Appendix 15.A

Vegetation Survey Navajo Mine Area 4 North 1987

VEGETATION SURVEY

Navajo Mine

Area IV North

by

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VEGETATION INFORMATION
Navajo Mine
Area IV North

Table of Contents

1.1 Introduction 1

1.2 Vegetation Mapping and Sampling 1

1.3 Methodology 1

1.3.1 Vegetal Cover 2

1.3.2 Frequency 2

1.3.3 Constancy 2

1.3.4 Production 2

1.3.5 Density 3

1.3.6 Sample Adequacy 3

1.3.7 Randomization 3

1.4 Results and Discussion 4

1.4.1 Alkali Wash Range Site 4

1.4.2 Arroyo Shrub Range Site 5

1.4.3 Badlands Range Site 6

1.4.4 Dunes Range Site 7

1.4.5 Saline Sands Range Site 8

1.4.6 Sands Range Site 9

1.4.7 Thin Breaks Range Site 10

1.4.8 Sample Adequacy 11

1.5 General Plant Survey of Area IV North, Navajo Mine, with Emphasis on Rare, Threatened, or Endangered Species 12

Appendix A 24

VEGETATION INFORMATION

1.1 Introduction

The native vegetation of the Navajo Mine Study Area is characteristic of the Colorado Plateau salt-desert shrub ecosystem. Salt-desert shrub ranges occur in Utah, Nevada, Western Colorado, Northeastern Arizona, and Northwestern New Mexico. This ecosystem contains a large number of salt tolerant species and a significant shrub component. Common shrubs present include numerous species of salt bush (*Atriplex* spp.), rabbitbrush (*Chrysothamnus* spp.), Mormon tea (*Ephedra* spp.), and snakeweed (*Gutierrezia sarothrae*). The grass community is generally dominated by the warm season species of galleta (*Hilaria jamesii*) and alkali sacaton (*Sporobolus airoides*) and the annual, cheatgrass (*Bromus tectorum*). The only cool-season grass of any significance is Indian ricegrass (*Oryzopsis hymenoides*). Prevalent forb species include ribscale (*Atriplex powellii*), globemallow (*Sphaeralcea* spp.), buckwheat (*Eriogonum* spp.), and Russian thistle (*Salsola iberica*).

1.2 Vegetation Mapping and Sampling

The first step characterizing the vegetation on the Navajo Mine Study Area was to produce a map that divided areas into representative units. This was accomplished by producing a range site map for the entire study area. Range sites are separate vegetation communities found on rangelands and are defined as follows:

> A distinctive kind of rangeland, which in the absence of abnormal disturbance and physical site deterioration has the potential to support a native plant community typified by an association of species different from that of other sites. This differentiation is based upon significant differences in kind or proportion of species, or total productivity (Society for Range Management. 1974. A Glossary of Terms Used in Range Management. 2nd Ed. Belke Printing Co. Denver).

Site-specific range sites were identified on the Study Area by aerial photography interpretation followed by ground truthing. Pace transects were run on undisturbed areas to obtain data on species composition and frequency of species occurrence. This information along with site-specific data on soils, geology, and topography were used to delineate individual range sites.

The map showing the distribution and extent of the seven range sites found on the Study Area are presented at the end of the report.

Sampling of the vegetation on the seven range sites occurred in July and August of 1987. This report will characterize the vegetation of the Study Area based on the 1987 data. This data is presented in its entirety as tables at the end of the report.

1.3 Methodology

Personnel of Buchanan Consultants Ltd. collected the data necessary to complete the following information:

1. Vegetation basal cover, frequency, and constancy for each species in the herbaceous stratum for each plant community.

2. Total annual production for each species in the herbaceous stratum for each plant community.

3. Basal cover, frequency, constancy, and density for each species in the shrub stratum for each plant community in which the shrub stratum is present.

4. Total production for each palatable species in the shrub stratum for each plant community in which the shrub stratum is present.

The following methodologies were utilized to assure that data was collected in a timely and statistically adequate manner.

1.3.1 Vegetal Cover

Vegetal cover by species for grasses, forbs, and shrubs was determined by utilizing a 30 meter line intercept transect. Continuous readings recording intercepted length of live vegetation were taken along the entire length of the transect. The intercepted length of each plant was recorded to the nearest 1 mm. Each transect counted as one sample.

1.3.2 Frequency

Frequency was obtained by species for grasses, forbs, and shrubs. The 30 meter tape was divided into ten subplots each 3 meters in length. The number of subplots, in which a given species was present, was recorded as a percentage.

1.3.3 Constancy

Constancy was calculated for each species by dividing the number of transects in which a species was recorded by the total number of transects within each vegetative type. Constancy values were recorded as a percentage.

1.3.4 Production

Production for grasses, forbs, and shrubs was harvested by species within a 10 cm x 10 m quadrat (1 m^2). The longest edge of the quadrat was placed to the right of and adjacent to a previously selected random location along the 30 meter tape. All plant biomass within the vertical projection of the quadrat was clipped regardless of rooting location. The clipped green weight was recorded to the nearest one tenth gram. Sample adequacy for production was based on these field weights. Each quadrat counted as one sample.

The clipped biomass was oven-dried at 60° C to a constant weight and recorded to the nearest one hundredth gram. All calculations of Animal Unit Months (AUMs) are reported on a per acre basis using the oven-dried weights. Animal Unit Month figures were computed by multiplying production by their appropriate Proper Use Factor (PUF). PUF values for each species were supplied by the Bureau of Indian Affairs, Shiprock Agency and the Bureau of Land Management, Farmington Resource Area Office. The products of PUF values times production/acre values

for each species were totaled by vegetation type.

AUMs per acre for each vegetation type was then calculated using the formula:

$$\text{AUM/acre} = \frac{(\text{PUF} \times \text{production})/\text{acre}}{28 \text{ lbs/day} \times 30 \text{ days/month}}$$

1.3.5 Density

Density for shrubs was determined from counting the number of rooted individuals by species within one meter of either side of the 30 meter transect. Data are expressed in numbers per acre or hectare.

1.3.6 Sample Adequacy

Sample adequacy for vegetal cover and production was determined based on the formula:

$$N = \frac{Z^2 \; s^2}{(d \; x)^2}$$

Where: N = Number of samples (minimum sample size)

s = Sample standard deviation

d = Precision level for desired percentage of the sample mean (expressed as a decimal).

x = Sample mean

Z = Value for specified confidence level.

The values of z and d are 1.345 and 0.20, respectively.

If, after 40 samples, sample adequacy had not been met at the desired level of accuracy, no further sampling was conducted for that range site and the sample size was considered adequate.

1.3.7 Randomization

Selection of the starting point, direction of the line intercept transect and the location of the production quadrant along the transect was completely random. The starting point for the line transect was determined by overlaying the vegetative map with a grid, assigning coordinate axes and then selecting the coordinate values from a random numbers table. A minimum of 15 sampling points was selected for each vegetative type. Following collection of data from these 15 sampling points, sample adequacy was calculated for vegetative cover and production for each vegetation type. If additional sampling points were needed to meet sample adequacy, the random selection procedure was repeated.

Direction of the transect was randomly selected by running the transect in the direction of the position of the watch second hand at the exact time that the starting point for the line transect was located in the field. If the transect extended into another vegetative type, at that point another random direction was chosen by the above method to

continue the transect to its 30 meter length.

Location of the production quadrat along the line transect was determined by selection of numbers from a random numbers table. This number was determined prior to going to the field.

1.4 Results and Discussion

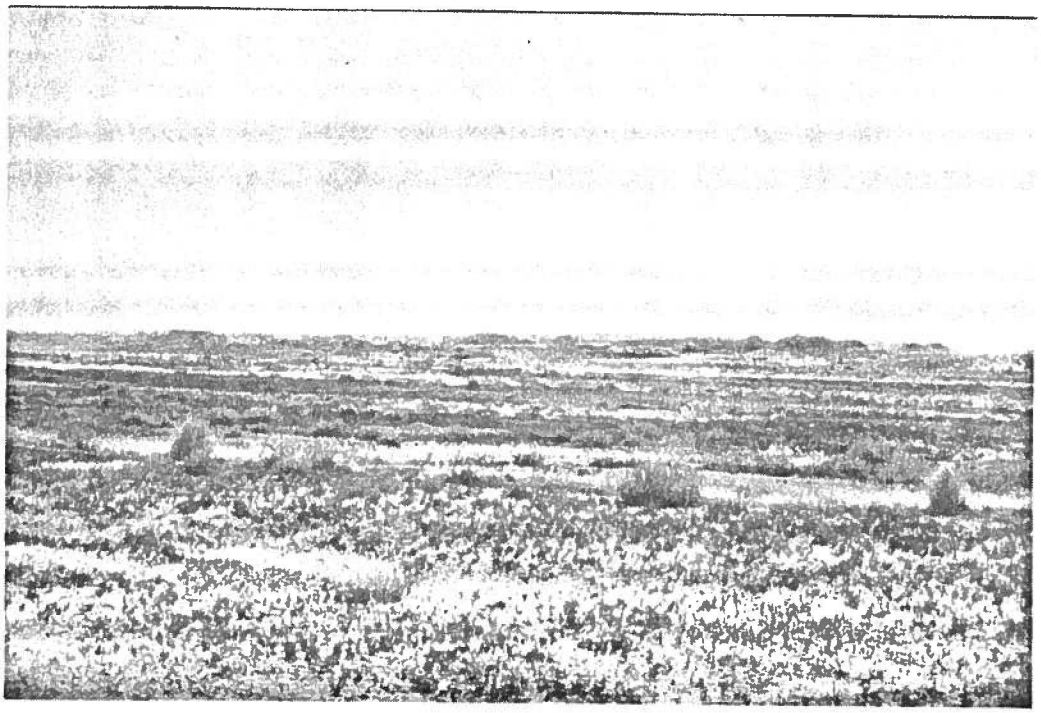
The Navajo Mine Study Area is delineated into seven range sites:

1. Alkali Wash
2. Arroyo Shrub
3. Badlands
4. Dunes
5. Saline Sands
6. Sands
7. Thin Breaks

No vegetation was found in areas delineated as River Wash on the maps.

Table 1-1 summarizes the cover and shrub density data for the 1987 survey. Table 1-2 summarizes the production or phytomass and carrying capacity data. The following sections are a discussion of the data from each range site.

1.4.1 Alkali Wash Range Site



Alkali Wash range sites occupy approximately 42.2 percent of the study area and are typically located in washes and major drainages as well as at the base of Badlands. Terrain is nearly level to moderately sloping ranging from zero to three percent. The soils are shallow and unsuitable for salvage because of heavy clays and high sodic levels.

Table 1.1. Summary of cover and shrub density for all sites

Summary	ACREAGE	COVER (%) Foliar mm	Foliar mean	Basal mm	Basal mean	Standard deviation	SHRUB DENSITY #/m square Mean	#/m square Std. dev.	#/ha Mean	#/acre Mean
Alkali Wash	1135	69814	5.81	27873	2.31	5.82	0.416	0.974	2850	1153
Arroyo Shrub	104	128130	10.68	52062	4.34	8.73	0.738	1.593	7362	2978
Badlands	786	39633	3.3	13911	1.17	3.23	0.125	0.264	1250	506
Dunes	75	101265	8.44	43186	3.58	6.33	0.691	0.963	6949	2813
Saline Sands	37	74472	6.09	45809	3.83	4.88	0.269	0.543	2688	1087
Sands	146	75143	6.19	35171	2.94	4.93	1.646	1.798	15569	6301
Thin Breaks	387	85342	7.11	42173	3.49	5.34	0.782	1.079	7832	3171

Table 1.2. Summary of production (phytomass) and carrying capacity for all sites.

