas due to the increasing density of pinyon-juniper trees. Negative impacts to riparian areas may have a detrimental impact to the pygmy rabbits. Vehicular traffic in April may impact nesting shrikes.

#### C. Wild Horses

1. Initially manage wild horses and burros in current herd use areas at present estimate population levels. Existing demand of 228 AUMs. The 1982 wild horse numbers will be adjusted as indicated through monitoring or as agreed to by consultation and coordination through a public process.

This evaluation is the first step in developing management direction for the allotment, including management of wild horses. Once evaluations for all 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 relevant 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 existing demand identified in the Rangeland Program Summary was 228 AUMs. This was based upon the number of wild horses present in the allotment at the time of the Land Use Plan. It provided a target level which could be used for future analysis.

Wild horses in the allotment are year-round residents. Therefore, AUMs are computed for the entire year and are based on census data gathered during the evaluation period:

Year	Adults	AUMs
1989	49	588
1990	29	348
1992	8	96
1993	37	444
Averages	31	369

Poor resource condition, downward trend, and continuous year-round use points out that modification of current numbers is necessary to provide a stable habitat for all use within the allotment. The objective is outdated.

The objective will be modified, in the Technical Recommendations, to reflect current conditions, horses.

2. Develop Herd Management Area Plan (HMAP) for the Pine Nut Herd Management Area.

Evaluations are being completed on all allotments containing the Pine Nut Herd Management Area. This is the first step in the process that will ultimately result in the development of the Pine Nut Herd Management Plan.

This will move toward meeting this objective.

D. Monitoring

1. Continue rangeland and watershed monitoring to determine if management objectives are being met and what future

adjustments in grazing use are necessary. Continue to monitor to ensure livestock, wild horses and mule deer use will not result in deterioration of ecological condition and vegetation production or create multiple-use resource conflicts.

Studies, due to Custodial classification, have been limited. Aerial census of wild horses, actual use for livestock, use pattern mapping, and continuance of recording changes at the photo trend plots have all been completed during the evaluation period. Functionality of riparian areas (springs) has also been evaluated. All of this information has identified a need for change in the current situation. These changes are discussed in depth in the Technical Recommendations section.

The objective has been met.

2. If monitoring indicates there are significant resource problems developing, the allotment could be reclassified as Category I.

Problems associated with the allotment will not be alleviated more rapidly or in a different manner from that being recommended under Section VI. with an "I" classification.

## VI. TECHNICAL RECOMMENDATIONS

### A. Potential Stocking Level

Normally, the 55% allowable use level for yearlong grazing of perennial grasses and grasslike plants is considered desirable. Proper Use is a degree of utilization of current years growth which, if continued, will maintain or improve the long term productivity of the site. Proper use varies with season, the ecological site, the physiological requirement of the plant species, and other factors. In monitoring degrees of utilization, the primary concern is the trend in the plant community resulting from various levels of use.

Bureau policy states that " Wild horses and burros shall be managed as self-sustaining populations of healthy animals in balance with other uses and the productive capacity of their habitat."

The Strategic Plan for the Management of Wild Horses and Burros on Public Lands (1992) established an action plan that includes; "Determine through resource management planning process what the appropriate mix of competing forage consumers will be." It further states that the Bureau is to "Develop criteria to establish initial Appropriate Management Levels through the land use

plan process. Consider existing inventory and monitoring data and resource conflicts in the development of reasonable alternatives to be analyzed and proposed in the Resource Management Plan. One or more of the alternatives must have the objective of arriving at a natural thriving ecological balance."

This evaluation reaches the conclusion that ecological condition appears to be in a downward trend. Grass species appear to be declining in frequency. Browse species are showing signs of stress by their apparent reduction in size. These circumstances are the result of the continuing below average annual precipitation and year-round use by wild horses. Of major concern is the continuance of grazing during the plants critical growth period, particularly spring use. The period of growth for all plant species in the allotment begins in March and can continue, depending on climatic conditions, to July. The effectiveness of the amount of moisture received can be enhanced but obviously there is no control over the amount of precipitation received during any given year.

Observations in Eldorado Canyon and adjacent allotments show that wild horses are consuming plant species that normally would not be included in their diet. These include annual mustard, rabbitbrush, and low sage. A thriving ecological balance does not exist. In order to provide an opportunity for the plants, particularly grass species, to maintain/improve in vigor, reproduce, and allow seedlings to become established in the plant community, steps must be implemented to reverse the existing trend.

**It is recommended that:**

1. **The objective identifying 600 AUMs of use by livestock will no longer be applicable.**
2. **The option to graze livestock will not be eliminated. Use will be authorized on a temporary non-renewable basis. Livestock use will be authorized in the allotment to take pressure off of or supplement use from other allotments.**
3. **The authorization will be limited to sheep.**
4. **The authorized season of use will be from 11/1 to 2/28.**
5. **The potential stocking level for wild horses be established at 270 AUMs (541 divided by 2 = 270; Refer to Appendix D for Calculations).**

Wild horse census data has shown the allotment received an average of 460

AUMs of use. This figure excludes the 1992 data. Factoring in the 1992 data, an average of 369 AUMs have been harvested. The below average precipitation coupled with continual grazing during the critical growth period has contributed to the apparent downward trend. The extent of spring grazing by wild horses can be partially controlled. By allocating 270 AUMs to wild horses, the ecological condition of the allotment will have the opportunity of improving and a balance between wild horses and their habitat will have the chance of being achieved. This is allocating wild horses 50% of the total forage that is available.

The potential for the majority of allotment has been recognized to be low. Considering the current trend, irregardless of the potential, it is important to preserve the existing condition to the greatest extent possible. Although the allotment remains unadjudicated, livestock can be used as a tool for the objective of creating a larger and more diverse grass/forb component within the vegetative community. Specifically, herding sheep in a concentrated group and holding them in an area for an extended period of time can impact the shrub community in two ways. Hoof action will disturb the soil surface and break up branches of the shrubs bringing them in contact with the soil surface. Substantial removal of vegetative growth will create stress on the shrub community. The combination of these actions can ultimately result in a situation that will favor the establishment of grasses and forbs by reducing competition. This type of landscape will favor not only wild horses but also wildlife by creating a greater plant diversity. Contrastingly, by exercising open herding techniques, and maintaining some semblance of ground disturbance, management would be geared toward favoring shrubs.

#### B. Riparian

A check of water rights identified that two valid Proofs of Appropriation, 01757 and 01758, exist. They were issued for the purpose of stockwatering. All other applications dealing with these sources were either denied or withdrawn. A chain of title was established to these Proofs to Walter E. Herman, and wife, contained in deeds filed on 2/23/55. The names and legal descriptions for the springs are as follows:

Fiddlers Green Spring No. 1	T 16 N, R 22 E, Section 29, NESE
Fiddlers Green Spring No. 2	T 16 N, R 22 E, Section 29, SWSE

Since the Beneficial Use for which the Proofs were authorized is no longer valid, it is recommended that the Bureau obtain water rights for these sources. An additional source, which had no documentation of water rights, should also be included. This would allow the Bureau to complete fencing of these sources and pipe water outside of the proposed exclosures. This is the only reasonable

means to provide these areas the opportunity to recover because of continuous pressure from wild horses.

C. Pinyon/Juniper Woodlands

Pinyon-juniper woodlands reaches its greatest development on mesas, plateaus, piedmonts, slopes and ridges from 3200 to 8400 feet. Precipitation ranges from 10-25 inches annually. Throughout most of Nevada, singleleaf pinyon dominates, along with Utah and western juniper.

The competitive ability of pinyon-juniper trees gradually reduces shrubs, grasses, and forbs on many sites that are left undisturbed (Tausch and Tueller 1977).

Upland sites of the allotment are not as productive, in both plant and animal life, as they could be. This is also a developing problem in the vicinity of the springs.

Bitterbrush, a key species for mule deer, is gradually being crowded out of the community. Moisture interception and prevention of water infiltration into the soil are resulting in loss of existing riparian habitat (vegetation and water).

Fire hazard potential continues to increase. Increasing fuel build-up is providing the opportunity for a devastating wildland fire.

Based on the data analyzed in this evaluation, an ecosystem without human intervention would have probably resulted in a potential natural plant community of approximately 12% pinyon-juniper/aspen woodland. Instead, as determined in this evaluation and during preliminary research, human activities including fire suppression have resulted in 43% P-J dominated plant communities. This, in turn, has resulted in a significant, adverse effect on biological diversity and therefore on wildlife, wild horse and livestock habitat. Therefore, a definite opportunity exists in the Eldorado allotment for habitat improvement.

