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SEMI-ANNUAL REPORT ON BURRO STUDIES COVERING PERIOD

JULY 1975 TO DECEMBER 1975

Submitted to the Bureau of Land Management

By Robert D. Ohmart

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The Chemehuevi, Bill Williams and Kofa Mountains are presently serving as study areas to examine the biology of wild burros (Equus asinus). This research includes an investigation of burro-bighorn sheep (Ovis canadensis) interactions in the Bill Williams and Kofa Mountains.

Chemehuevi Mountains

Dr. Woodward is intermittently monitoring movements, habitat use, food habits and reproduction of the burro herd.

Two papers have been submitted to scientific journals on our previous findings. One on habitat use and diet has been accepted for publication in the Journal of Range Management (copy appended) and the other on home ranges and movements is being readied for submission to the Journal of Wildlife Management. A copy of Susan's doctoral thesis will be submitted to BLM as soon as my office receives one.

Recently three of our marked burros were found shot to death in Trampas Wash.

Bill Williams Mountains

Mr. Rick Seegmiller has completed his field studies on sheep and burros, and an abstract of his findings are included in this report. Mr. Mike Walker will continue the study and has already begun observing both species and collecting monthly fecal samples for diet determinations. Rick's thesis should be completed in the next few months and will be included in the next report.

Approximately eight months of field research were conducted during the summer of 1974 and the winter, spring, and early summer of 1975. Data regarding the relationships of feral burros and desert bighorn sheep, as to their movements, food habits, and interspecific interactions were recorded.

The monitoring of burro and bighorn movements was aided with seven radio-transmitter collars on burros and one on a ewe bighorn sheep. Color

 

collars were also attached to sixteen burros, allowing definitive identification of these individuals. Observations were made principally in the Bill Williams Mountain block, just east of the Bill Williams River Delta at Lake Havasu, Arizona.

Burro movements during summer followed a consistent daily pattern. The daytime hours were spent in the foothills and washes. Movements were made to the riparian communities in the late evening or night and back to the desert in the early morning hours. During the cooler months, no consistent movement pattern was observed and only sporadic treks were made to the river.

The distribution of burros and bighorn sheep (Figures 1,2 and 3) varied seasonally in amount of overlap and proximity to permanent water. Substantial overlap was observed during all seasons, but was greatest during November to March, when the area occupied by burros completely encompassed that of bighorn sheep.

Table 1 illustrates the seasonal mean distance of burro and bighorn sightings from the Bill Williams River or other permanent water sources adjacent to the river. Both species remained in relatively close proximity to permanent water during the warmer months (May to August). In the cooler months, October to April, sporadic rains supplied temporary free water and succulent annual vegetation, allowing burros and bighorns to venture farther from permanent water.

Types of habitats preferred by burros and bighorns for forage intake were determined by first differentiating the study area into seven major categories: foothills, long steep slopes, rugged talus terrain, mesas, washes, cultivated fields, and riparian. Table 2 shows the percent frequency of burro and bighorn sightings in these habitat types, over the total distribution of each species and within the area of distribution overlap. To gain insight into habitat overlap between burros and bighorn sheep, the habitat preferences of each species within the area of distribution overlap becomes especially important. Within this area, greatest overlap

FIGURE 1. DISTRIBUTION OF BURRO AND BIGHORN HERD LOCATIONS
IN THE BILL WILLIAMS MOUNTAINS: JUNE-OCTOBER 1974

FIGURE 2. DISTRIBUTION OF BURRO AND BIGHORN HERD LOCATIONS
IN THE BILL WILLIAMS MOUNTAINS MOUNTAINS: NOVEMBER-MARCH 1974-75

FIGURE 3. DISTRIBUTION OF BURRO AND BIGHORN HERD LOCATIONS
IN THE BILL WILLIAMS MOUNTAINS: APRIL-JUNE 1975

Table 1. SEASONAL MEAN DISTANCE OF BURRO AND BIGHORN SIGHTINGS FROM
THE BILL WILLIAMS RIVER OR OTHER PERMANENT WATER SOURCES

	1974		1975					
	June-August		October-January		February-April		May-June	
	<u>Burros</u>	<u>Bighorn</u>	<u>Burros</u>	<u>Bighorn</u>	<u>Burros</u>	<u>Bighorn</u>	<u>Burros</u>	<u>Bighorn</u>
Mean Distance (miles):	0.65	0.19*	1.68	2.67	2.30	3.15	1.00	0.56
Range of Distance (miles):	0.00- 2.50	0.00- 3.00	0.25- 3.25	2.00- 4.25	0.00- 4.00	0.50- 4.25	0.25- 2.50	0.00- 1.75
95% Confidence Interval:	± 0.04	± 0.08	± 0.08	± 0.21	± 0.06	± 0.13	± 0.07	± 0.11
Number of Sightings:	1253	161	280	33	491	156	366	137

*May not be true representation in that only casual observations were made of bighorn sheep mostly around water or cultivated fields.