All Sites

	GREEN PHYTOMASS		DRY PHYTOMASS				CARRYING CAPACITY			
Summary	g/m square		g/m square		kg/ha	lb/ac	AUM'S/acre			
	Mean	Std. dev.	Mean	Std. dev.	Mean	Mean	Cattle	Sheep	Horses	Deer
Alkali Wash	97.03	261.58	65.45	168.92	654.33	584.04	0.1435	0.1468	0.1084	0.0937
Arroyo Shrub	271.61	676.43	156.06	375.28	1560.44	1392.82	0.3031	0.3534	0.3141	0.0765
Badlands	75.19	257.61	44.24	146.3	442.32	394.78	0.0958	0.1431	0.1032	0.047
Dunes	224.95	556.3	137.11	322.64	1370.83	1223.57	0.3108	0.3272	0.2928	0.0187
Saline Sands	153.8	271.36	102.37	182.66	1023.78	913.81	0.4599	0.4631	0.4573	0.0142
Sands	172.06	393.67	102.77	244.01	1027.71	917.33	0.2731	0.293	0.277	0.042
Thin Breaks	169.49	369.41	117.52	248.09	1175.05	1048.93	0.2293	0.3907	0.2931	0.1045

These conditions made the site very unproductive.

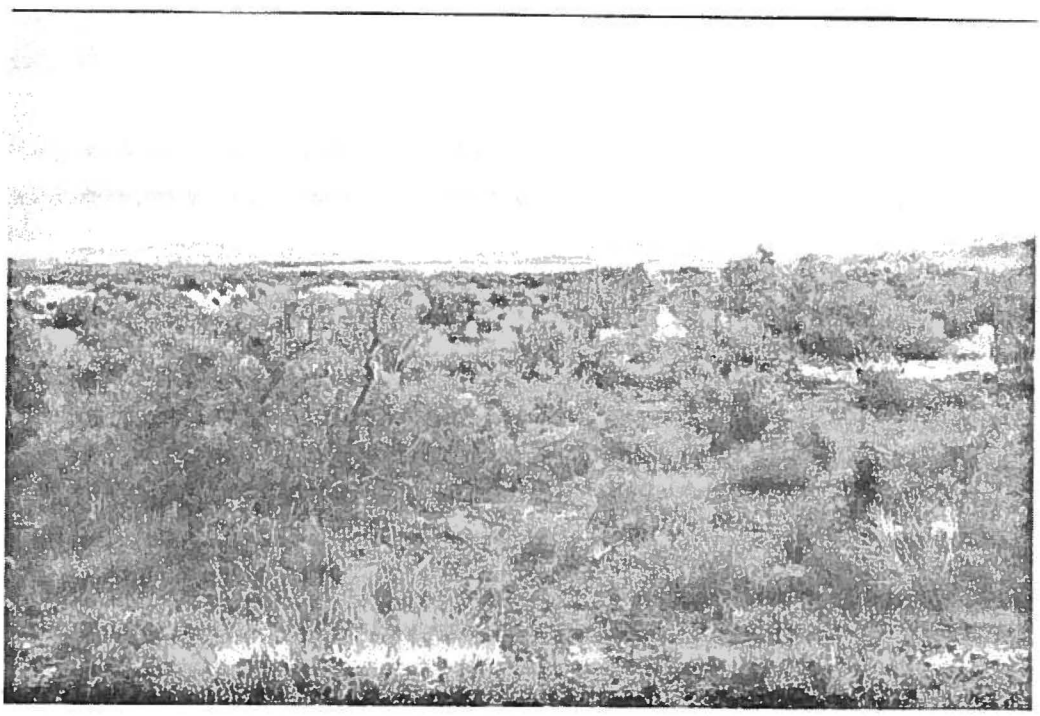
Total vegetation cover on the range site was 2.31 percent with 1.62 percent perennial vegetation and 0.69 percent contributed by annuals. The site is dominated by the annual species of Salsola iberica, Atriplex powellii, and Halogeton glomeratus which comprise 1.0, 0.12, and 0.13 percent cover, respectively. The highest cover values for perennials were recorded for Atriplex obovata (0.65 percent), and Sporobolus airoides (0.45 percent).

The Alkali Wash range site had a total mean production of 584 pounds per acre. Annuals made up 355 pounds per acre with perennials contributing 229 pounds per acre. Highest producing annual species were Salsola iberica and Atriplex powellii at 156 and 114 pounds per acre, respectively. Atriplex obovata had 117 pounds per acre. Atriplex confertifolia had 32 pounds per acre while Suaeda torreyana and Atriplex cuneata had 32 and 29 pounds per acre, respectively. Sporobolus airoides had 18 pounds per acre which was the highest producing perennial grass.

The average shrub density for this site was 1683 plants per acre. Atriplex obovata had a mean density of 1153 per acre. Atriplex corrugata and Atriplex cuneata each had a density of 179 per acre.

The computer printouts for this range site can be found at the end of this report.

1.4.2 Arroyo Shrub Range Site



Arroyo Shrub range sites are found on level or nearly level (zero to 2 percent slopes) terrain located next to stream beds in major drainages, such as Cottonwood Wash, and occupy approximately 3.9 percent of the

Study Area. The soils are stratified sands and often have high Sodium Adsorption Ratio values. Production is still high on the site because of the deep, well-drained soil and proximity to water.

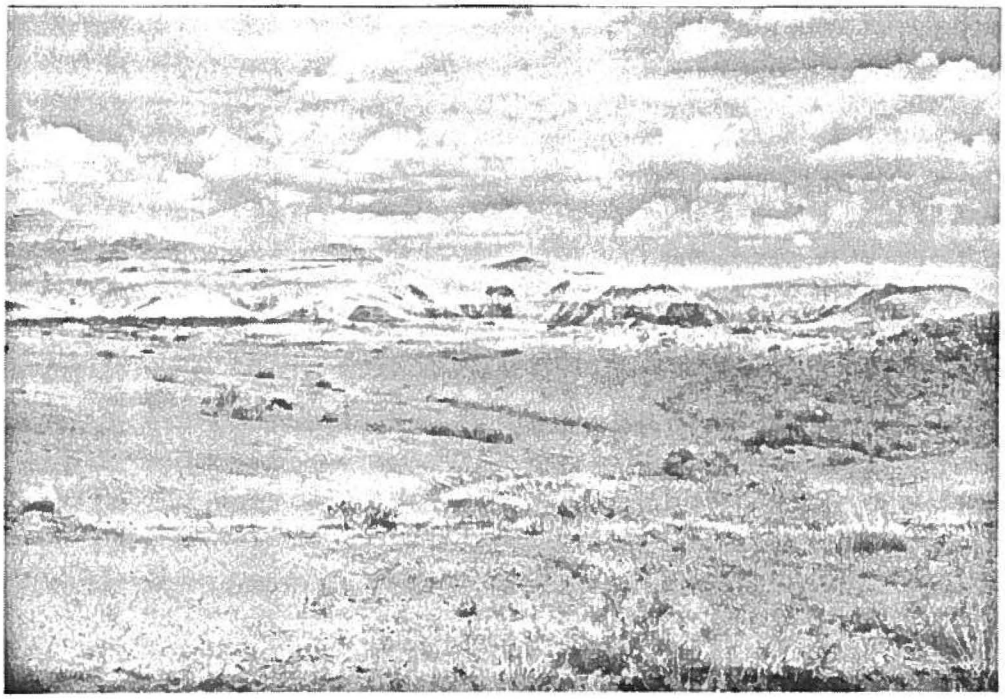
Total vegetation cover mean was 4.34 percent. Perennial vegetation made up 3.61 percent with annuals contributing 0.73 percent. Bromus tectorum had 0.47 percent cover while Vulpia octoflora had 0.18 percent. Forb cover was negligible. Perennial grasses with the most cover were Sporobolus airoides (1.07 percent), Hilaria jamesii (0.6 percent), and Oryzopsis hymenoides (0.27 percent).

Total production on this site averaged 1,393 pounds per acre. Perennial vegetation comprised 1,194 pounds per acre with annual vegetation making up 199 pounds per acre. The highest perennial production values were for Sporobolus airoides (116 pounds per acre), Sarcobatus vermiculatus (253 pounds per acre), Chrysothamnus nauseosus (348 pounds per acre), and Gutierrezia sarothrae at 118 pounds per acre.

Shrub density was the third highest of the seven range sites with a mean value of 2,978 plants per acre. Gutierrezia sarothrae had a mean density of 1,150 plants per acre followed by Atriplex obovata at 958 plants per acre.

The computer printouts for this range site can be found at the end of this report.

1.4.3 Badlands Range Site



The Badland range sites consist of exposed, weathered shales with steep to moderately undulating topography (10 to 60 percent). These sites, generally occur between plateau edges and major drainages and form

approximately 29.2 percent of the Study Area. This is the most unproductive of the seven range sites, and none of the soil material is suitable for salvage because of the high clay content and high sodium values.

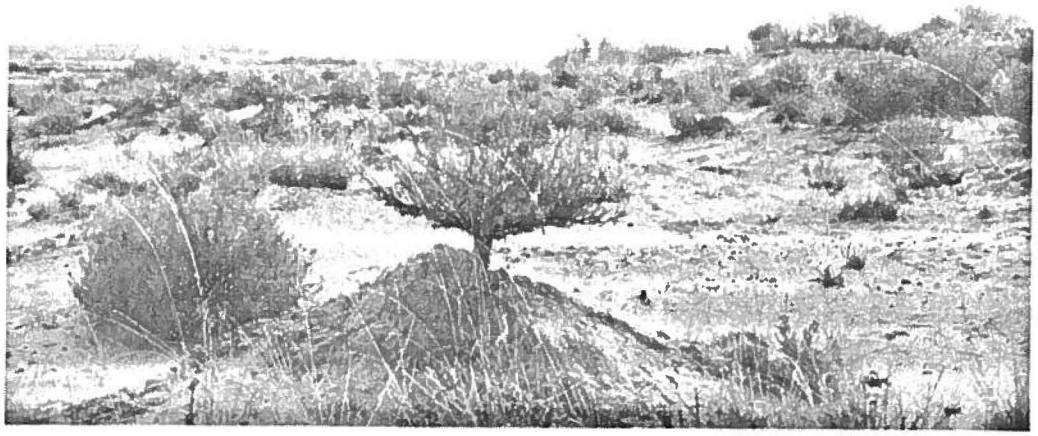
Total vegetation cover on this site averaged 1.17 percent. Annual vegetation made up 0.42 percent and perennial vegetation comprised 0.75 percent of the total cover. The highest cover values were recorded by the Atripex species. Cover for Atriplex powellii was 0.17 percent, Atriplex obovata was 0.28 percent, Atriplex confertifolia was 0.16 percent, Atriplex cuneata was 0.11 percent, and Atriplex corrugata was 0.09 percent.

Total production was 395 pounds per acre. Nearly half of this was from annuals (143 pounds per acre) and only 24.8 pounds was from perennial grasses. Shrubs of the genus Atriplex made up 227 pounds per acre.

Shrub density on Badlands was low in comparison to the other sites at 506 plants per acre. Atriplex obovata had the highest shrub density of 266 plants per acre followed by Atriplex cuneata at 155 plants per acre.

The computer printouts for this range site can be found at the end of the report.

1.4.4 Dunes Range Site



The Dunes range site is the second most productive found on the Study Area. It is the most productive for desirable forage plants. Dunes form gently rolling terrain (zero to 5 percent) located on the leeward side of ridges, bluffs, or plateaus. Dunes soils are deep and composed

of well-drained sands. Dunes range sites comprise approximately 2.8 percent of the Study Area.

Total vegetation cover of these sites was relatively high at 3.58 percent. All of the cover was perennial vegetation. The highest cover values were for grasses Muhlenbergia pungens (1.27 percent), Oryzopsis hymenoides (0.59 percent), Sporobolus airoides (0.27 percent), and Aristida purpurea (0.23 percent). Four shrubs were found in nearly equal amounts and consisted of Ephedra torreyana (0.25 percent), Eriogonum leptocladon (0.22 percent), Chrysothamnus pulchellus (0.19 percent), and Gutierrezia sarothrae (0.16 percent).