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.

**Therefore, it is recommended that long term management in the Eldorado allotment be directed toward achieving an ecosystem containing a natural balance of pinyon-juniper woodland, and other ecological sites.**



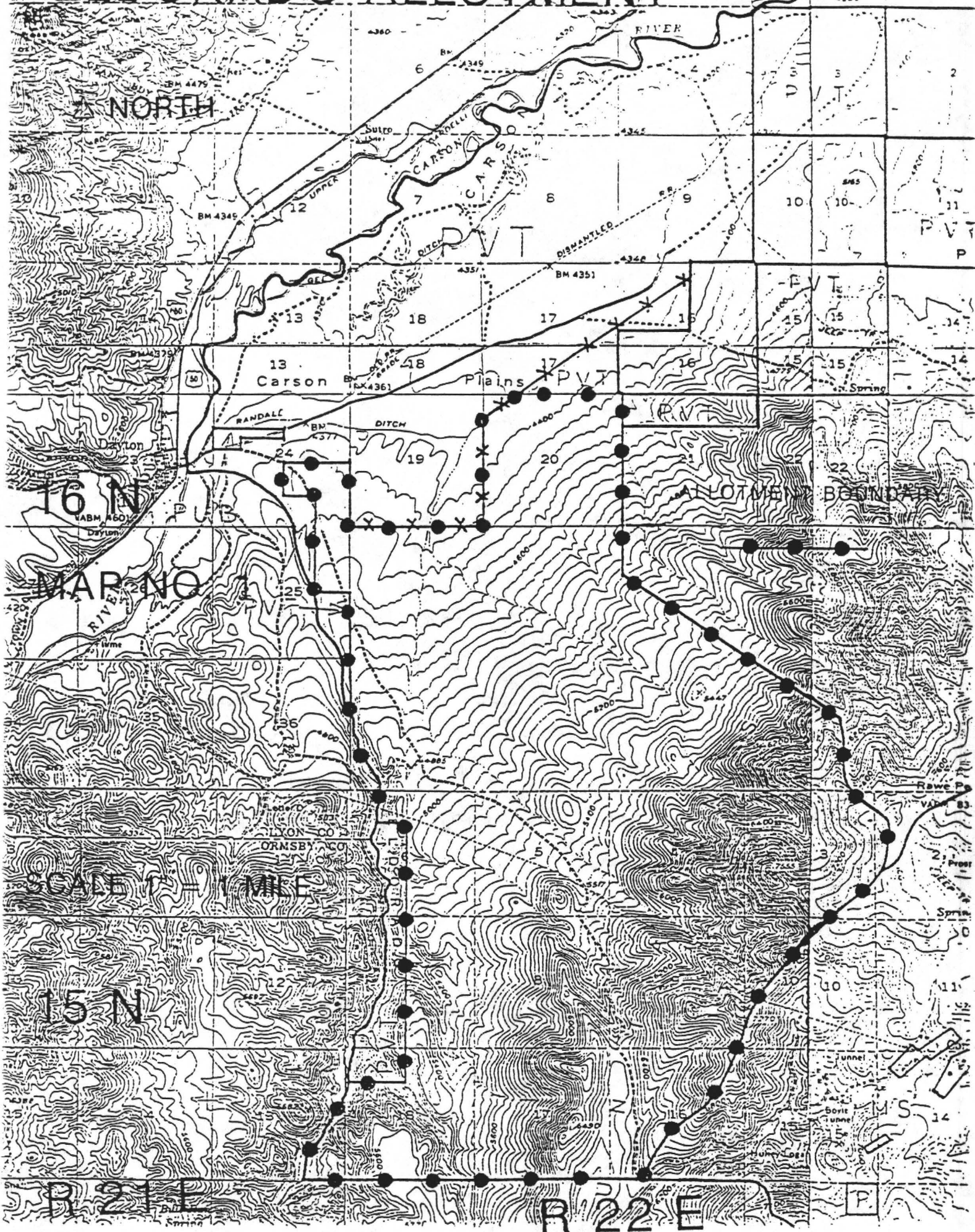
## APPENDIX A

### MAP NUMBER

### MAP NAME

MAP NO. 1	GENERAL ALLOTMENT MAP
MAP NO. 2	EXISTING RANGE IMPROVEMENTS
MAP NO. 3	PINE NUT HERD MANAGEMENT AREA
MAP NO. 4	MULE DEER RANGES
MAP NO. 5	RANGE SITES
MAP NO. 6	EXISTING WATER LOCATIONS
MAP NO. 7	1993 WILD HORSE USE PATTERN MAPPING
MAP NO. 8	1992 WILD HORSE USE PATTERN MAPPING
MAP NO. 9	1990 SHEEP USE PATTERN MAPPING
MAP NO. 10	1988 SHEEP USE PATTERN MAPPING
MAP NO. 11	PHOTO TREND PLOT LOCATIONS