Table 2. PERCENT FREQUENCY OF BURRO AND BIGHORN SIGHTINGS
IN VARIOUS TYPES OF TOPOGRAPHY OR HABITAT.

Habitat or Topography Type	Over Total Distribution					
	1974		1975		April-June	
	June-October		November-March			
	<u>Burros</u>	<u>Bighorn</u>	<u>Burros</u>	<u>Bighorn</u>	<u>Burros</u>	<u>Bighorn</u>
Foothills	59	49	55	0	76	36
Long Steep Slopes	3	1	33	67	4	15
Rugged Talus Terrain	0	4	0	21	0	13
Washes	31	0	9	0	19	5
Mesas	0	0	2	12	0	7
Cultivated Fields	5	39	1	0	1	24
Riparian	<u>2</u>	<u>7</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	100	100	100	100	100	100
Number of Sightings	1323	168	576	150	570	169

Within Area of Distribution Overlap

Habitat or Topography Type	<u>Burros</u>	<u>Bighorn</u>	<u>Burros</u>	<u>Bighorn</u>	<u>Burros</u>	<u>Bighorn</u>
Foothills	57	26	38	0	61	50
Long Steep Slopes	0	3	44	67	4	13
Rugged Talus Terrain	0	12	0	21	0	6
Washes	26	0	13	0	30	7
Mesas	0	0	5	12	0	3
Cultivated Fields	17	59	0	0	5	21
Riparian	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	100	100	100	100	100	100
Number of Sightings	89	61	215	150	158	130

in topography occurred during November to March on long steep slopes extending from high mesas, peaks, and ridges (burros 44%; bighorns 67%) and during April to June in foothill topography (burros 61%; bighorns 50%). Foothills were generally choppy, rolling, or flat interfluvies of relatively low elevation.

The ten major plant species in the diets of burros and bighorn sheep on an average annual basis and as determined by fecal composition analysis is shown in Table 3. The predominant plant in the diets of both was the annual forb Indian-wheat, (Plantago insularis), 26% in burro diets and 16% in bighorn diets. Of the ten major plants, burros and bighorns shared bermuda grass, (Cynodon dactylon), foothills palo verde, (Cercidium microphyllum), burro-bush, (Ambrosia dumosa), brittle-bush, (Encelia farinosa), and forget-me-not, (Cryptantha spp.).

The monthly utilization of the three major plant species shared in the diets of burros and bighorns, Indian-wheat, palo verde and bermuda grass, is represented in Figure 4. Both species foraged on Indian-wheat principally in the winter and spring when it was abundant. Palo verde was taken primarily in summer and winter and bermuda grass predominantly in the summer, the latter coinciding with its growing season. Generally, these three plant species were found in a higher proportion in the diet of burros than in bighorn sheep.

Burros when foraging palo verde, rather than selecting a portion of the annual new growth at the branch tips as bighorn and most other browsing animals do, generally chew and break off branches up to six feet in length and 1½ inches in diameter. They then shred and consume a small portion of the broken end of the branch and leave the remainder. As the lower branches of the palo verde are broken from the tree and partially consumed by burros the higher branches may be above the foraging reach of sheep in areas of burro-bighorn distribution overlap and thereby reduce the availability of

Table 3. THE TEN MAJOR PLANT SPECIES IN THE DIETS OF FERAL BURROS AND DESERT BIGHORN SHEEP IN THE BILL WILLIAMS MOUNTAINS:
Fecal Composition Analysis.