Total production on the Dunes range site averaged 1,224 pounds per acre, with perennials making up 1,223 pounds per acre and annuals only 1 pound. Penstemon strictus was the highest producing perennial forb with 4.58 pounds per acre while Oryzopsis hymenoides and Muhlenbergia pungens were the highest producing grasses with 170 and 105 pounds per acre, respectively.

Shrub species had a density value of 2,813 plants per acre on the Dunes range sites. Gutierrezia sarothrae had the highest value of 1,096 plants per acre followed by Eriogonum leptocladon with 710 plants per acre.

The computer printouts for this range site can be found at the end of this report.

1.4.5 Saline Sands Range Site

The Saline Sands range sites form the smallest expanse in the Study Area. Total area occupied by this vegetation type is approximately

1.39 percent of the Study Area. Terrain is level to gently rolling (zero to 5 percent slopes). The site in this Study Area is located downwind from strongly alkali affected sites (i.e., Badlands, Alkali Wash) or surrounding such sites. Soil types are moderately deep and soils of these sites tend to be alkaline in nature, thereby supporting vegetation species which are moderately salt tolerant.

Total vegetation cover on this site was second highest for all seven sites at 3.83 percent. Perennial vegetation made up 3.47 percent with perennial grasses comprising 3.35 percent. Cover of the perennial vegetation was dominated by grass species as follows: Sporobolus airoides (2.25 percent), Oryzopsis hymenoides (0.64 percent), and Hilaria jamesii (0.31 percent).

The only annual producing any significant cover was Vulpia octoflora at 0.12 percent.

Production of all vegetation on the Saline Sands range site averaged 914 pounds per acre. Sporobolus airoides (431 pounds per acre) and Oryzopsis hymenoides (238 pounds per acre) made up most of the production for the site.

Shrub density on this range site was 1089 plants per acre. Gutierrezia sarothrae had the majority of density with 682 plants per acre.

The computer printouts for this range site can be found at the end of this report.

1.4.6 Sands Range Site

The Sands range sites are usually located on the leeward and lower

windward side of ridges and plateaus occupying approximately 5.44 percent of the Study Area. Soils, aeolian in nature, are moderately deep and well-drained. Terrain is flat to gentle, rolling slopes (zero to 5 percent).

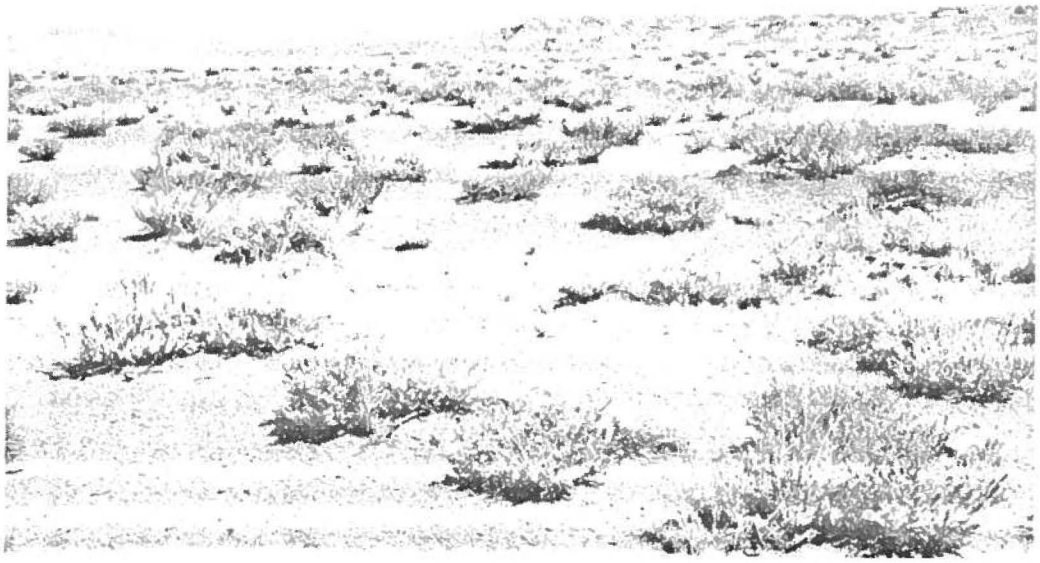
The Sands range site had a total vegetation cover of 2.94 percent. Annual vegetation contributed only 0.14 percent. Much of the total cover came from four species: Oryzopsis hymenoides (0.52 percent), Sporobolus airoides (0.61 percent), Hilaria jamesii (0.44 percent), and Gutierrezia sarothrae (0.59 percent).

Total production on this range site averaged 917 pounds per acre. Perennial vegetation contributed 834 pounds per acre with annuals having only 83 pounds per acre. The highest producing annual species was Salsola iberica at 37 pounds per acre. The six top producing perennials are: Oryzopsis hymenoides (162 pounds per acre), Sporobolus airoides (124 pounds per acre), Hilaria jamesii (73 pounds per acre), Gutierrezia sarothrae (275 pounds per acre), Atriplex confertifolia (63 pounds per acre), and Atriplex obovata (61 pounds per acre).

The Sands range site had the highest shrub density of the seven range sites at 6,301 plants per acre. The majority of these plants were Gutierrezia sarothrae with 5,319 plants per acre.

The computer printouts for this range site can be found at the end of this report.

1.4.7 Thin Breaks Range Site



Thin breaks topography includes exposed sandstone outcrops and associated thin soils of the immediate surrounding area. Thin breaks

range sites occup approximately 14.4 percent of the Study Area. These sites usually occur along ridges and rock outcrops between plateaus and major drainages or plateaus and Badlands, as well as butte and mesa tops. Slopes vary from 2 to 9 percent. Typical soils are shallow sandy deposits overlaying sandstone. The soil surface is usually covered with thin, broken fragments of sandstone.

Thin breaks range site had a total vegetation cover value of 3.49 percent. Perennial vegetation species made up 3.39 percent while annuals constituted the remainder or 0.10 percent. Perennials with the highest cover values were: Sporobolus airoides (0.62 percent), Hilaria jamesii (0.47 percent), Atriplex confertifolia (1.50 percent), and Atriplex obovata (0.46 percent). None of the annuals had any substantial cover values.

Total plant production on this site averaged 1,048 pounds per acre with perennials contributing 1,018 pounds per acre and annuals 30 pounds per acre. Top producing perennial species included Sporobolus airoides (100 pounds per acre), Atriplex confertifolia (573 pounds per acre), and Atriplex obovata (181 pounds per acre). Of the annuals Atriplex powellii had 13 pounds per acre and Salsola iberica had 7 pounds per acre.

Shrub density on the Thin breaks range site averaged 3,171 plants per acre. Atriplex confertifolia was the most abundant with 1,685 plants per acre or more than half of the total. Other abundant shrubs were Atriplex obovata (641 plants per acre) and Gutierrezia sarothrae (432 plants per acre).

The computer printouts for this range site can be found at the end of this report.

1.4.8 Sample Adequacy

Sample adequacy for production and cover on all the range sites, except for cover on Saline Sands range site, was met by taking 40 samples as explained in Section 1.3.6. Because of miscalculation or counting error in the field, 46 samples were taken for Sands range site. All 46 samples were used in calculations for the Sands range site in this report. Because of the tremendous variability between transects, statistical sample adequacy requirements on some range sites would have required several hundred samples. Discussions with O.S.M. on this issue at other UII projects in New Mexico resulted in an agreement that 40 samples would be the maximum number of samples taken on any one range site. Cover on Saline Sands met statistical sample adequacy by taking 34 samples.

GENERAL PLANT SURVEY OF AREA IV NORTH, NAVAJO MINE, WITH EMPHASIS ON RARE, THREATENED, OR ENDANGERED SPECIES

21-25 July 1987

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TABLE OF CONTENTS

Page

INTRODUCTION 14

Objective 14

Methods 14

Previous Work 14

SPECIES OF SPECIAL CONCERN 15

Found 15

Not Found 15

LIST OF VASCULAR PLANT SPECIES FOUND ON THE STUDY SITE 18

REFERENCES 23

INTRODUCTION

This document reports the findings of a plant survey taken 21-25 July 1987 on Area IV North of the Navajo Mine, owned by BHP-Utah International, Inc. The study site lies about 15 miles south of Fruitland, New Mexico, and about 10 miles southeast of The Hogback. It is bounded roughly on the north by the Cottonwood Arroyo and on the south by the Pinabete Arroyo. It is approximately 3.5 miles at the longest point and 4 miles at the widest point, and comprises approximately 10 square miles. Elevation ranges from about 5300 ft. to about 5600 ft. above sea level. The native vegetation is typical of the Colorado Plateau salt-desert shrub ecosystem, with the dominant plants being species of Atriplex, Bromus, Chrysothamnus, Gutierrezia, Hilaria, Oryzopsis, Sarcobatus, and Sporobolus. Topography includes flat plains and washes, mesas and buttes, eroded talus slopes, and rounded badland hills and knolls.

Objective: To document the occurrence of the plant species found on the study area, with particular emphasis placed on rare, threatened, or endangered species.

Methods: Based on previous work done at the mine (see below), a review of pertinent literature (see References), and personal knowledge and expertise, a preliminary list of "possible species of special concern" was drawn up (see Species of Special Concern, below). In particular, the plant survey by Richard Spellenberg in 1983 of Areas I-III of the Navajo Mine was a valuable reference. In addition, habitats were identified where the species of special concern might occur. At the study site, all types of vegetation (range types) were surveyed, with special attention paid to potential habitats of the species of special concern. The survey was done entirely by foot. For plants already well-known to the author, identification was done in the field; other plants were collected, pressed, and identified later with the aid of appropriate manuals, monographs, and herbarium specimens. These specimens are deposited in the Range Science Herbarium, Department of Animal and Range Sciences, New Mexico State University, Las Cruces. Notes were taken regarding vegetation type, soils or substrate, topography, abundance, and associated plant species. Color photographs were also taken of many plants and habitats. A significant difficulty encountered in the survey was the timing relative to the growing season. Some spring-flowering plants may have already fruited and died and may have been missed in the survey. However, as many dead plants as possible were identified. Also, many of the fall-flowering species had not yet begun to bloom.

For further information about species of special concern, contact the Heritage Program, New Mexico Department of Natural Resources, Villagra Building, Santa Fe, NM 87503 (attn. Paul Knight), 827-7865

Previous Work: In November 1983 Richard Spellenberg prepared "A Report On the Plant Species Present On the Navajo Mine, With Special Emphasis On Threatened Or Endangered Species." For this he surveyed approximately 45 square miles of land to the north of the present study site, comprising Areas I-III of the Navajo Mine. He identified species of special concern and reported on those species found in his study area. He also supplied a complete listing of all

species found on the area, with notes on occurrance and abundance. His work was utilized heavily in gaining a preliminary understanding of the plants on the present study site. In order to easily compare the study areas, this report will refer to his findings. In 1986, Dr. Spellenberg also prepared for the mine "An Annotated List of the Plant Species on the Navajo, San Juan, and La Plata Coal Mines, Utah International, Inc." Acknowledgment is herein given for his contribution to this report.

SPECIES OF SPECIAL CONCERN

This section reports on the the species of special concern that may occur on the study site. The locations of species that were found are marked on the orthophotos of Area IV North, maps 8 and 9.

FOUND:

Oenothera caespitosa ssp. navajoensis (Onagraceae)
Classification: Species of special concern
Source: New Mexico Heritage Program

Oenothera caespitosa was encountered infrequently in the thin breaks and badlands range types. The plants were past flowering but still carried the fruiting capsules and could be identified as subsp. navajoensis. According to the recent revision of this group by Wagner et al. (1985), this subspecies forms small colonies on soils derived from clays, shale, sandstone, and gypsum. In New Mexico it is found only in San Juan County and central Sandoval County, but it is more common in the Colorado Plateau region of east-central Utah, northern Arizona, and western Colorado.