# ELDORADO ALLOTMENT



NORTH

16 N

MAP NO

SCALE 1" = 1 MILE

15 N

R 21 E

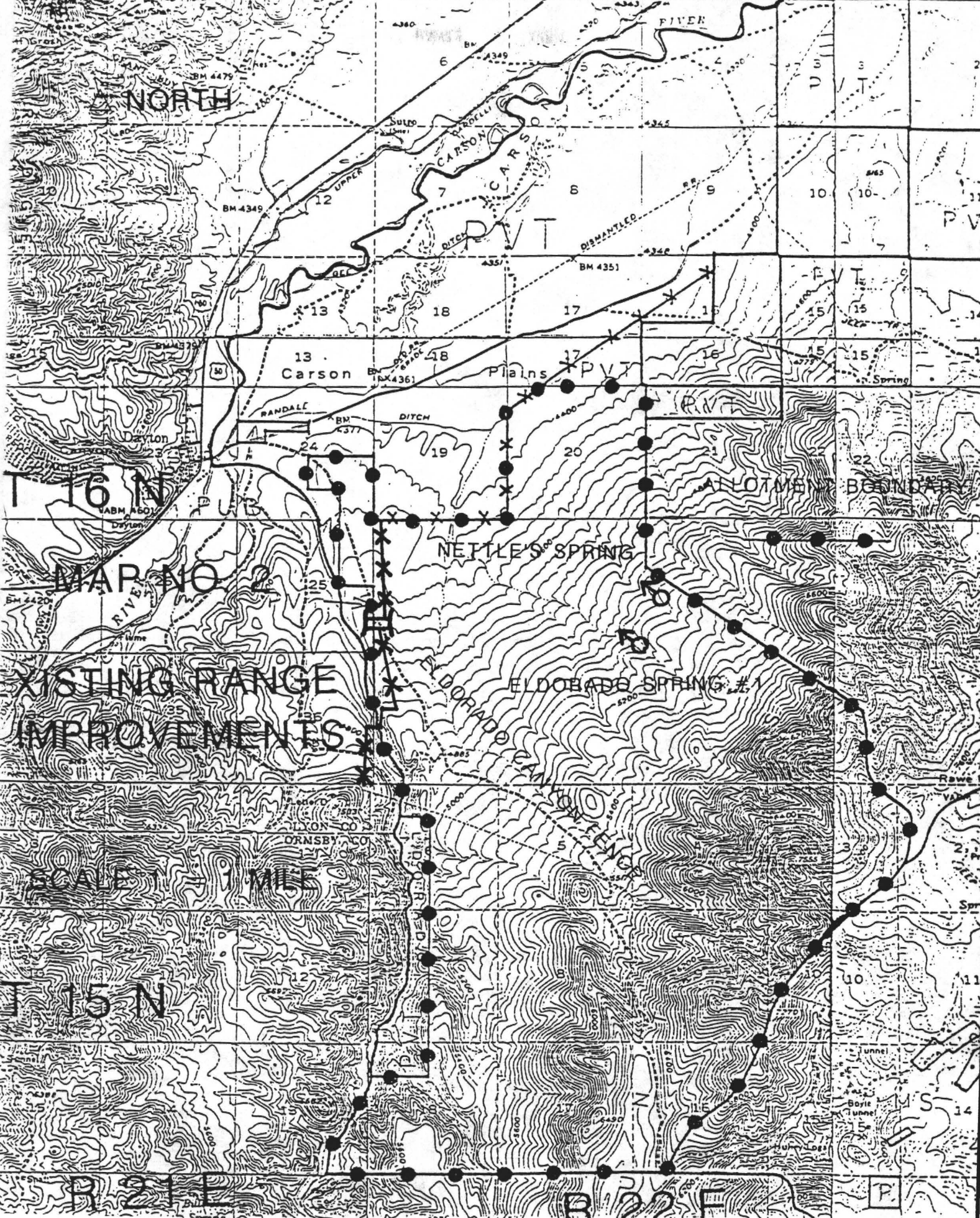
R 22 E

ALLOTMENT BOUNDARY

Tunnel  
Boritt Tunnel



# ELDORADO ALLOTMENT



NORTH

T 16 N

MAP NO. 2

EXISTING RANGE  
IMPROVEMENTS

SCALE 1" = 1 MILE

T 15 N

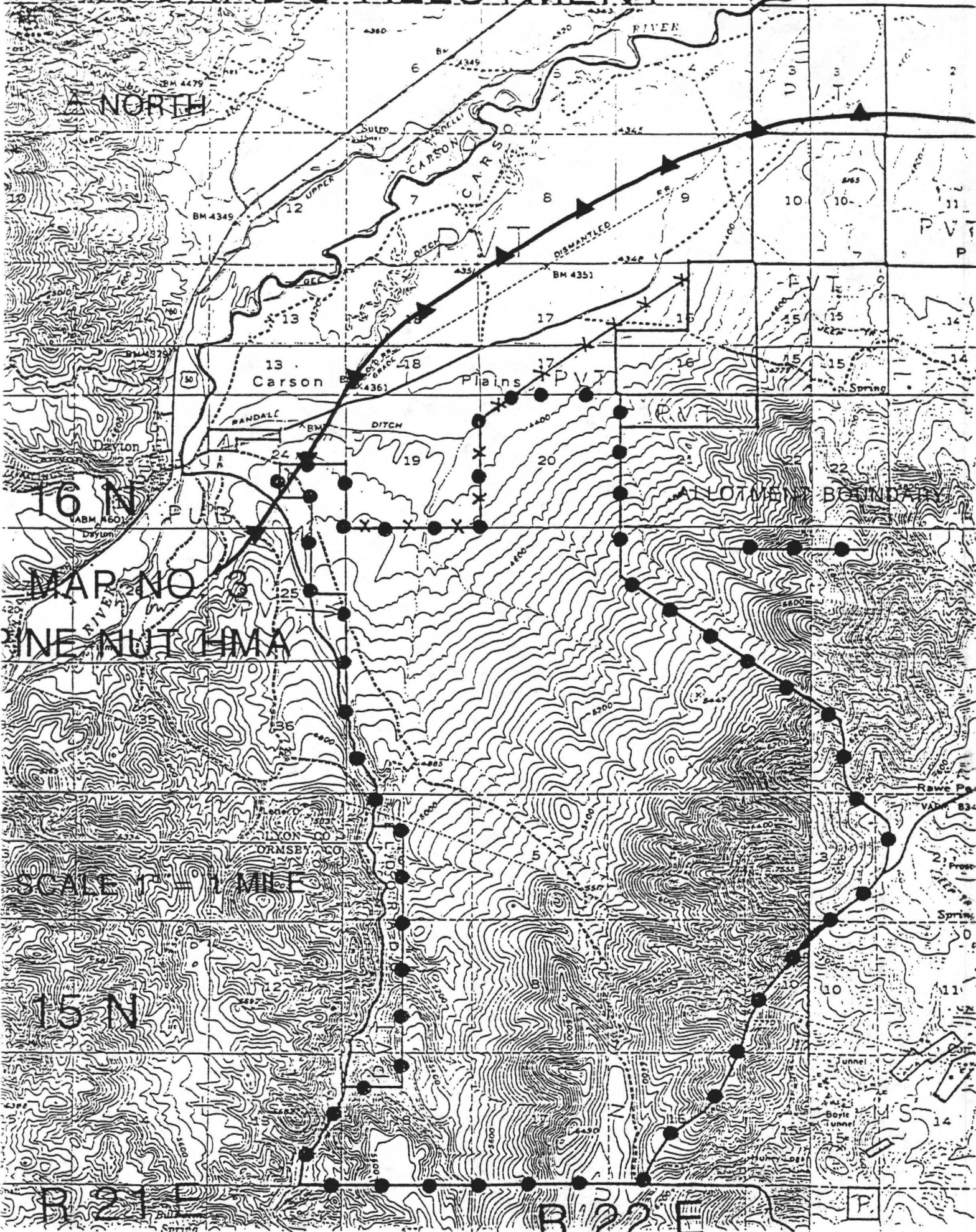
R 21 E

R 22 E

P



# ELDORADO ALLOTMENT



16 NORTH

16 N

MAP NO. 3

FINE NUT LIMA

SCALE 1" = 1 MILE

15 N

R 21 E

R 22 E

P



# EDGORDADO ALLOTMENT

T 16 N

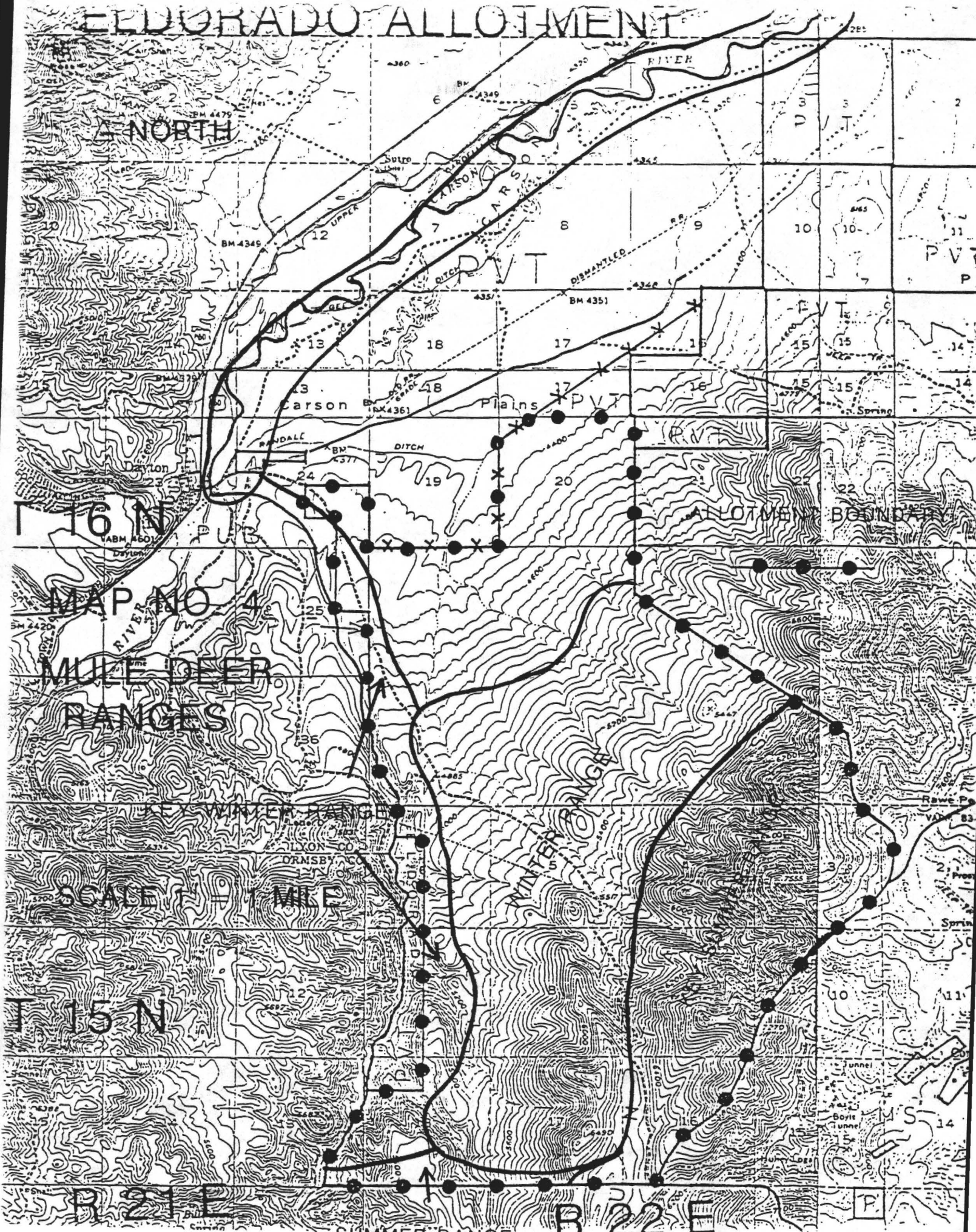
MAP NO. 4  
MULE DEER  
RANGES

SCALE 1" = 1 MILE

T 15 N

R 21 E

R 22 E



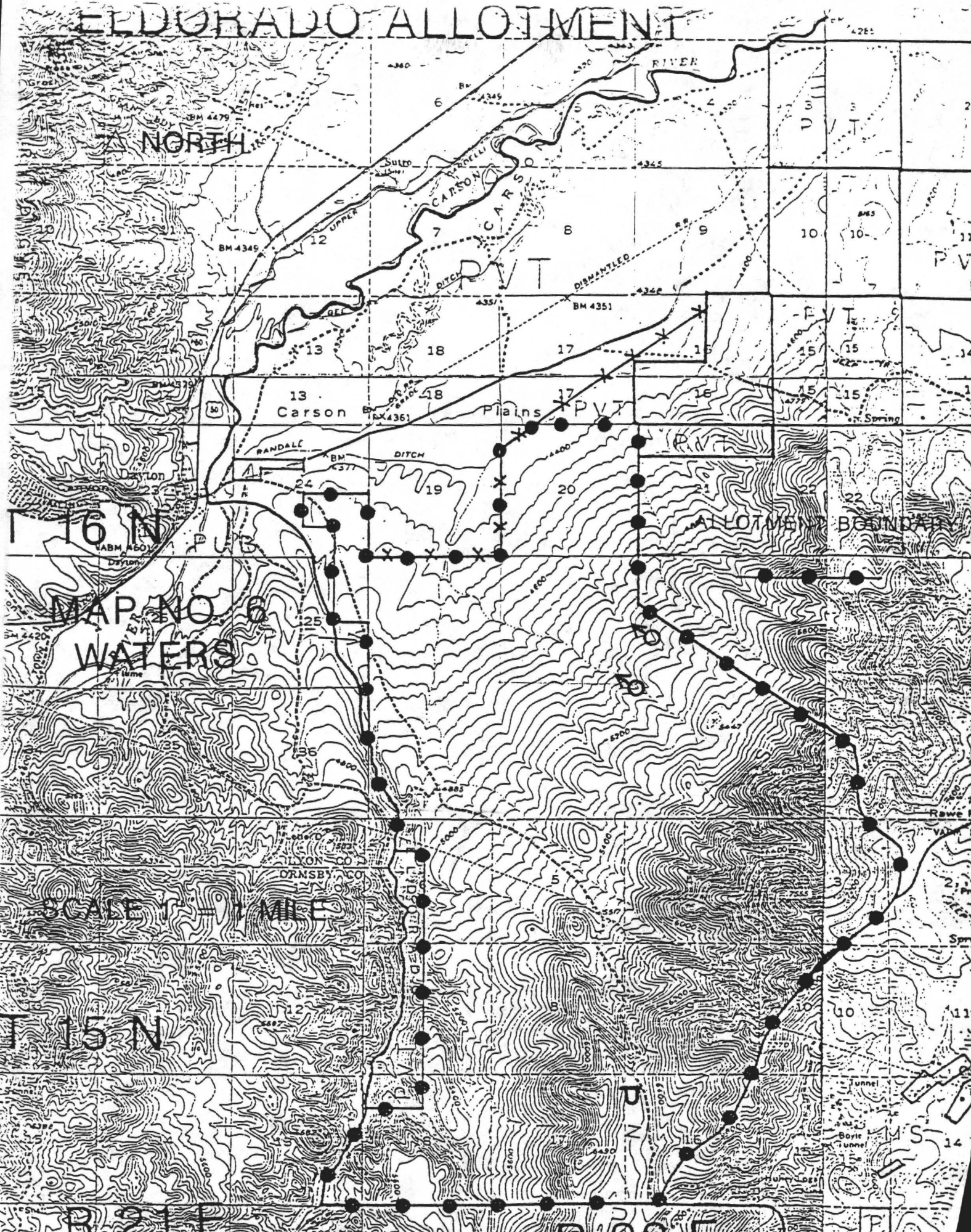






# ELDORADO ALLOTMENT

NORTH



MAP NO. 6  
WATERS

SCALE 1" = 1 MILE

T 15 N

R 21 E

R 22 E

P







# EDORADO ALLOTMENT

SEVERE



HEAVY



MODERATE



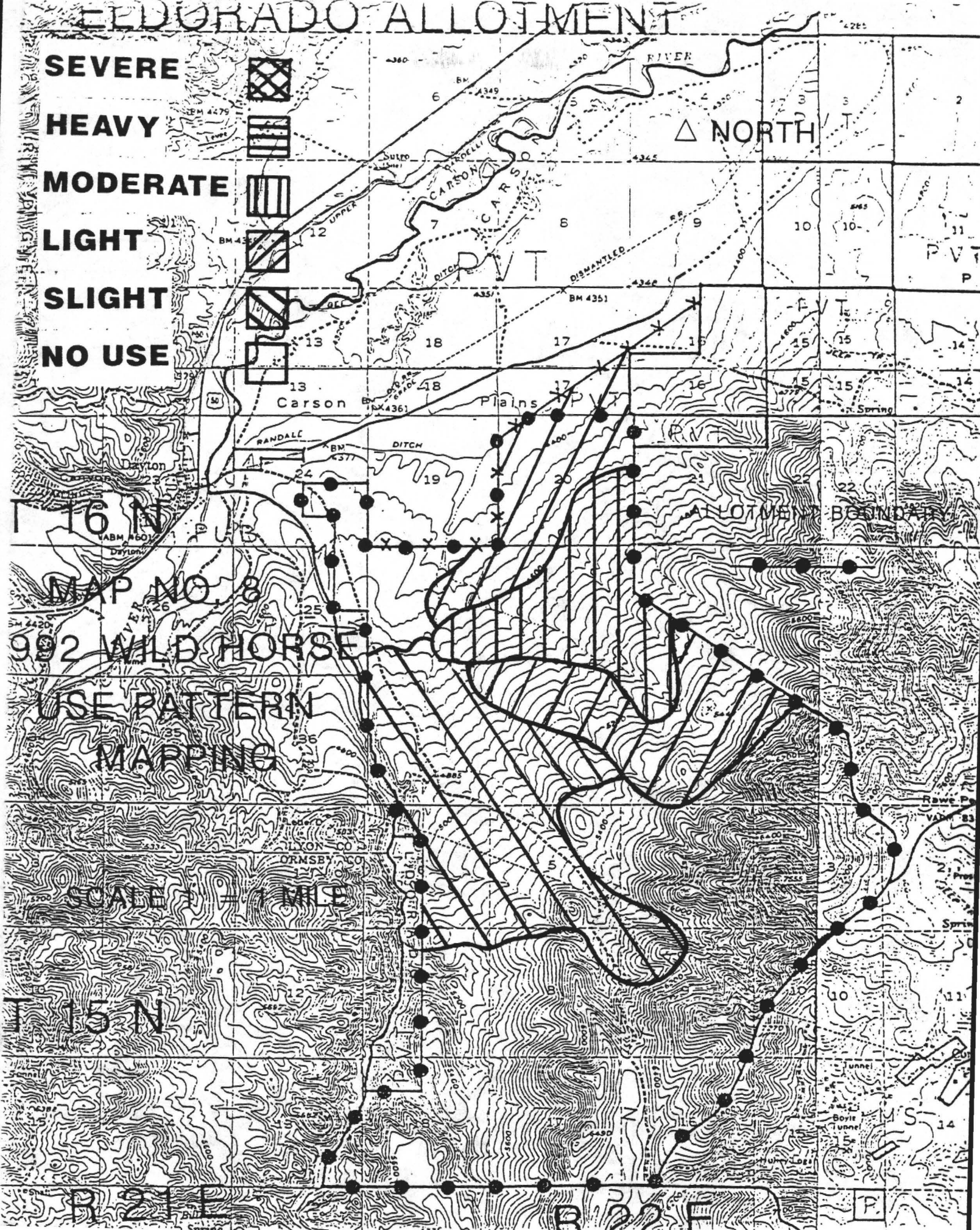
LIGHT



SLIGHT



NO USE



△ NORTH

T 16 N