<u>BURROS</u>		
<u>Plant Species</u>	* <u>Average % Relative Density</u>	** <u>% Frequency</u>
1. Indian-wheat- <u>Plantago insularis</u>	26	100
2. Bermuda Grass- <u>Cynodon dactylon</u>	18	100
3. Mesquite- <u>Prosopis juliflora</u>	15	100
4. Foothills Palo Verde- <u>Cercidium microphyllum</u>	10	100
5. Arrow-weed- <u>Pluchea sericea</u>	5	78
6. Bulrush- <u>Scirpus Olneyi</u>	4	44
7. Staghorn Cholla- <u>Opuntia acanthocarpa</u>	3	89
8. Burro-bush- <u>Ambrosia dumosa</u>	2	78
9. Brittle-bush- <u>Encelia farinosa</u>	2	89
10. Forget-me-not- <u>Cryptantha spp.</u>	1	100

<u>BIGHORN</u>		
1. Indian-wheat- <u>Plantago insularis</u>	16	100
2. Globe-mallow- <u>Sphaeralcea spp.</u>	8	100
3. Desert-lavender- <u>Hyptis Emoryi</u>	8	100
4. Foothills Palo Verde- <u>Cercidium microphyllum</u>	7	100
5. Bermuda Grass- <u>Cynodon dactylon</u>	7	78
6. Forget-me-not- <u>Cryptantha spp.</u>	6	100
7. Burro-bush- <u>Ambrosia dumosa</u>	6	89
8. Brittle-bush- <u>Encelia farinosa</u>	5	100
9. Burro-brush- <u>Hymenoclea spp.</u>	4	100
10. Creosote-bush- <u>Larrea divaricata</u>	3	89

*Average from months sampled, June 1974 through May 1975 (excepting September, November and December).

**Percent Frequency refers to the proportion of months sampled in which the plant species occurred in the diets.

Figure 4. MONTHLY UTILIZATION OF THE THREE MAJOR PLANT SPECIES SHARED IN THE DIETS OF BURROS AND BIGHORN

this important browse species to sheep. The bark of palo verde is also taken by burros.

Burro-bighorn interactions at watering sites in summer were not observed and are probably unlikely since water is not limiting on the study area, due to the presence of the river and irrigation of the fields cultivated by the Planet Ranch. In addition bighorn sheep watered during all hours of the day, contrasting to the nocturnal watering habit of burros.

On January 28th the first newborn lamb was observed with its maternal parent and other adult sheep in a high remote area. Between the dates of January 29 and February 2, the radio collared ewe gave birth to a lamb. Shortly before, during, and after lambing she and other bighorns were located only in the more rugged and remote terrain. They soon moved to the lower and less rugged areas that supplied more plentiful forage, principally the long steep slopes.

Burro-bighorn interactions during the lambing season were not observed and neither burros nor burro sign was observed in these isolated and rugged areas. However, shortly after lambing, both species were seen in close association, even with young lambs present. They showed seemingly no concern for one another's presence.

Seasonal burro population ground estimates were made essentially by a direct count of marked, recognizable, and non-recognizable individuals. These generally indicated that approximately 100 burros used the study area, which varied seasonally in size from about 10 to 20 square miles. However, this estimate includes some burros that were infrequently seen and who apparently seldom visited the study area.

A total of 20 jennys with newborn foals were observed on the study area, yielding an estimated annual increment in the burro population of about 20%. Natural mortality of foals was never seen or evidenced, suggesting high young survival in burros.

A minimum of 15 adults and yearling bighorn sheep (this figure is thought to be a close approximation of the actual sheep population in the area) were seen on the study area during January to April. Following this period none of the four adult rams were observed until June (initiation of the breeding season), when several were again seen on the study area.

Three lambs were produced among seven adult ewes, but by June two lambs were missing and were presumed dead. The third has survived into January 1976 suggesting an estimated 7% annual bighorn population increase.

Recent visits to the study area in December and January showed nearly all palo verdes and most shrubs, especially near the river, to be heavily utilized. The cured herbaceous layer has been depleted over most of the area and succulent annual plant growth was not present.

Considering the current deteriorating range condition in the Bill Williams Mountains and the possibility of insufficient winter precipitation to propagate replenishment of the depleted winter annuals, future range conditions may be critical to both burros and bighorn sheep. This in turn, may lead to increased burro and bighorn use of the Planet Ranch cultivated fields. Continuing burro-bighorn research will be fundamental in assessing these effects on the bighorn sheep and the rapidly expanding burro population.

Kofa Mountains

In July 1975 a total of 20 burros were collared and marked with ear tags. Color collars were put on 13 animals and radio collars were placed on 7. Susan Woodward has been monitoring the movements and reproductive success of this population. However, it appears that we will abandon this area and establish a new study area in the Black Mountains.