Platyschkuhria integrifolia var. oblongifolia (Asteraceae)
Synonyms: Platyschkuhria oblongifolia, Bahia oblongifolia
Classification: Species of special concern
Source: New Mexico Heritage Program

The most recent treatment of this species group (Ellison 1971) classifies our plant as a variety of the wider ranging Platyschkuhria integrifolia. Subspecies oblongifolia is found in desert shrub communities in all four states of the Four Corners area and is closely related to the more northern var. desertorum. Our subspecies was found somewhat frequently in the thin breaks, but infequently in the badlands, arroyo shrub, and sand range types.

NOT FOUND:

Astragalus fucatus (Fabaceae)
Classification: Species of special concern
Source: New Mexico Heritage Program

Although not located in this survey, this species was found by Spellenberg in loose sand along the east side of the Navajo Mine.

Astragalus hallii var. hallii (Fabaceae)

Astragalus humillimus (Fabaceae)

Astragalus kentrophyta var. neomexicana (Fabaceae)

Astragalus micromerius (Fabaceae)

Astragalus monumentalis var. cottamii (Fabaceae)

Astragalus monumentalis var. monumentalis (Fabaceae)

Astragalus naturitensis (Fabaceae)

Astragalus oocalycis (Fabaceae)

Atriplex pleiantha (Chenopodiaceae)
Classification: Federal candidate, category 2
Source: Spellenberg's 1983 report, New Mexico Heritage Program

Spellenberg found this species north of our study area in badlands and alkali wash range types, and it has been found in other areas as well since 1983. These range types in area IV-north were searched very carefully, especially areas with Atriplex saccaria, a known cohabitant. The species was not found. It is possible, though it seems unlikely, that plants had dried and were not recognized. Spellenberg (personal communication) thought that this species would not be present in our study area.

Camissonia scapoidea var. scapoidea (Onagraceae)
Classification: Species of special concern
Source: Spellenberg's 1983 report, New Mexico Heritage Program

Although this species was not found during the present survey, Spellenberg found it on the north banks along Cottonwood Arroyo in sandy soil. It is a spring-flowering annual, likely withered by late July when the survey was made, and to be expected in the sandy washes at the north portion of area IV-north. It has been found in several localities in the northwest corner of New Mexico, and is common to the north.

Castilleja chromosa (Scrophulariaceae)

Cercocarpus intricatus (Rosaceae)

Cleome multicaulis (Capparidaceae)

Eriogonum ovalifolium (Polygonaceae)

Gilia formosa (Polomoniaceae)

Mimulus eastwoodiae (Scrophulariaceae)

Pediocactus knowltonii (Cactaceae)

Penstemon strictus var. *strictus* (Scrophulariaceae)

Phacelia splendens (Hydrophyllaceae)

Sclerocactus mesae-verdae (Cactaceae)
Classification: Federal threatened
Source: Federal Register, 1980

The badlands and shale formations of the area were searched very carefully for this species. All previous searches have failed to find this cactus on the mine lease, and we did not find it in area IV-North.

Sclerocactus whipplei var. *heilii* (Cactaceae)

Sclerocactus whipplei var. *reevesii* (Cactaceae)

Sclerocactus new species, as yet undescribed (Cactaceae)

Ken Heil has recently found an undescribed species of Sclerocactus near Sheep Springs. It is very tiny and apparently allied to *S. mesae-verdae* (Spellenberg, personal communication). No cactus was found in this survey that could be this new species.

Veronica micromeria (Scrophulariaceae)

Wyethia scabra var. *canescens* (Asteraceae)

LIST OF VASCULAR PLANT SPECIES FOUND ON THE STUDY SITE

A list is presented of the vascular plants found in area IV-North in this survey. The species are arranged alphabetically within families. Following each species is an estimate of its occurrence by range type. The range types are abbreviated as follows:

pond = stock ponds and drains
rw = river wash
alwa = alkali wash
arsh = arroyo shrub
sa = sands (including saline sands and calcareous sands)
du = sand dunes
thbr = thin breaks
bd = badlands

Frequency of occurrence is estimated following Spellenberg's 1980 report, as follows:

<u>COMMON</u> = part of the dominant vegetation; encountered regularly and often.
abbreviation: all upper case and underlined (<u>POND</u>)

OCCASIONAL = encountered several times during a search, but not regularly part of the dominant vegetation.
abbreviation: all upper case (POND)

uncommon = rarely encountered during the search
abbreviation: all lower case (pond)

The frequency of the annuals and herbaceous perennials is likely underestimated because of die-off during the time of search.

An asterisk (*) notes species found that have not been recorded previously for the Navajo Mine.

APIACEAE (Carrot Fam.)	
Cymopteris sp.	sa, bd
ASCLEPIADACEAE (Milweed Fam.)	
Asclepias sp.	sa
ASTERACEAE (Sunflower Fam.)	
Ambrosia acanthicarpa (= Franseria a.)	RW, SA, DU
Artemisia bigelovii	sa, thbr
Artemisia dracunculus (=A. dracunculoides)	RW, alwa
Artemisia filifolia	sa, du
Artemisia ludoviciana subsp. mexicana	RW
*Bahia woodhousei	thbr
Brickellia oblongifolia	SA, du, THBR, bd

Chrysothamnus nauseosus subsp. graveolens	RW, alwa, ARSH,
Chrysothamnus pulchellus subsp. baileyi	sa, DU
Chrysothamnus greenei	SA
Conyza canadensis	POND, alwa
Dicoria brandegei	RW, DU
Gaillardia pinnatifida	sa
Grindelia squarrosa	POND, alwa, sa, thbr
Gutierrezia sarothrae	ALWA, ARSH, SA, DU, THBR
*Isocoma tenuisecta	rw, arsh
*Iva axillaris	POND
Lactuca serriola	arsh
Leucelene ericoides	alwa, arsh, SA, DU, bd
Machaeranthera canescens	sa, DU, thbr, bd
Platyschkuhria integrifolia var. oblongifolia (= Bahia oblongifolia)	arsh, sa, THBR, bd
Senecio douglasii var. longilobus	pond, alwa, sa, du
Stephanomeria exigua	arwh, arsh, sa, du
Townsendia fendleri	du
BORAGINACEAE (Borago Fam.)	
Cryptantha crassisepala var. elacantha	ALWA, ARSH, SA, du, THBR, bd
BRASSICACEAE (Mustard Fam.)	
Descurainia pinnata	alwa, arsh, sa, du
Sisymbrium altissimum	ALWA, ARSH, thbr, BD
CACTACEAE (Cactus Fam.)	
Opuntia polyacantha	arsh, SA
Sclerocactus whipplei var. intermedius	arsh, sa, thbr, bd
CAPPARIDACEAE (Caper Fam.)	
Cleome lutea	rw, ALWA, ARSH, sa, du, bd

CHENOPODIACEAE (Goosefoot Fam.)

Atriplex argentea subsp. argentea	pond
Atriplex canescens	alwa, ARSH, SA, DU, THBR, bd
Atriplex confertifolia	ALWA, ARSH, SA, THBR, BD
Atriplex corrugata	ALWA, ARSH, THBR, BD
Atriplex gardneri var. cuneata (= A. cuneata, A. nuttallii var. cuneata)	alwa, arsh, BD, THBR
Atriplex obovata	ALWA, arsh, thbr, BD
Atriplex powellii	POND, ALWA, ARSH, SA, BD
Atriplex saccaria	arsh, BD
Chenopodium leptophyllum	POND
Ceratoides lanata	sa
Halogeton glomeratus	ALWA, thbr, BD
Kochia scoparia	pond
Salsola iberica (= S. kali)	POND, RW, ALWA, ARSH, SA, du, THBR, BD
Sarcobatus vermiculatus	ALWA, ARSH, sa, bd
Suaeda torreyana	pond, ALWA, ARSH, BD

CONVOLVULACEAE (Morning-glory Fam.)

*Evolvulus pilosus	DU

EPHEDRACEAE (Mormon Tea Fam.)

Ephedra torreyana	ARSH, SA, THBR
Ephedra viridis	thbr

EUPHORBIACEAE (Spurge Fam.)

Euphorbia missurica var. intermedia	DU

FABACEAE (Pea Fam.)

Astragalus mollissimus var. thompsonae	sa
Astragalus sabulonum	sa, du
Dalea lanata (= D. terminalis)	SA
*Glycerrhiza lepidota	RW

Hoffmanseggia jamesii	sa
Parryella filifolia	SA, DU
Psoralea lanceolata	RW
HYDROPHYLLACEAE (Waterleaf Fam.)	
Nama hispidum var. hispidum	sa
Phacelia crenulata var. corrugata	ALWA, ARSH, sa, thbr
LILIACEAE (Lily Fam.)	
Allium macropetalum	arwa
Yucca angustissima	SA, thbr
LINACEAE (Flax Fam.)	
Linum aristatum	SA
LOASACEAE (Loasa Fam.)	
Mentzelia albicaulis	ALWA, ARSH, SA, THBR, BD
Mentzelia multiflora	sa, thbr, BD
MALVACEAE (Mallow Fam.)	
Sphaeralcea coccinea	SA, du, THBR, bd
Sphaeralcea parviflora	alwa, arsh, SA, DU
ONAGRACEAE (Evening Primrose Fam.)	
Oenothera caespitosa subsp. navajoensis	thbr, bd
Oenothera pallida	SA
OROBANCHACEAE (Broomrape Fam.)	
Orobanche ludoviciana	SA, du
PLANTAGINACEAE (Plantain Fam.)	
Plantago patagonica (= P. purshii)	RW, ALWA, ARSH, SA, du, thbr, bd
POACEAE (Grass Fam.)	
*Agropyron cristatum	alwa
Agropyron smithii	RW
Aristida purpurea var. fendleriana	SA, DU
*Aristida purpurea var. nealleyi	sa
Bromus rubens	alwa, arsh
Bromus tectorum	ALWA, ARSH, SA, THBR, BD
Distichlis spicata	RW

Hilaria jamesii	ALWA, ARSH, SA, THBR, BD
Hordeum jubatum	RW. ALWA
Hordeum pusillum	ALWA, ARSH
Muhlenbergia pungens	SA, DU
Oryzopsis hymenoides	RW, ALWA, ARSH, SA, DU, THBR, bd
Sitanion hystrix	RW, ALWA, ARSH, SA
Sporobolus airoides	ALWA, ARSH, SA, THBR, BD
Sporobolus contractus	arsh, SA, DU
Sporobolus cryptandrus	rw, sa
Sporobolus giganteus	rw, SA, DU
Stipa comata var. comata	SA
Vulpia ocotflora	ALWA, ARSH, SA, DU, THBR, bd
POLEMONIACEAE (Phlox Fam.)	
Ipomopsis gunnisonii	sa, thbr
Ipomopsis longiflora	sa
POLYGONACEAE (Buckwheat Fam.)	
Eriogonum divaricatum	BD
Eriogonum gordonii	BD
Eriogonum hookeri	thbr
Eriogonum leptocladon	SA, DU
Eriogonum salsuginosum	ARSH, THBR, BD
Eriogonum scabrellum	BD
Polygonum aviculare	POND
Rumex hymenosepalus	SA, DU
SCROPHULARIACEAE (Snapdragon Fam.)	
Penstemon strictus?	SA, DU
SOLANACEAE (Potato Fam.)	
Lycium pallidum	ALWA, ARSH
TAMARICACEAE (Saltcedar Fam.)	
Tamarix ramosissima (= T. pentandra)	RW, ARSH
VERBENACEAE (Verbena Fam.)	
Verbena bracteata	POND