ALLOTMENT BOUNDARY

MAP NO. 8

992 WILD HORSE

USE PATTERN  
MAPPING

SCALE 1" = 1 MILE

T 15 N

R 21 E







R 22 E

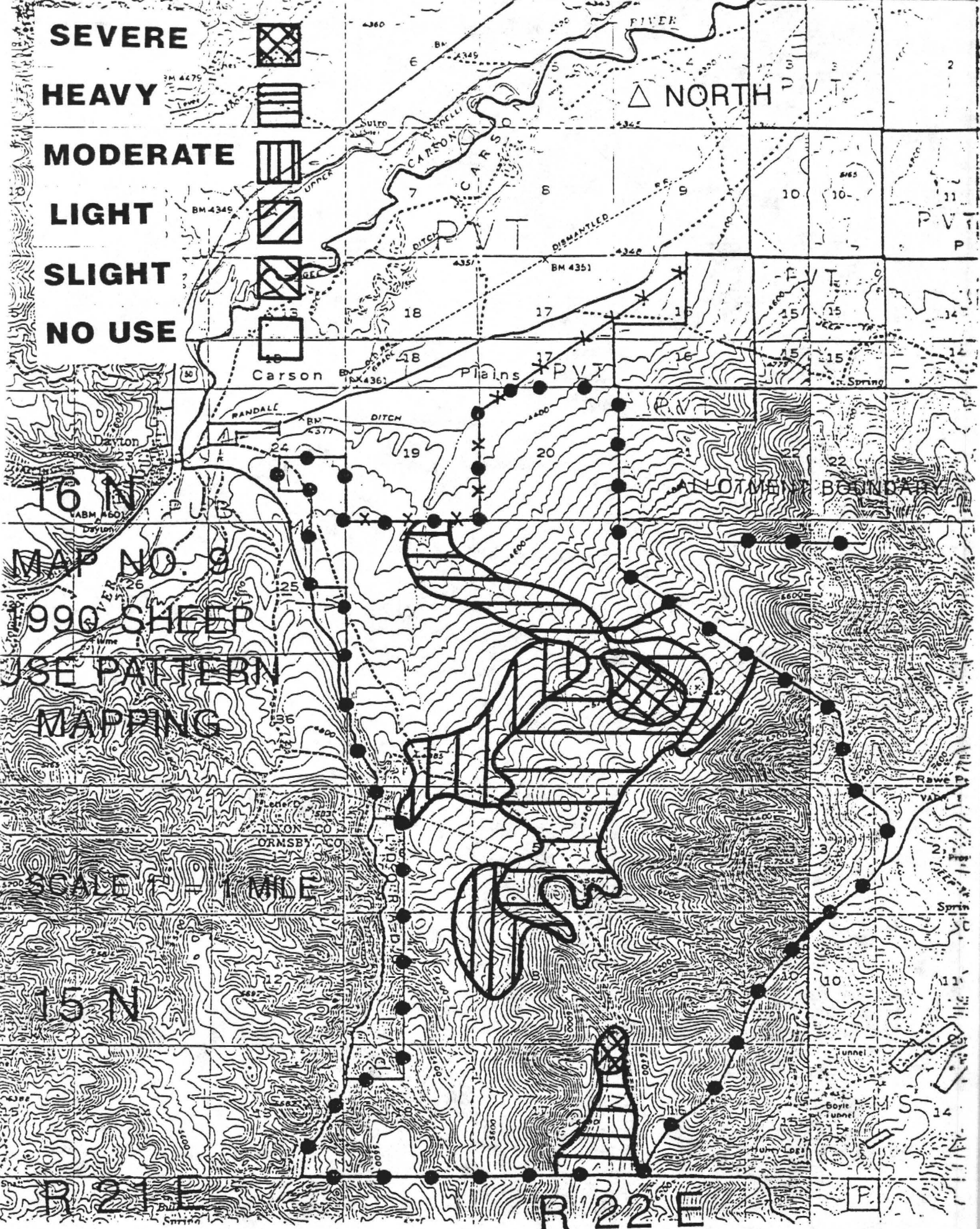
P



# ELUGRADO ALLOTMENT

4281

- SEVERE** 
- HEAVY** 
- MODERATE** 
- LIGHT** 
- SLIGHT** 
- NO USE** 



MAP NO. 9  
1990 SHEEP  
USE PATTERN  
MAPPING

SCALE 1" = 1 MILE

15 N

R 21 E

R 22 E

P



# ELDORADO ALLOTMENT

**SEVERE**



**HEAVY**



**MODERATE**



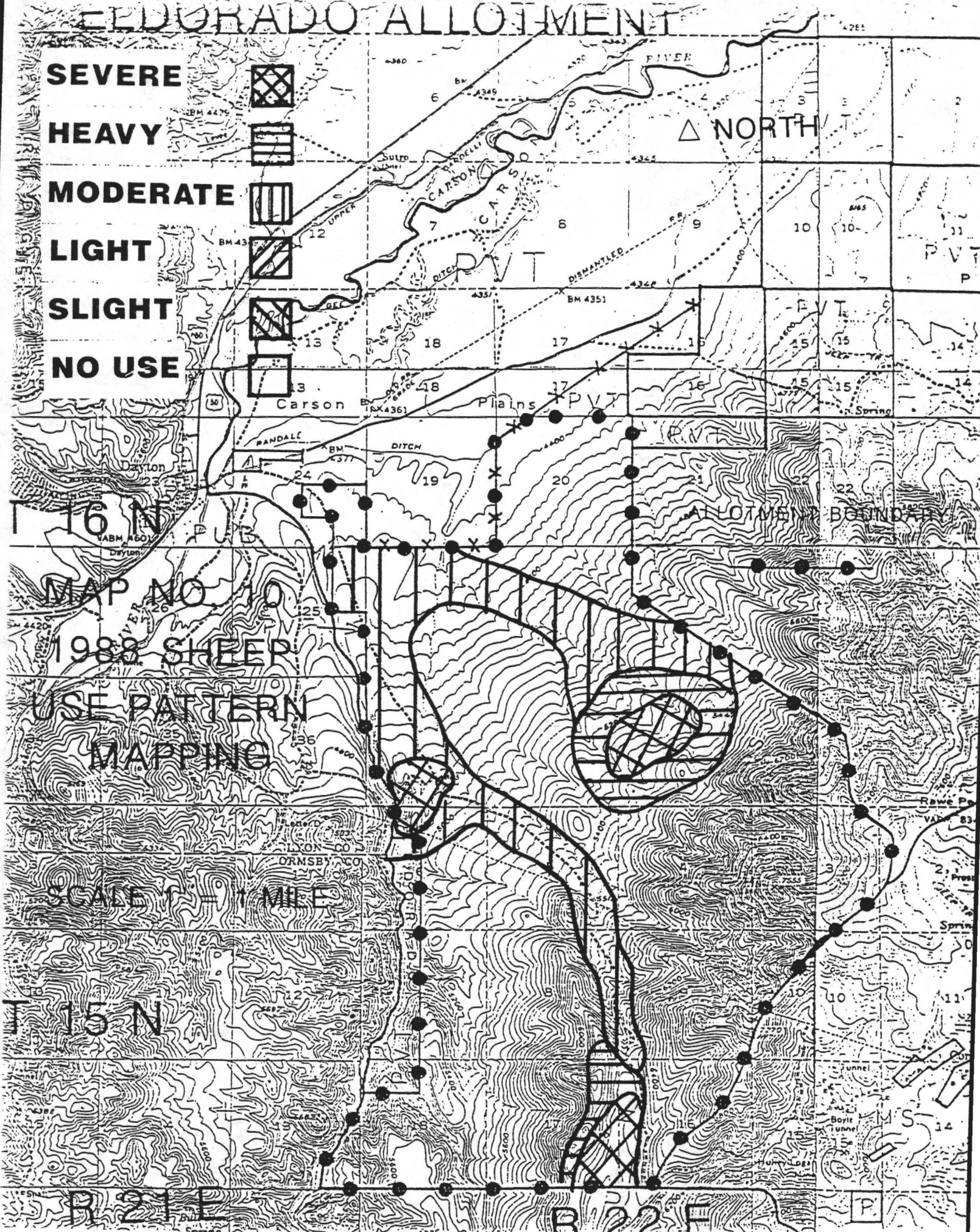
**LIGHT**



**SLIGHT**



**NO USE**



MAP NO. 10  
1988 SHEEP  
USE PATTERN  
MAPPING

SCALE 1" = 1 MILE

T 15 N

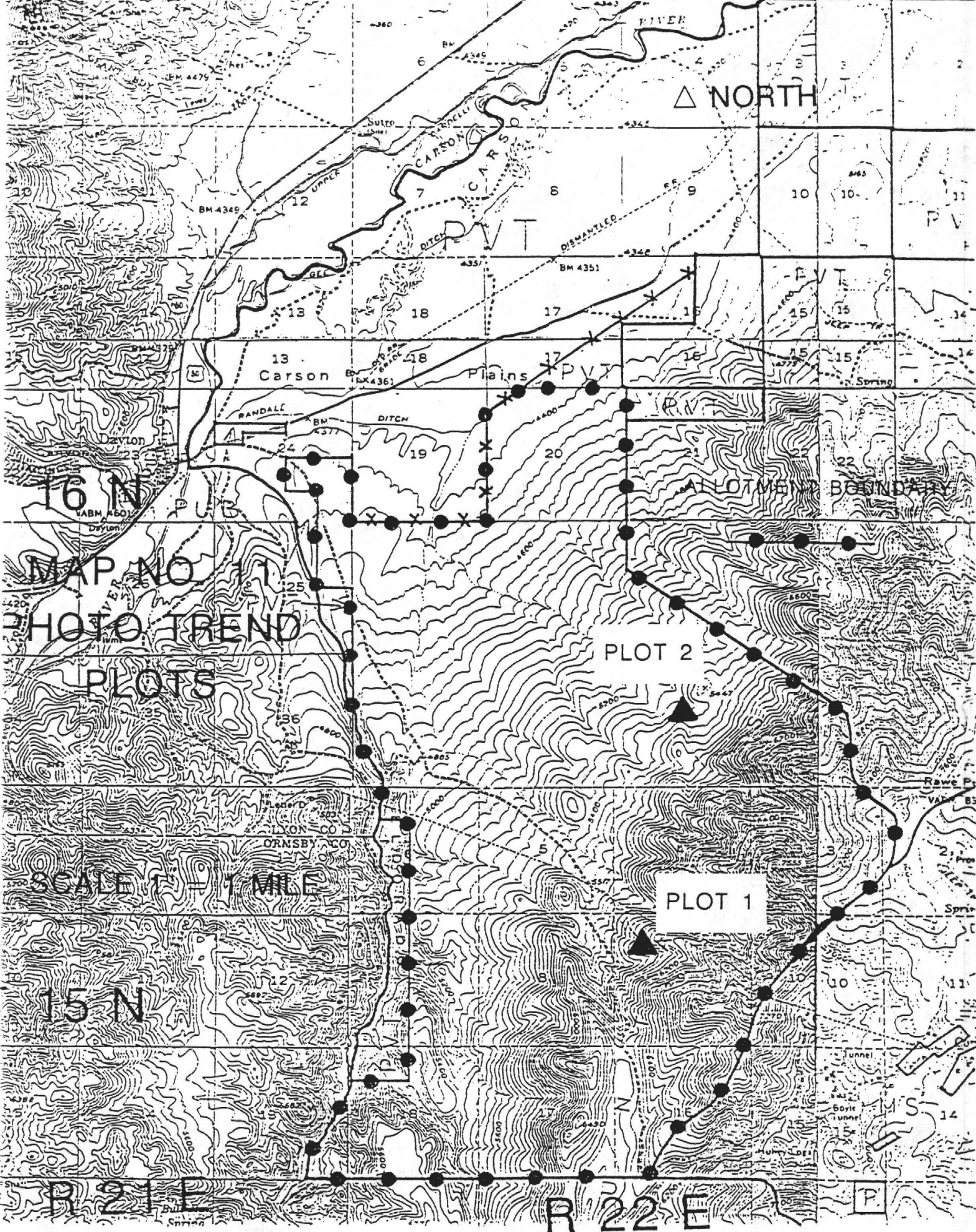
R 21 E

R 22 E

P



# ELDORADO ALLOTMENT



△ NORTH

PLOT 2

PLOT 1

MAP NO. 11  
PHOTO TREND  
PLOTS

SCALE 1" = 1 MILE

15 N

16 N

R 21 E

R 22 E

P

APPENDIX B

PINYON-JUNIPER WOODLAND SITE DETERMINATION

ELDORADO ALLOTMENT

Como Quadrangle

SMU ACRES	TOTAL TREED ACRES		NATURAL WOODLANDS