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APPENDIX A

Site: Alkali Wash

	COVER (%)							CONSTANCY	FREQUENCY	DENSITY			
	Foliar mm	mean	Basal mm	mean	Standard deviation	Percentage of Group	Percentage of Total	%	%	#/m square Mean	Std.dev.	#/ha Mean	#/acr Mean
Annual Forbs													
Salsola iberica	11244	0.94	1192	0.1	0.13	27	4.2	75	40.75				
Atriplex powellii	7728	0.64	1422	0.12	0.25	32.2	5.1	87.5	39.25				
Halogeton glomeratus	3984	0.33	1506	0.13	0.35	34.1	5.4	32.5	18.25				
Descurainia pinnata	672	0.06	168	0.01	0.04	3.8	0.6	37.5	9.5				
Eriogonum gordonii	228	0.02	46	0	0.01	1	0.2	22.5	9				
Eriogonum salsuginosum	156	0.01	31	0	0.01	0.7	0.1	20	4.75				
Plantago patagonica	96	0.01	24	0	0.01	0.5	0.1	15	2.25				
Eriogonum scabrellum	36	0	7	0	0	0.2	0	2.5	0.25				
Atriplex saccaria	36	0	7	0	0	0.2	0	2.5	0.5				
Phacelia cenulata var. corrugata	12	0	3	0	0	0.1	0	2.5	0.25				
Cleome lutea	12	0	3	0	0	0.1	0	5	0.5				
Sisyabrium altissimum	12	0	8	0	0.01	0.2	0	2.5	0.25				
Allium macropetalum	12	0	3	0	0	0.1	0	5	0.5				
Total	24228	2.01	4420	0.36	0.81	100.2	15.9						
Annual Grasses													
Bromus tectorum	7572	0.63	3710	0.31	0.84	92.2	13.3	70	28.25				
Hordeum pusillum	262	0.02	149	0.01	0.05	3.7	0.5	10	2.5				
Vulpia octoflora	168	0.01	168	0.01	0.06	4.2	0.6	7.5	0.75				
Total	8002	0.66	4026	0.33	0.95	100.1	14.4						
Perennial Forb													
Sphaeralcea parviflora	12	0	6	0	0	100	0	2.5	0.25				
Total	12	0	6	0	0	100	0						
Perenial Grasses													
Sporobolus airoides	7632	0.64	5434	0.45	0.97	79.5	19.5	45	10.75				
Hilaria jamesii	1236	0.1	921	0.07	0.28	12	2.9	10	1				
Oryzopsis hymenoides	1080	0.09	567	0.05	0.2	8.3	2	20	3.75				
Sitanion hystrix	24	0	14	0	0.01	0.2	0.1	2.5	0.25				
Total	9972	0.83	6936	0.57	1.46	100	24.5						
Shrubs													
Atriplex obovata	16044	1.34	7813	0.65	1.04	62.1	28	87.5	34.5	0.259	0.431	2850	1153
Atriplex corrugata	3216	0.27	1376	0.12	0.65	10.9	4.9	5	2	0.044	0.266	442	179
Atriplex confertifolia	3180	0.27	1491	0.12	0.38	11.8	5.3	12.5	2.5	0.02	0.07	196	79
Suaeda torreyana	2832	0.24	1136	0.1	0.33	9	4.1	15	6.3	0.017	0.043	172	69
Atriplex cuneata	2208	0.18	733	0.06	0.19	5.8	2.6	15	3.75	0.044	0.144	442	179
Gutierrezia sarothrae	120	0.01	36	0	0.01	0.3	0.1	5	0.5	0.004	0.014	42	17
Sarcobatus vermiculatus	0	0	0	0	0	0	0	0	0	0.002	0.006	17	7
Total	27600	2.31	12585	1.05	2.6	99.9	45.2			0.416	0.974	4161	1683
Grand Total	69814	5.81	27673	2.31	5.82		100						

SITE: Alkali Wash

	GREEN PHYTOMASS g/m square Mean	GREEN PHYTOMASS g/m square Std.dev	DRY PHYTOMASS g/m square Mean	DRY PHYTOMASS g/m square Std.dev.	kg/ha Mean	lb/ac Mean	Percentage of Group	Percentage of Total	CARRYING CAPACITY AUM'S/acre Cattle	Sheep	Horses	Deer
Annual Forbs												
Salsola iberica	21.43	33.39	15.6	23.6	155.97	139.22	46	23.8	0.0663	0.0663	0.0663	0.0663
Atriplex powellii	13	27.13	11.42	22.1	114.15	101.89	33.7	17.4	0.0243	0.0243	0.0243	0.0243
Halogeton glomeratus	13.35	35.63	5.43	15.5	54.33	48.5	16	8.3	0	0	0	0
Descurainia pinnata	0.7	2.53	0.89	3.39	8.88	7.92	2.6	1.4	0	0	0	0
Eriogonum gordonii	0.13	0.34	0.32	1.19	3.23	2.88	1	0.5	0.0005	0.0005	0.0005	0.0004
Eriogonum salsuginosum	0.03	0.16	0.06	0.33	0.6	0.54	0.2	0.1	0.0001	0.0001	0.0001	0
Plantago patagonica	0.05	0.22	0.17	0.9	1.65	1.47	0.5	0.3	0.0002	0.0002	0.0002	0.0002
Eriogonum scoprellum	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex saccaria	0	0	0	0	0	0	0	0	0	0	0	0
Phacelia cuenulata var. corrugata	0	0	0	0	0	0	0	0	0	0	0	0
Cleome lutea	0	0	0	0	0	0	0	0	0	0	0	0
Sisymbrium alttissimum	0	0	0	0	0	0	0	0	0	0	0	0
Allium macropetalum	0	0	0	0	0	0	0	0	0	0	0	0
Total	48.71	99.95	33.69	67.06	338.81	302.42	100	51.8	0.0914	0.0914	0.0914	0.0912
Annual Grasses												
Bromus tectorum	6.03	15.97	5.93	15.76	59.33	52.96	100	9.1	0	0	0	0
Hordeum pusillum	0	0	0	0	0	0	0	0	0	0	0	0
Vulpia octoflora	0	0	0	0	0	0	0	0	0	0	0	0
Total	6.03	15.97	5.93	15.76	59.33	52.96	100	9.1	0	0	0	0
Perennial Forb												
Sphaeralcea parviflora	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Perennial Grasses												
Sporobolus airoides	2.05	3.04	1.98	7.96	19.77	17.65	80.7	3	0.0105	0.0105	0.0105	0
Hilaria jamesii	0	0	0	0	0	0	0	0	0	0	0	0
Oryzopsis hymenoides	0.5	3.16	0.47	2.99	4.73	4.22	19.3	0.7	0.0028	0.0028	0.0028	0
Sitanion hystrix	0	0	0	0	0	0	0	0	0	0	0	0
Total	2.55	11.2	2.45	10.95	24.5	21.87	100	3.7	0.0133	0.0133	0.0133	0
Shrubs												
Atriplex obovata	21.03	47.97	13.18	28.63	131.78	117.62	56.9	20.1	0.028	0.042	0.028	0.014
Atriplex corrugata	0.9	4	0.42	2.63	4.21	3.75	1.8	0.6	0.0009	0.0013	0.0009	0.0004
Atriplex confertifolia	4.93	25.46	3.58	17.9	35.75	31.91	15.4	5.5	0.004	0.012	0.008	0.004
Suaeda torreyana	6	24.12	3.2	13.04	32	28.56	13.8	4.9	0	0	0	0
Atriplex cuneata	6.83	32.91	2.8	12.95	27.95	24.95	12.1	4.3	0.0059	0.0088	0.0059	0.003
Gutierrezia sarothrae	0	0	0	0	0	0	0	0	0	0	0	0
Sarcobatus vermiculatus	0	0	0	0	0	0	0	0	0	0	0	0
Total	39.74	134.46	23.18	75.15	231.69	206.79	100	35.4	0.0388	0.0421	0.037	0.025
Grand Total	97.03	261.53	65.45	168.92	654.33	584.04			0.1435	0.1468	0.1484	0.0937

Site: Arroyo Shrub

	COVER (%)							CONSTANCY FREQUENCY		DENSITY			
	Foliar		Basal			Percentage	Percentage	%	%	#/m square		#/ha	#/acr
	mm	mean	mm	mean	Std.Dev.	of Group	of Total			Mean	Std.dev.	Mean	Mean
Annual Forbs													
Salsola iberica	5328	0.44	565	0.05	0.04	63.64	1.09	60	27.25				
Descurainia pinnata	996	0.08	249	0.02	0.05	27.91	0.48	52.5	13.75				
Halogeton glomeratus	156	0.01	59	0.01	0.02	6.61	0.11	5	1.25				
Eriogonum salsuginosum	36	0	7	0	0	0.78	0.01	5	0.5				
Eriogonum scabrellum	24	0	5	0	0	0.56	0.01	2.5	0.25				
Astragalus sabulonum	12	0	1	0	0	0.11	0	2.5	0.25				
Atriplex powellii	11	0	2	0	0	0.22	0	2.5	0.25				
Plantago patagonica	10	0	2	0	0	0.22	0	2.5	0.25				
Mentzelia albicaulis	5	0	1	0	0	0.11	0	2.5	0.25				
Eriogonum gordonii	4	0	1	0	0	0.11	0	7.5	0.75				
Total	6582	0.53	892	0.08	0.11	99.97	1.71						
Annual Grasses													
Bromus tectorum	11448	0.95	5610	0.47	0.56	71.17	10.78	82.5	57.25				
Vulpia octoflora	2136	0.18	2136	0.18	0.76	27.1	4.1	17.5	7.75				
Hordeum pusillum	240	0.02	136	0.01	0.03	1.73	0.26	20	2				
Total	13824	1.15	7882	0.66	1.35	100	15.14						
Perennial Forbs													
Grindelia squarrosa	168	0.01	37	0	0.01	27.84	0.07	7.5	0.75				
Sphaeralcea parviflora	144	0.01	67	0.01	0.01	54.03	0.13	10	1				
Penstemon strictus	48	0	20	0	0.02	16.13	0.04	2.5	0.25				
Total	360	0.02	124	0.01	0.04	100	0.24						
Perennial Grasses													
Sporobolus airoides	18048	1.5	12850	1.07	1.61	55.07	24.58	55	14.75				
Hilaria jamesii	10788	0.9	7163	0.6	0.89	30.7	13.76	52.5	16				
Oryzopsis hymenoides	6216	0.52	3263	0.27	0.48	13.98	6.27	72.5	20				
Sporobolus giganteus	96	0.01	58	0	0.03	0.25	0.11	2.5	0.25				
Total	35148	2.93	23334	1.95	3.01	100	44.82						
Shrubs													
Sarcobatus vermiculatus	22476	1.87	3618	0.3	0.36	18.25	6.95	67.5	17	0.112	0.106	1117	452
Chrysothamnus nauseosus	14028	1.17	3619	0.3	0.62	18.25	6.95	27.5	8.75	0.047	0.055	467	189
Gutierrezia sarothrae	13200	1.1	3920	0.33	0.67	19.77	7.53	27.5	11	0.284	0.605	2842	1150
Atriplex obovata	10788	0.9	5254	0.44	1.42	26.5	10.09	32.5	8.75	0.237	0.672	2367	958
Atriplex canescens	6144	0.51	1352	0.11	0.24	6.82	2.65	32.5	5.25	0.037	0.048	367	148
Atriplex confertifolia	1368	0.11	642	0.05	0.17	3.24	1.23	10	1.25	0.015	0.035	150	61
Suaeda torreyana	1296	0.11	520	0.04	0.27	2.62	1	2.5	0.75	0.011	0.033	139	56
Parryella filifolia	1008	0.08	252	0.02	0.13	1.27	0.48	2.5	0.25	0.001	0.005	8	3
Yucca angustissima	816	0.07	422	0.04	0.22	2.13	0.81	2.5	0.25	0.001	0.005	8	3
Ephedra torreyana	804	0.07	137	0.01	0.07	0.69	0.26	2.5	0.25	0.001	0.004	8	3
Atriplex cuneata	276	0.02	92	0.01	0.05	0.46	0.18	2.5	0.25	0.001	0.005	8	3
Isocoma tenuisecta	12	0	2	0	0	0.01	0	2.5	0.25	0.001	0.004	7	3
Artemisia dracunculus	0	0	0	0	0	0	0	0	0	0.001	0.003	4	2
Atriplex corrugata	0	0	0	0	0	0	0	0	0	0.001	0.005	8	3
Eriogonum leptocladon	0	0	0	0	0	0	0	0	0	0.001	0.005	8	3
Total	72216	6.02	19830	1.65	4.22	100.01	38.09			0.751	1.63	7508	3037
Grand Total	128130	10.68	52062	4.34	8.73		100						

Site: Arroyo Shrub

	GREEN PHYTOMASS g/m square Mean	GREEN PHYTOMASS g/m square Std.dev.	DRY PHYTOMASS g/m square Mean	DRY PHYTOMASS g/m square Std.dev	DRY PHYTOMASS kg/ha Mean	DRY PHYTOMASS lb/ac Mean	Percentage of Group	Percentage of Total	CARRYING CAPACITY AUM'S/acre Cattle	Sheep	Horses	Deer
Annual Forbs												
Salsola iberica	12.08	23.79	5.7	11.3	57	50.88	94	3.7	0.0242	0.0242	0.0242	0.0242
Descurainia pinnata	0.1	0.38	0.36	1.51	3.63	3.24	6	0.2	0	0	0	0
Halogeton glomeratus	0	0	0	0	0	0	0	0	0	0	0	0
Eriogonum salsuginosum	0	0	0	0	0	0	0	0	0	0	0	0
Eriogonum scabrellum	0	0	0	0	0	0	0	0	0	0	0	0
Astragalus sabulonum	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex powellii	0	0	0	0	0	0	0	0	0	0	0	0
Plantago patagonica	0	0	0	0	0	0	0	0	0	0	0	0
Mentzelia albicaulis	0	0	0	0	0	0	0	0	0	0	0	0
Eriogonum gordonii	0	0	0	0	0	0	0	0	0	0	0	0
Total	12.18	24.17	6.06	12.81	60.63	54.12	100	3.9	0.0242	0.0242	0.0242	0.0242
Annual Grasses												
Bromus tectorum	15.18	19.01	14.55	17.89	143.5	129.87	90.1	9.3	0	0	0	0
Vulpia octoflora	1	3.9	1.08	3.95	10.8	9.64	6.7	0.7	0	0	0	0
Hordeum pusillum	0.58	3.48	0.53	2.82	5.25	4.69	3.3	0.3	0.0022	0.0022	0.0022	0
Total	16.76	26.39	16.16	24.66	161.55	144.2	100.1	10.3	0.0022	0.0022	0.0022	0
Perennial Forbs												
Grindelia squarrosa	0.98	6.17	0.47	2.96	4.68	4.17	51.9	0.3	0	0	0	0
Sphaeralcea parviflora	0.48	3	0.43	2.74	4.33	3.86	48.1	0.3	0.0005	0.0005	0.0005	0.0002
Penstemon strictus	0	0	0	0	0	0	0	0	0	0	0	0
Total	1.46	9.17	0.9	5.7	9.01	8.03	100	0.6	0.0005	0.0005	0.0005	0.0002
Perennial Grasses												
Sporobolus airoides	17.4	39.33	13.02	28.39	130.15	116.17	43.6	8.3	0.0691	0.0691	0.0691	0
Hilaria jamesii	11.58	19.79	9.98	16.56	99.82	89.1	33.4	6.4	0.0477	0.0424	0.0424	0
Oryzopsis hymenoides	6.58	16.11	6.3	13.97	62.98	56.21	21.1	4	0.0368	0.0368	0.0368	0
Sporobolus giganteus	0.88	3.53	0.59	3.73	5.9	5.27	2	0.4	0.0022	0.0022	0.0022	0
Total	36.44	80.76	29.89	62.65	298.85	266.75	100.1	19.2	0.1558	0.1505	0.1505	0
Shrubs												
Sarcobatus vermiculatus	66.48	118	28.35	49.03	283.48	252.03	27.5	18.2	0.0151	0.0302	0.0302	0
Chrysothamnus nauseosus	73.18	196.5	39.01	107.64	390.08	348.16	37.9	25	0.0415	0.0622	0.0415	0.0208
Gutierrezia sarothrae	19.2	55.32	13.17	36.14	131.73	117.59	12.8	8.4	0	0	0	0
Atriplex obovata	23.2	65	12.1	32.22	121.02	108.03	11.7	7.8	0.0257	0.0386	0.0257	0.0128
Atriplex canescens	14.98	52.23	7.14	23.76	71.4	63.73	6.9	4.6	0.0341	0.0379	0.0341	0.0152
Atriplex confertifolia	2.13	13.44	1.17	7.37	11.65	10.4	1.1	0.7	0.0012	0.0036	0.0024	0.0012
Suaeda torreyana	1.25	7.91	0.18	1.11	1.75	1.56	0.2	0.1	0	0	0	0
Parryella filifolia	3.25	20.56	1.29	8.16	12.9	11.52	1.3	0.8	0.0014	0.0014	0.0014	0.0014
Yucca angustissima	0	0	0	0	0	0	0	0	0	0	0	0
Ephedra torreyana	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex cuneata	1.1	6.98	0.64	4.03	6.38	5.69	0.6	0.4	0.0014	0.0021	0.0014	0.0007
Isocoma tenuisecta	0	0	0	0	0	0	0	0	0	0	0	0
Artemisia dracunculus	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex corrugata	0	0	0	0	0	0	0	0	0	0	0	0
Eriogonum leptocladon	0	0	0	0	0	0	0	0	0	0	0	0
Total	204.77	535.94	103.05	269.46	1030.4	919.72	100	66	0.1204	0.176	0.1367	0.0521
Grand Total	271.61	676.43	156.06	375.28	1560.4	1392.8		100	0.3031	0.3534	0.3141	0.0765

Site: Badlands

	COVER (%)							CONSTANCY FREQUENCY		DENSITY			
	Foliar		Basal			Percentage	Percentage	%	%	#/m square		#/ha	#/acre
	mm	mean	mm	mean	Std.Dev.	of Group	of Total			Mean	Std.dev.	Mean	Mean
Annual Forbs													
Atriplex powellii	10920	0.91	2009	0.17	0.2	48.26	14.44	80	41.5				
Salsola iberica	3609	0.3	382	0.03	0.06	9.18	2.75	57.5	21				
Eriogonum salsuginosum	1322	0.11	1056	0.08	0.18	25.37	7.59	50	15.5				
Atriplex saccaria	1320	0.11	243	0.02	0.06	5.84	1.75	20	4.5				
Halogeton glomeratus	367	0.03	136	0.01	0.04	3.27	0.98	15	2.75				
Plantago patagonica	362	0.03	54	0.01	0.02	1.3	0.39	10	3.25				
Descurainia pinnata	248	0.02	60	0.01	0.01	1.44	0.43	12.5	2.25				
Eriogonum gordonii	245	0.02	144	0.01	0.04	3.46	1.04	15	5.25				
Eriogonum scabrellum	240	0.02	79	0.01	0	1.9	0.57	2.5	0.5				
Allium macropetalum	12	0	6	0	0	0	0	5	0.5				
Sisymbrium altissimum	21	0	10	0	0.01	0	0	5	0.5				
Total	18666	1.56	4163	0.36	0.62	100.02	29.93						
Annual Grasses													
Bromus tectorum	1442	0.12	706	0.06	0.15	100	5.08	32.5	9.25				
Vulpia octoflora	0	0	0	0	0	0	0	2.5	0.25				
Total	1442	0.12	706	0.06	0.15	100	5.08						
Perennial Forb													
Sphaeralcea parviflora	241	0.02	112	0.01	0.05	100	0.8	5	1				
Total	241	0.02	112	0.01	0.05	100	0.8						
Perennial Grasses													
Sitanion hystrix	482	0.04	288	0.02	0.1	23.45	2.07	7.5	0.75				
Sporobolus airoides	1320	0.11	940	0.08	0.41	76.55	6.76	10	2				
Total	1802	0.15	1228	0.1	0.51	100	8.83						
Shrubs													
Atriplex obovata	6960	0.58	3390	0.28	0.52	44.02	24.37	35	26	0.066	0.086	658	266
Atriplex confertifolia	4203	0.35	1970	0.16	0.73	25.56	14.16	7.5	1.5	0.008	0.02	82	33
Atriplex cuneata	3968	0.33	1315	0.11	0.43	17.07	9.45	12.5	3.25	0.039	0.124	383	155
Atriplex corrugata	2401	0.2	1027	0.09	0.22	13.33	7.38	17.5	2.75	0.011	0.024	112	45
Gutierrezia sarothrae	0	0	0	0	0	0	0	0	0	0	0.003	3	1
Opuntia polyacantha	0	0	0	0	0	0	0	0	0	0	0.003	3	1
Sarcobatus vermiculatus	0	0	0	0	0	0	0	0	0	0.001	0.004	8	3
Total	17532	1.46	7702	0.64	1.9	100	55.36			0.125	0.264	1249	504
Grand Total	39683	3.3	13911	1.17	3.23		100						

Site: Badlands

	GREEN PHYTOMASS g/m square Mean	GREEN PHYTOMASS g/m square Std.dev.	DRY PHYTOMASS g/m square Mean	DRY PHYTOMASS g/m square Std.dev.	DRY PHYTOMASS kg/ha Mean	DRY PHYTOMASS lb/ac Mean	Percentage of Group	Percentage of Total	CARRYING CAPACITY AUM'S/acre Cattle	Sheep	Horses	Deer
Annual Forbs												
Atriplex powellii	17.05	24.99	11.5	15.82	115	102.65	77.1	26	0.0244	0.0366	0.0244	0.0122
Salsola iberica	3.08	7.87	1.37	3.12	13.73	12.25	9.2	3.1	0.0059	0.0058	0.0059	0.0056
Eriogonum salsuginosum	1.22	3.98	0.79	2.65	7.88	7.03	5.3	1.8	0.0013	0.0013	0.0013	0.0009
Atriplex saccaria	0.45	1.78	0.25	1.01	2.48	2.21	1.7	0.6	0.0005	0.0008	0.0005	0.0002
Halogeton glomeratus	0.08	0.47	0.14	0.61	1.35	1.21	0.9	0.3	0	0	0	0
Plantago patagonica	0.9	5.69	0.2	1.23	1.95	1.74	1.3	0.4	0.0002	0.0002	0.0002	0.0002
Descurainia pinnata	0.45	2.54	0.24	1.38	2.4	2.14	1.6	0.5	0	0	0	0
Eriogonum gordonii	0.95	3.92	0.31	1.47	3.13	2.79	2.1	0.7	0.0004	0.0004	0.0004	0.0003
Eriogonum scabrellum	0.48	3	0.13	0.84	1.33	1.18	0.9	0.3	0.0002	0.0002	0.0002	0.0002
Allium macropetalum	0	0	0	0	0	0	0	0	0	0	0	0
Sisymbrium altissimum	0	0	0	0	0	0	0	0	0	0	0	0
Total	24.67	54.24	14.93	28.13	149.25	133.2	100.1	33.7	0.0328	0.0453	0.0328	0.0198
Annual Grasses												
Bromus tectorum	2.28	7.09	1.1	4.24	10.98	9.8	100	2.5	0	0	0	0
Vulpia octoflora	0	0	0	0	0	0	0	0	0	0	0	0
Total	2.28	7.09	1.1	4.24	10.98	9.8	100	2.5	0	0	0	0
Perennial Forb												
Sphaeralcea parviflora	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Perennial Grasses												
Sitanion hystrix	0	0	0	0	0	0	0	0	0	0	0	0
Sporobolus airoides	4.38	20.75	2.78	14.33	27.8	24.81	100	6.3	0.0148	0.0148	0.0148	0
Total	4.38	20.75	2.78	14.33	27.8	24.81	100	6.3	0.0148	0.0148	0.0148	0
Shrubs												
Atriplex obovata	18.46	44.17	10.82	26.73	108.23	96.6	42.6	24.5	0.023	0.034	0.023	0.011
Atriplex confertifolia	11.18	70.68	6.21	37.33	62.08	55.41	24.4	14	0.0074	0.0222	0.0148	0.0074
Atriplex cuneata	8.85	37.05	5.88	24.26	58.83	52.51	23.1	13.3	0.0125	0.0188	0.0125	0.0062
Atriplex corrugata	5.35	23.63	2.52	11.28	25.15	22.45	9.9	5.7	0.0053	0.008	0.0053	0.0026
Gutierrezia sarothrae	0	0	0	0	0	0	0	0	0	0	0	0
Opuntia polyacantha	0	0	0	0	0	0	0	0	0	0	0	0
Sarcobatus vermiculatus	0	0	0	0	0	0	0	0	0	0	0	0
Total	43.86	175.53	25.43	99.6	254.29	226.97	100	57.5	0.0482	0.093	0.0556	0.0272
Grand Total	75.19	257.61	44.24	146.3	442.32	394.78		100	0.0958	0.1431	0.1032	0.047