372	565.44 =	565	
		x .35 (Hyloc) = 197.75 =	198 PJ
		x .01 (Aspen) = 5.65 =	6 Aspen

Dayton Quadrangle

841	84.22 =	84	(No woodland soils)
441	144.19 =	144	(No woodland soils)
242	578.27 =	578	(No woodland soils)
471	19.88 =	20	(No woodland soils)
831	89.69 =	90	x .30 (Hyloc) =
314	65.84 =	66	(No woodland soils)
491	31.04 =	31	(No woodland soils)
372	2803.94 =	2804	x .35 (Hyloc) = 981.40 =
		2804	x .01 (Aspen) = 28.04 =

Total treed acres = 4382 (Existing)      Natural Community = 1240 acres

Total acres in the allotment is 10,261 (100% Public)

4382/10261 = 43% of the allotment is woodland

Natural woodland (PJ and Aspen) should comprise 1240 acres, or 12% of the allotment acreage.

June 20, 1994

## APPENDIX C

### 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. Freemont contacted Washoe Tribe in 1844 near Topaz Lake in Antelope Valley, who harvested nuts from the southern



Pine Nut Range. The entry in Freemont'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)<sup>1</sup>.

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

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<sup>1</sup>Dates 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.

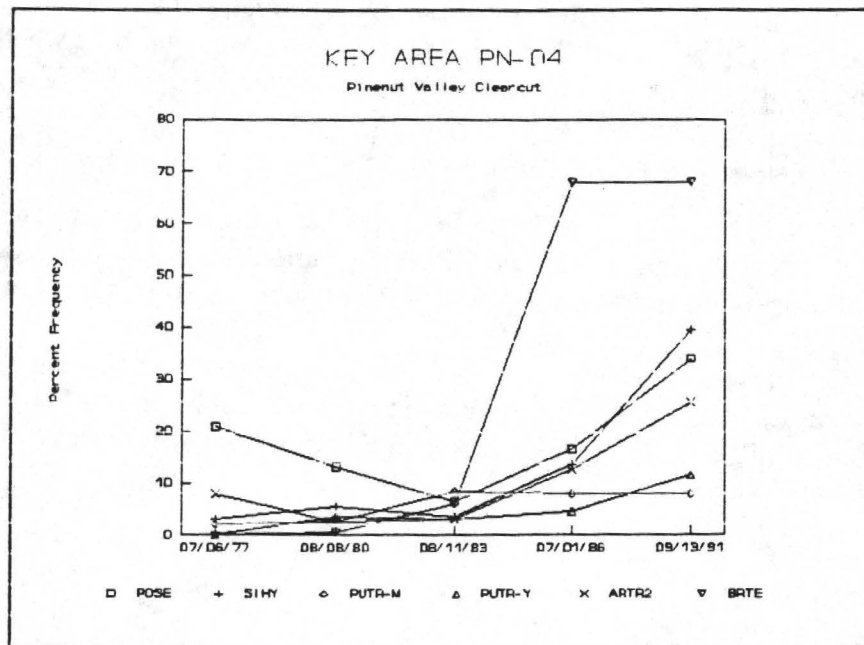
The effects of overstory removal in the Pine Nut Mountains was monitored on a 10 acre experimental pinyon - juniper clearcut done in 1977. Quadrat frequency study data was collected in accordance to procedures adapted from Tueller, etal (1972)<sup>2</sup>. The results are shown in Table 1 and Figure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

<sup>2</sup>Procedures 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. desetorum*, or crosses) coincided with heavy and severe use levels due primarily to wild horses<sup>3</sup>.