Site: Dune

	COVER (%)							CONSTANCY	FREQUENCY	DENSITY			
	Foliar		Basal			Percentage	Percentage	%	%	#/m square		#/ha	#/acre
	mm	mean	mm	mean	Std.Dev.	of Group	of Total			Mean	Std.dev.	Mean	Mean
Annual Forbs													
Ambrosia acanthicarpa	317	0.03	17	0	0	47.2	0.04	22.5	3				
Descurainia pinnata	33	0	8	0	0	22.2	0.02	7.5	1.25				
Salsola iberica	15	0	2	0	0	5.6	0	5	0.5				
Ipomopsis gunnisonii	10	0	3	0	0	8.3	0	2.5	0.25				
Dithyrea wislizenii	10	0	5	0	0	13.9	0	2.5	0.25				
Euphorbia missurica var. intermedia	2	0	1	0	0	2.8	0	2.5	0.25				
Total	387	0.03	36	0	0	100	0.08						
Annual Grass													
Bromus tectorum	7	0	3	0	0	100	0	5	0.5				
Total	7	0	3	0	0	100	0						
Perennial Forbs													
Penstemon strictus	527	0.04	214	0.02	0.04	39.9	0.5	30	4				
Evolvulus pilosus	478	0.04	145	0.01	0.04	27	0.34	12.5	3				
Dalea lanata	225	0.02	22	0	0.01	4.1	0.05	15	2				
Oenothera pallida	194	0.02	58	0.01	0.02	10.8	0.13	7.5	1.5				
Leucelene ericoides	75	0.01	38	0	0.01	7.1	0.09	7.5	0.75				
Dalea sp.	65	0.01	32	0	0.02	6	0.07	2	0.25				
Sphaeralcea parviflora	61	0.01	28	0	0.01	5.2	0.06	10	1				
Total	1625	0.14	537	0.04	0.15	100.1	1.24						
Perennial Grasses													
Muhlenbergia pungens	17420	1.46	15208	1.27	2.47	51.2	35.22	57.5	19.25				
Oryzopsis hymenoides	13574	1.13	7126	0.59	0.41	24	16.5	100	73.5				
Sporobolus airoides	4624	0.38	3292	0.27	0.57	11.1	7.62	57.5	19.25				
Aristida purpurea	3255	0.27	2786	0.23	0.33	9.4	6.45	55	9.75				
Hilaria jamesii	1091	0.09	724	0.06	0.12	2.4	1.68	27.5	9				
Sporobolus giganteus	933	0.08	565	0.05	0.13	1.9	1.31	20	3.25				
Total	40957	3.41	29701	2.47	4.03	100	68.77						
Shrubs													
Ephedra torreyana	17350	1.45	2950	0.25	0.31	22.9	6.83	67.5	14.25	0.057	0.047	571	231
Eriogonum leptocladon	11887	0.99	2686	0.22	0.29	20.8	6.22	80	32.75	0.172	0.166	1754	710
Chrysothamnus pulchellus	10537	0.88	2276	0.19	0.28	17.6	5.27	52.5	11.25	0.084	0.104	838	339
Gutierrezia sarothrae	6442	0.54	1913	0.16	0.32	14.8	4.43	62.5	14.25	0.271	0.372	2708	1096
Chrysothamnus nauseosus	3967	0.33	1023	0.08	0.34	7.9	2.37	12.5	2.25	0.014	0.032	142	57
Artemisia filifolia	3319	0.28	770	0.06	0.22	6	1.78	12.5	2	0.019	0.073	192	78
Atriplex canescens	1540	0.13	339	0.03	0.09	2.6	0.78	15	2.25	0.015	0.021	154	62
Isocoma tenuisecta	1180	0.1	229	0.02	0.1	1.8	0.53	7	0.75	0.007	0.029	71	29
Chrysothamnus greenei	1143	0.1	251	0.02	0.1	1.9	0.58	10	2	0.016	0.048	158	64
Yucca angustissima	814	0.07	420	0.04	0.1	3.3	0.97	17.5	2	0.032	0.053	320	130
Atriplex confertifolia	110	0.01	52	0	0	0.4	0.12	2.5	0.25	0.003	0.014	29	12
Atriplex obovata	0	0	0	0	0	0	0	0	0	0.001	0.004	12	5
Total	58289	4.86	12909	1.07	2.15	100	29.39			0.691	0.963	6949	2813
Grand Total	101265	8.44	43186	3.58	6.33		100						
Grand Total	101265	8.44	43186	3.58	6.33		100						

Site: Dunes

	GREEN PHYTOMASS g/m square Mean	GREEN PHYTOMASS g/m square Std.dev.	DRY PHYTOMASS g/m square Mean	DRY PHYTOMASS g/m square Std.dev.	kg/ha Mean	lb/ac Mean	Percentage of Group	Percentage of Total	CARRYING CAPACITY AUM'S/acre Cattle	Sheep	Horses	Deer
Annual Forbs												
Ambrosia acanthicarpa	0.4	2.53	0.09	0.57	0.9	0.8	100	0.1	0	0	0	0
Descurainia pinnata	0	0	0	0	0	0	0	0	0	0	0	0
Salsola iberica	0	0	0	0	0	0	0	0	0	0	0	0
Ipomopsis gunnisonii	0	0	0	0	0	0	0	0	0	0	0	0
Dithyrea wislizenii	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia missurica	0	0	0	0	0	0	0	0	0	0	0	0
Total	0.4	2.53	0.09	0.57	0.9	0.8	100	0.1	0	0	0	0
Annual Grass												
Bromus tectorum	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	100	0	0	0	0	0
Perennial Forbs												
Penstemon strictus	0.45	2.85	0.51	2.18	5.13	4.58	49.7	0.4	0.0003	0.000	0.0003	0.000
Evolvulus pilosus	0.55	2.47	0.24	1.09	2.35	2.1	22	0.2	0.0003	0.000	0.0003	0.000
Dalea lanata	0.62	2.82	0.13	0.61	1.3	1.16	12.1	0.1	0	0	0	0
Oenothera pallida	0.82	3.66	0.19	0.87	1.93	1.72	18	0.1	0	0	0	0
Leucelene ericoides	0	0	0	0	0	0	0	0	0	0	0	0
Dalea sp.	0	0	0	0	0	0	0	0	0	0	0	0
Sphaeralcea parviflora	0	0	0	0	0	0	0	0	0	0	0	0
Total	2.01	11.8	1.07	4.75	10.71	9.56	100	0.8	0.0006	0.000	0.0006	0.000
Perennial Grasses												
Muhlenbergia oungens	17.02	35.61	11.77	25.61	117.7	105.06	27.1	8.6	0.0125	0.012	0.0125	0.006
Oryzopsis hymenoides	28.8	25.34	19.12	19	191.18	170.64	44	13.9	0.1117	0.111	0.1117	0
Sporobolus airoides	9.4	26.27	6.31	18.21	63.08	56.3	14.5	4.6	0.0335	0.033	0.0335	0
Aristida purpurea	5.02	11.98	2.93	7.8	29.3	26.15	6.8	2.2	0.0047	0.004	0.0047	0
Hilaria jamesii	2.98	7.82	1.42	3.79	14.18	12.65	3.3	1	0.0068	0.006	0.006	0
Sporobolus giganteus	3.32	12.92	1.84	6.09	18.35	16.38	4.2	1.3	0.0066	0.006	0.0068	0
Total	66.54	119.94	43.39	80.5	433.79	387.18	100	31.6	0.175	0.175	0.1752	0.006
Shrubs												
Ephedra torreyana	48.47	98.66	33.28	65.26	332.78	297.04	36	24.3	0.0707	0.070	0.053	0.070
Eriogonum leptocladon	26.3	51.83	15.94	32.95	159.35	142.24	17.2	11.6	0.0254	0.025	0.0254	0.016
Chrysothamnus pulchellus	21.85	44.21	12.94	25.71	129.35	115.46	14	9.4	0.0137	0.020	0.0137	0.006
Gutierrezia sarothrae	19.9	38.24	10.01	19.39	100.13	89.37	10.8	7.3	0	0	0	0
Chrysothamnus nauseosus	23	92.13	12.04	46.35	120.43	107.49	13	8.8	0.0128	0.019	0.0128	0.006
Artemisia filifolia	4	22.28	1.67	9.62	16.7	14.91	1.8	1.2	0.0036	0.005	0.0036	0.000
Atriplex canescens	2.3	14.55	1.37	8.65	13.68	12.21	1.5	1	0.0065	0.007	0.0065	0.002
Isocoma tenuisecta	6.08	34.88	3.06	17.74	30.55	27.27	3.3	2.2	0	0	0	0
Chrysothamnus greenei	0.38	1.69	0.23	1.03	2.33	2.08	0.3	0.2	0.0002	0.000	0.0002	0.000
Yucca angustissima	2.42	15.34	1.52	6.97	15.15	13.52	1.6	1.1	0.0008	0.000	0.0008	0.000
Atriplex confertifolia	1.3	8.22	0.5	3.15	4.98	4.44	0.5	0.4	0.0005	0.001	0.001	0.000
Atriplex obovata	0	0	0	0	0	0	0	0	0		0	0
Total	156	422.03	92.56	236.82	925.43	826.03	100	67.5	0.1342	0.151	0.117	0.011
Grand Total	224.95	556.3	137.11	322.64	1370.8	1223.5		100	0.3108	0.327	0.2928	0.018
Grand Total	224.95	556.3	137.11	322.64	1370.8	1223.5		100	0.3108	0.327	0.2928	0.018