### 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

<sup>3</sup>This 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	Unharmad	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 comata</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 balsamroot ( <i>Balsamorhiza sagittata</i> ) Common sunflower ( <i>Helianthus annuus</i> ) Coyote tobacco ( <i>Nicotiana attenuata</i> ) Foothill deathcannas ( <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)



APPENDIX D  
ELDORADO CANYON ALLOTMENT  
STOCKING LEVEL CALCULATIONS

Shown below are the series of calculations used to derive the potential stocking level for the Eldorado Canyon Allotment portion of the Pine Nut Herd Management Area. The stocking level is 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:

$$\begin{array}{rcl} \text{Actual Use (AUMs)} & = & \text{Potential Actual Use (AUMs)} \\ \text{-----} & & \text{-----} \\ \text{Average Utilization (\%)} & & \text{Desired Average Utilization (\%)} \end{array}$$

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 Eldorado Canyon Allotment.

- A. Use Pattern Mapping Data. Acreages shown below are taken from the 1993 use pattern mapping. Acreage for a "No Use" category is not shown since it is 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.

No livestock was authorized to graze in 1993, therefore all use is by wild horses. The Utilization Class Midpoint values (y) are from six utilization classes for herbaceous vegetation as described in BLM Technical Reference TR 4400-3<sup>1</sup>.

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<sup>1</sup> *Utilization Studies* (1984), pages 12 and 50.

Utilization Class	(x) Acres in HMA by Class	(y) Class Midpoint	(x * y)
Slight	152	10	1,520
Light	2517	30	75,510
Moderate	2601	50	130,050
Heavy	1156	70	80,920
Severe	49	90	4,410
Subtotals	6475		292,410

- B. Average Utilization. The source for the weighted average formula used below is from the BLM Technical Reference TR 4400-7<sup>2</sup>.

$$\text{Avg. Utilization} = \frac{\text{Sum (Acres per Util. Class X Class Mid-Point)}}{\text{Sum (Acres)}}$$

$$\text{Average Utilization} = \frac{(x \times y)}{x} = \frac{292,410}{6,475} = 45.16\%$$

- C. Wild Horse Actual Use in Eldorado Canyon Allotment. The 1993 census identified 37 wild horses using the allotment. Based on yearlong grazing, wild horse actual use for the allotment is calculated as follows:

$$37 \text{ wild horses} \times 12 \text{ months} = 444 \text{ AUMs}$$

- D. Desired Utilization in HMA. Since these calculations are based on yearlong use of the allotment (i.e., during the critical growth periods of plant species) is appropriate to use the yearlong AUL for perennial grasses (55%) shown in the *Nevada Rangeland Monitoring Handbook* (September, 1984), page 23.
- E. Potential Actual Use (AUMs) Calculation for Eldorado Canyon Allotment. The potential actual use (i.e., potential stocking level) necessary to bring the average utilization to 55% is calculated below.

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

$$\frac{444 \text{ AUMs (from C, above)}}{45.16\% \text{ (from B, above)}} = \frac{\text{Potential Actual Use}}{55\% \text{ (from D, above)}}$$

$$541 \text{ AUMs} = \text{Potential Actual Use (Potential Stocking Level)}$$

<sup>2</sup> *Rangeland Monitoring Analysis, Interpretation, and Evaluation* (November, 1985) Appendix 1, page 52 and 53.

ELDORADO ALLOTMENT EVALUATION  
ERRATA AND ATTACHMENTS

Insert the attached Sections VII and VIII after page 23. In the Table of Contents, insert the following under Section VI:

VII. CONSULTATIONS ..... 24  
VIII. MANAGEMENT ACTIONS SELECTED ..... 29



## 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. Eldorado was among these allotments.

Sections I (Introduction) through VI (Technical Recommendations) of this evaluation were sent out for public review on November 30, 1994. Since a considerable amount of time had elapsed since the original scoping letter had been sent out, the evaluation was sent to all persons and organizations who had expressed interest in wildlife, wild horse and livestock grazing on public lands within the Walker Resource Area. Fifteen copies were sent to the Nevada State Clearinghouse for distribution among state agencies. In addition, the following were sent copies of this evaluation.

Wild Horse Organized Assistance	Animal Protection Institute
Nevada Wildlife Federation	The Wildlife Society
Natural Resources Defense Council	Sierra Club, Toiyabe Chapter
The Nature Conservancy	Carson City District Grazing Advisory Board
Nevada Cattlemen's Association	Resource Concepts Inc.
Nevada Woolgrowers Association	Bureau of Indian Affairs, Western Nevada Agency
Rutgers University, S.I. Newhouse Center of Law and Justice	U.S. Wild Horse and Burro Foundation
Washoe Tribe	The Honorable Harry M. Reid
The Honorable Barbara Vucanovich	American Bashkir Curley Register
The Honorable Richard Bryan	Bobby Royal
American Horse Protection Association	
Craig C. Downer	American Mustang and Burro Association
Dan Keiserman	Humane Society of Southern Nevada
Fund for Animals	Kathey McCovey
International Society for the Protection of Mustangs and Burros	L.I.F.E Foundation
Ann Earle	National Mustang Association, Inc.
U.S. Fish and Wildlife Service, Reno Field Office	Nevada Humane Society
Paula S. Askew	Paul Clifford
Steven Fulstone	Rebecca Kunow
U.S. Humane Society	The Mule Deer Foundation

Comments were received from the Association of Conservation Districts, 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"), Wild Horse Organized Assistance (WHOA) and Craig Downer. Most of the comments showed a general opposition to livestock grazing. The BLM, however, is mandated to support a multiple-use concept while managing for a healthy ecosystem. It is therefore important to seek management goals that are fair to the majority of interests while maintaining or improving the health of the range.

There also appeared to be some confusion related to the potential stocking level calculated in Appendix II. The potential stocking level represents the amount of forage *available* to wild horses and livestock. "Potential stocking level" should not be confused with uneven distribution, which in turn should not be confused with resource damage. The use mapping data showed that there was an uneven distribution of wild horses and livestock use. The trend data indicated that the areas of heavy and severe utilization have resulted in resource deterioration over portions of the allotment. Therefore, it was proposed that the 600 AUM objective for livestock should no longer be applicable and that the stocking level for wild horses should be maintained at half the calculated potential stocking level.

The fact that animal impacts are occurring on the range does not automatically equate to resource deterioration. Craig Downer made the following observation relating to large ungulates and their environments: "Little is said about the positive affects which these animals [wild horses] have upon the desert ecosystem, nor about the impact which their low population levels can have upon their own long-term survival." Such positive effects result from properly timed impacts. If timing and duration cannot be controlled, either through natural relationships or through intense management, then it becomes necessary to adjust use levels.

Other questions and comments that relate to the health of the land or address the evaluation of this health are discussed below.

Comment: Are population estimates made using census data? Do census observe all horses? Does one adult/foal equal one cow/calf? (Commission)

Response: These questions were in reference to the table on page 9. The numbers in the "Total" column are all wild horses counted during aerial census. At the time of aerial censuses, wild horses counted as "foals" are usually old enough, or soon will be old enough to be consuming substantial amounts of forage. Therefore, foals are counted as an animal unit. In calculating AUMs for use in analysis, a calf may also be counted as an animal unit if it develops to a stage where it will be consuming substantial amounts of forage.

Comment: The years 1988 and 1990 are the only data representing joint use by livestock and wild horses. These years best represent data for a carrying capacity to sustain any livestock use on the allotment. (NDOW)

Again we have an allotment with constant wild horse use and infrequent domestic sheep use. Your data shows that when livestock were authorized in 1988 and 1990 that the amounts of heavy and severe use increased on the allotment. These years of use should provide significant data in the determination of stocking rates and appropriate management levels. (WHOA)

Page 11, we strongly recommend that all available data from those years be used. (WHOA)

Response: It is assumed that the commenters were making an indirect reference to the stocking level calculations used in Appendix II, which used data collected in 1993. The data collected in 1988 and 1990 were collected in spring, immediately after sheep were taken off the range. Therefore, the data for these years did not show all the use by wild horses, who continued grazing after the livestock were removed. This is one reason that the 1993 data was used, since it was collected later in the year (note the larger area showing use by horses). Also, due to the mandate to establish AMLs by 1995, more effort was spent in 1993 in documenting use patterns *throughout* the HMA, rather than on an individual allotment basis. This resulted in detailed use pattern maps for all nine allotment within the HMA made during the same year of a wild horse census.

However, just because the other mappings were not used in the stocking rate calculations, this does not mean that the data was not analyzed during the evaluation process. The heavy and severe use levels recorded during the 1988 and 1990 mappings, along with 1993 data, helped explain the downward trend observed in areas of the allotment. This showed that damage was actually occurring from the uneven distribution of both livestock and horses. This resulted in the elimination of the objective to provide 600 AUMs for livestock and establishing a potential stocking level of 270 AUMs for wild horses instead of 541 AUMs. In addition to these actions, it may be necessary to incorporate terms and conditions addressing animal distribution (depending on the specific operation) if temporary and nonrenewable grazing is authorized in the Eldorado Allotment.

Comment: p. 7: I think that 600 AUM's for livestock is unreasonable and that this proportion should be reduced to accommodate more wildlife, including wild horses.  
(Craig Downer)

p. 14, Conclusions: I object to increasing livestock use to 600 AUMs. This confirms my fears that the wild horses are being overmagnified as to their impacts and squeezed out, as they have been in so many other places where they have legal right. (Craig Downer)

Response: These comments are in reference to the old allotment objective to provide 600 AUMs of livestock use. Mr. Downer's concerns reflect the conclusions made by the authors of this evaluation, which resulted in Technical Recommendation 1, page 21 ("The objective identifying 600 AUMs of use by livestock will no longer be applicable"). It is further recommended that only temporary and nonrenewable livestock grazing be allowed in winter (dormancy period of key plant species). Therefore, wild horses were not "singled out" while increasing livestock use.

Comment: p.12: Evaluations for all grazer categories should be made, not just one or the other. This will establish unbiased information by which to base future conclusions.  
(Craig Downer)



Response: It is assumed that Mr. Downer is referring to the actual use table on page 12. 1988 and 1990 data was collected in spring immediately after the sheep were removed, therefore reflecting primarily livestock use with some wild horse use. No grazing occurred in 1992 and 1993, therefore the use was by wild horses. Once the AML has been established and livestock are authorized, it may be necessary to take more than one reading per year.

Comment: Much of the resource decline is due to drought which should be alleviated this year by unusually heavy precipitation received to date. (Craig Downer)

Response: It is important to prevent resource degradation, even during years of reduced annual precipitation. Properly managed rangelands should provide adequate amounts of forage to grazing animals, even during times of reduced annual precipitation. The actions defined in this evaluation will accomplish this.

Comment: I note that bitterbrush is not effected by wild horses and that they may be quite compatible with mule deer. (Craig Downer)

Response: Bitterbrush is not the only component in the ecosystem that is important to mule deer. As an example, horses directly compete with mule deer in the spring when green grass is important to both animals. Cured grass is also important in the winter diets of both mule deer and wild horses. Indirect effects may result from disrupted water, energy and nutrient cycles due to improper grazing by wild horses. Any example of this could be a reduction of water sources, decrease in forage plant seedlings, and decrease of riparian vegetation.

Comment: I recommend developing a variety of water sources and making accessible sources that have been restricted so that the horses do not have to concentrate too much upon any one source. (Craig Downer)

Response: It must be remembered that, in the absence of large predators, wild horses will concentrate in riparian areas. In lieu of an intensive grazing system to control the timing and duration of impacts, the only two options open in some areas may be the fencing of riparian areas or the total elimination of wild horses. Where the expense of fence construction and maintenance is justified, the projects can be constructed in order to provide water while protecting riparian vegetation.

Comment: p. 19: Also give consideration to what is a healthy viable population of wild horses, for too small population numbers can cause serious problems for the long term survival of the horses. I recommend a considerably larger wild horse herd size than the current one. (Craig Downer)

p.20: VI. A. "Self sustaining populations ..." means adequate population numbers to prevent inbreeding, not mere token numbers which are themselves placed in jeopardy of extinction by a variety of causes. (Craig Downer)

Recom. 5: As usual the tiny minority of wild horses are being targeted. 22 horses year round is much too few. I strenuously object to your reducing wild horse population here to this level, and rather favor an increase in their numbers, re-source permitting. (Craig Downer)

p.22: top: This fails to account for the fact that the wild horse has been largely eliminated throughout the West. Ipso facto, where meager numbers persist, such as here in the Pine Nut Range, their numbers should be allowed to increase to at least minimally viable population levels, estimate at 1,000 breeding adults. (Craig Downer)

Response: The AML will be established for the *entire* HMA, not for individual allotments. Therefore the 22 horses is meaningless since Eldorado Allotment represents only ten percent of the HMA. Based on the analysis of monitoring data presented in all nine allotment evaluations, a population of 179 wild horses can be supported within the HMA.

Comment: Why is there the big fluctuation in wild horse numbers: gatherings, migration for adjoining areas? (Craig Downer)

Response: The fluctuation of horse numbers shown on page 19 of this evaluation is mostly due from movement of wild horses throughout the HMA. A few have been gathered by BLM when they moved onto private lands near Dayton.

### 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.



In accordance with §4110.3-2(c), 159 AUMs will be suspended.

B. In accordance with §4130.6-1(a), the authorized season of use will be changed from 4/1 - 5/31 to 1/1 - 5/31.

### RATIONALE

Insufficient forage is available to provide 772 AUMs for livestock. The existing livestock authorized period of use occurs during a portion of the active growing season. Wild horse use occurs throughout the active growing season. This amount and concentration of use is resulting in the loss of grass plants at the mid and lower elevations of the allotment. Adjusting livestock numbers will, in part, begin to allow these areas an opportunity to recover. By eliminating the compressed season of use for livestock and allowing more flexibility, use can be made during plant dormancy when they are least vulnerable. Snow, when available, will further help by providing the opportunity to distribute livestock over a larger portion of the allotment. These actions should provide adequate forage on a sustainable basis.

### **ELDORADO ALLOTMENT** **LIVESTOCK GRAZING MANAGEMENT DECISION**

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

A. In accordance with §4130.4-2, livestock grazing will be authorized on a temporary non-renewable basis to take pressure off of or supplement use from other allotments.

B. In accordance with §4130.6-1 (a), the authorized season of use will be from 11/1 to 2/28. The authorization will be limited to sheep. A total of 270 AUMs will be available for livestock use.

### RATIONALE

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 land use plan objectives, the application would not be authorized. If the authorized officer determines that a modification to the application would meet these objectives, use would be authorized accordingly.

Authorizing sheep use during the winter is advantageous. Grass plants are in a dormant state, so are not susceptible to overgrazing. Harvesting the old growth from the grass plants will allow better access to sunlight for the spring growth and the plants can better remain vigorous. In addition, heavy browsing of the shrubs by sheep will favor the growth of the grasses which make up the bulk of the diet for wild horses.



COMMISSION FOR THE  
PRESERVATION OF WILD HORSES

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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: Eldorado Canyon Allotment Evaluation

Dear Mr. Singlaub:

The Commission for the Preservation of Wild Horses appreciates your consultation concerning the Pine Nut Wild Horse Herd. The Eldorado Canyon Allotment is alike many of the allotments of the Pine Nut Range with constant wild horse use and infrequent domestic sheep use. It is obvious that when livestock were authorized in 1988 and 1990 that the amounts of heavy and severe use increased on the allotment. These years of wild horse and livestock use should provide insight for the determination of stocking rates and appropriate management levels.

Page 9, Wild Horses

Are population estimates made using census data? Do census observe all horses? Does one adult/foal equal one cow/calf AUM?

Page 11, Use Pattern Mapping

We recommend that all available data be use to determine the appropriate management level for this allotment. We recommend that years of livestock authorization be used to determine livestock stocking rates and the appropriate management level for horses.



2/10/95

Mr. John Singlaub  
February 10, 1995  
Page 2

Appendix IIV

Weight averaging use pattern mapping data discounted the 30 percent of this allotment that was heavily used by livestock and wild horses. These computations indicate a needed increase in livestock above numbers known to cause overgrazing of this allotment.

Allocation of forage to wild horses and livestock are fair. We suggest that percentage of use be applied to the necessary reduction to achieve carrying capacity. Computations presented in this appendix clearly indicate that forage from wild horses are intended to be awarded to livestock.

In summary, we encourage better application of Bureau land use planning, procedures and policy would have produced better recommendations. We hope that our comments will assist in correcting the errors and supporting rationale for a multiple use decision for this allotment.

Sincerely,



Catherine Barcomb  
Director

2/10/95

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: Eldorado Canyon Allotment Evaluation

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Sincerely,

DAWN Y. LAPPIN  
Director