Site: Saline Sands

	COVER (%)							CONSTANCY FREQUENCY		DENSITY			
	Foliar		Basal			Percentage	Percentage	%	%	#/m square		#/ha	#/acre
	mm	mean	mm	mean	Std.Dev.	of Group	of Total			Mean	Std.dev.	Mean	Mean
Annual Forbs													
Cryptantha crassisepala	1224	0.1	678	0.06	0.06	73.1	1.5	45.7	14.35				
Salsola iberica	576	0.05	61	0.01	0.01	6.6	0.1	19.6	5.65				
Descurainia pinnata	348	0.03	67	0.01	0.03	9.4	0.2	30.4	5.65				
Plantago patagonica	324	0.03	81	0.01	0.03	8.7	0.2	23.9	5				
Ambrosia acanthicarpa	252	0.02	14	0	0	1.5	0	21.7	3.04				
Nama hispidum	24	0	6	0	0	0.6	0	2.2	0.22				
Eriogonum gordonii	0	0	0	0	0	0	0	2.2	0.22				
Total	2748	0.33	927	0.08	0.13	99.9	2						
Annual Grasses													
Bromus tectorum	2400	0.2	1176	0.1	0.38	44.9	2.6	43.5	16.3				
Vulpia octoflora	1416	0.12	1416	0.12	0.18	54	3.1	76.1	28.04				
Bromus rubens	60	0.01	29	0	0.02	1.1	0.1	4.3	0.87				
Total	3876	0.33	2621	0.22	0.58	100	5.7						
Perennial Forbs													
Penstemon strictus	1128	0.09	459	0.04	0.09	67.3	1	28.3	6.96				
Sphaeralcea parviflora	612	0.05	153	0.01	0.06	22.4	0.3	23.9	3.91				
Sphaeralcea coccinea	252	0.02	63	0.01	0.02	9.2	0.1	19.6	3.26				
Oenothera pallida	24	0	7	0	0	1	0	2.2	0.22				
Total	2016	0.16	682	0.06	0.17	99.9	1.5						
Perennial Grasses													
Sporobolus airoides	37944	3.16	27016	2.25	1.67	67.5	59	95.7	81.74				
Oryzopsis hymenoides	14508	1.21	7617	0.64	0.52	19	16.6	95.7	68.48				
Hilaria jamesii	5520	0.46	3665	0.31	0.83	9.2	8	52.2	16.3				
Aristida purpurea	1908	0.16	1636	0.14	0.53	4.1	3.6	17.4	5.87				
Sporobolus cryptandrus	84	0.01	60	0.01	0.04	0.1	0.1	2.2	0.22				
Sporobolus giganteus	36	0	22	0	0.01	0.1	0	2.2	0.22				
Total	6000	4.84	40014	3.35	3.6	100	87.3						
Shrubs													
Ephedra torreyana	2376	0.2	404	0.03	0.1	25.8	0.9	17.4	2.17	0.012	0.022	120	48
Gutierrezia sarothrae	1224	0.1	364	0.03	0.06	23.3	0.8	32.6	7.39	0.168	0.266	1685	682
Atriplex obovata	612	0.05	298	0.03	0.08	19	0.7	13	1.74	0.021	0.055	210	85
Atriplex canescens	576	0.05	127	0.01	0.04	6.1	0.3	10.9	1.52	0.018	0.026	181	73
Atriplex confertifolia	576	0.05	270	0.02	0.08	17.3	0.6	21.7	2.39	0.024	0.053	243	98
Eriogonum leptocladon	192	0.02	43	0	0.02	2.7	0.1	2.2	0.43	0.005	0.032	54	22
Isocoma tenuisecta	144	0.01	26	0	0.02	1.8	0.1	2.2	0.43	0.003	0.017	25	10
Opuntia polyacantha	48	0	10	0	0	0.6	0	6.5	0.65	0.001	0.002	4	2
Lycium pallidum	36	0	11	0	0	0.7	0	4.3	0.65	0.011	0.04	105	43
Chrysothamnus nauseosus	24	0	6	0	0	0.4	0	2.2	0.22	0.001	0.003	7	3
Sarcobatus vermiculatus	23	0	4	0	0	0.3	0	4.3	0.43	0.003	0.007	25	10
Yucca angustissima	0	0	0	0	0	0	0	0	0	0.003	0.022	33	13
Total	5831	0.43	1565	0.12	0.4	100	3.4			0.27	0.545	2688	1089
Grand Total	74471	6.09	45809	3.83	4.88		100						

Site: Saline Sands

	GREEN PHYTOMASS g/m square Mean	GREEN PHYTOMASS g/m square Std.dev.	DRY PHYTOMASS g/m square Mean	DRY PHYTOMASS g/m square Std.dev.	DRY PHYTOMASS kg/ha Mean	DRY PHYTOMASS lb/ac Mean	Percentage of Group	Percentage of Total	CARRYING CAPACITY AUM'S/acre Cattle	Sheep	Horses	Deer
Annual Forbs												
Cryptantha crassisepala	2.78	10.58	2.18	8.73	21.83	19.48	68.6	2.1	0	0	0	0
Salsola iberica	0.54	2.83	0.14	0.73	1.41	1.26	4.4	0.1	0.0006	0.0006	0.0006	0.0006
Descurainia pinnata	0.87	5.7	0.75	5.06	7.46	6.66	23.4	0.7	0	0	0	0
Plantago patagonica	0.17	1.18	0.07	0.49	0.72	0.64	2.3	0.1	0.0001	0.0001	0.0001	0.0001
Ambrosia acanthicarpa	0.54	3.67	0.04	0.28	0.41	0.37	1.3	0	0	0	0	0
Nama hispidum	0	0	0	0	0	0	0	0	0	0	0	0
Eriogonum gordonii	0	0	0	0	0	0	0	0	0	0	0	0
Total	4.9	24.18	3.18	15.29	31.83	28.41	100	2.1	0.007	0.0007	0.0007	0.0007
Annual Grasses												
Bromus tectorum	1.59	4.05	0.97	2.56	9.74	8.69	24.5	1	0	0	0	0
Vulpia octoflora	5.02	9.99	2.81	6.61	28.11	25.09	70.9	2.7	0	0	0	0
Bromus rubens	0.22	1.47	0.19	1.25	1.85	1.65	4.7	0.2	0	0	0	0
Total	6.83	15.51	3.97	10.42	39.7	35.43	100	3.9	0	0	0	0
Perennial Forbs												
Penstemon strictus	3.22	9.51	1.06	3.65	10.61	9.47	90.4	1	0.0006	0.0012	0.0006	0.0012
Sphaeralcea parviflora	0.3	2.06	0.11	0.77	1.13	1.01	9.6	0.1	0.0001	0.0001	0.0001	0
Sphaeralcea coccinea	0	0	0	0	0	0	0	0	0	0	0	0
Oenothera pallida	0	0	0	0	0	0	0	0	0	0	0	0
Total	3.52	11.57	1.17	4.42	11.74	10.48	100	1.1	0.0007	0.0013	0.0007	0.0012
Perennial Grasses												
Sporobolus airoides	71.28	51.36	48.3	38.04	483	431.13	58.5	47.2	0.2566	0.2566	0.2566	0
Oryzopsis hymenoides	38.07	46.01	26.72	37.48	267.17	238.48	32.4	26.1	0.1561	0.1561	0.1561	0
Hilaria jamesii	5.96	12.18	3.92	8.34	39.24	35.02	4.8	3.8	0.0188	0.0167	0.0167	0
Aristida purpurea	4.85	20.17	3.58	15.46	35.76	31.92	4.3	3.5	0.0057	0.0057	0.0057	0
Sporobolus cryptandrus	0	0	0	0	0	0	0	0	0	0	0	0
Sporobolus giganteus	0	0	0	0	0	0	0	0	0	0	0	0
Total	120.16	129.72	82.52	99.32	825.17	736.55	100	80.6	0.4372	0.4351	0.4351	0
Shrubs												
Ephedra torreyana	5.46	28.53	3.3	17.45	33.02	29.48	22.6	3.2	0.007	0.007	0.005	0.007
Gutierrezia sarothrae	5.11	14.83	2.87	8.33	28.72	25.63	24.9	2.8	0	0	0	0
Atriplex obovata	2.28	10.94	1.41	6.69	14.07	12.55	12.9	1.4	0.003	0.004	0.003	0.002
Atriplex canescens	3.5	17.45	2.04	10.64	20.39	18.2	17.7	2	0.0098	0.0109	0.0098	0.0022
Atriplex confertifolia	1.76	7.13	1.07	4.38	10.7	9.55	9.3	1	0.0011	0.0033	0.0022	0.0011
Eriogonum leptoclador	0	0	0	0	0	0	0	0	0	0	0	0
Isocoma tenuisecta	0.23	1.92	0.06	0.41	0.61	0.54	0.5	0.1	0	0	0	0
Opuntia polyacantha	0	0	0	0	0	0	0	0	0	0	0	0
Lycium pallidum	0	0	0	0	0	0	0	0	0	0	0	0
Chrysothamnus nauseosus	0	0	0	0	0	0	0	0	0	0	0	0
Sarcobatus vermiculatus	1.41	9.58	0.78	5.31	7.83	6.99	6.8	0.8	0.0004	0.0008	0.0008	0
Yucca angustissima	0	0	0	0	0	0	0	0	0	0	0	0
Total	18.39	90.38	11.33	53.21	115.34	102.94	100	11.3	0.0213	0.026	0.0202	0.0123
Grand Total	153.8	271.36	102.37	182.66	1023.7	913.31		100	0.4599	0.4831	0.4573	0.0142

Site: Sands

	COVER (%)							CONSTANCY FREQUENCY		DENSITY			
	Foliar		Basal			Percentage	Percentage	%	%	#/m square		#/ha	#/acre
	mm	mean	mm	mean	Std.Dev.	of Group	of Total			Mean	Std.dev.	Mean	Mean
Annual Forbs													
Salsola iberica	2280	0.19	242	0.02	0.07	59	6.7	20.6	7.94				
Descurainia pinnata	372	0.03	93	0.01	0.02	22.7	0.3	26.5	7.94				
Nama hispidum	96	0.01	24	0	0.01	5.9	0.1	11.8	1.18				
Allium macropetalum	48	0	13	0	0.01	3.2	0	2.9	0.29				
Cryptantha crassisepala	48	0	27	0	0.01	6.6	0.1	11.8	1.77				
Atriplex saccaria	36	0	7	0	0	1.7	0	2.9	0.29				
Dithyrea wislezenii	12	0	3	0	0	0.7	0	2.9	0.29				
Ambrosia acanthicarpa	12	0	1	0	0	0.2	0	2.9	0.29				
Sisymbrium altissimum	0	0	0	0	0	0	0	0	0				
Total	2904	0.23	410	0.03	0.12	100	1.2						
Annual Grasses													
Bromus tectorum	1488	0.12	729	0.06	0.26	54.9	2.1	38.2	11.77				
Vulpia octoflora	600	0.05	600	0.05	0.14	45.1	1.7	32.4	10				
Total	2088	0.17	1329	0.11	0.4	100	3.8						
Perennial Forbs													
Pentemon strictus	528	0.04	215	0.02	0.06	71	0.6	20.6	4.12				
Leucelene ericoides	168	0.01	84	0.01	0.02	27.7	0.2	14.7	2.35				
Delea lanata	36	0	4	0	0	1.3	0	2.9	0.59				
Sphaeralcea parviflora	12	0	0	0	0	0	0	5.9	0.59				
Total	744	0.05	303	0.03	0.08	100	0.9						
Perennial Grasses													
Oryzopsis hymenoides	11892	0.99	6243	0.52	0.66	28.4	17.8	91.2	62.06				
Sporobolus airoides	10248	0.85	7297	0.61	0.77	33.2	18.3	73.5	30.88				
Hilaria jamesii	7944	0.66	5275	0.44	0.59	24	15.4	70.6	40				
Aristida purpurea	2448	0.2	2095	0.18	0.57	9.5	6.1	29.4	8.24				
Muhlenbergia pungens	1008	0.08	877	0.07	0.23	4	2.5	11.8	2.35				
Sporobolus cryptandrus	132	0.01	94	0.01	0.05	0.4	0.3	2.9	0.59				
Sporobolus giganteus	132	0.01	80	0.01	0.04	0.4	0.2	2.9	0.88				
Total	33804	2.8	21961	1.34	2.91	99.9	62.4						
Shrubs													
Gutierrezia sarothrae	24012	2	7132	0.59	0.53	63.9	20.3	79.4	52.35	1.314	1.219	13142	5319
Atriplex confertifolia	3864	0.32	1812	0.15	0.25	16.2	5.2	38.4	7.94	0.087	0.139	873	353
Ephedra torreyana	2496	0.21	424	0.04	0.09	3.8	1.2	26.5	3.53	0.028	0.041	284	115
Atriplex obovata	2436	0.2	1136	0.1	0.36	10.6	3.4	11.8	1.76	0.018	0.054	176	71
Eriogonum leptocladon	2088	0.17	472	0.04	0.13	4.2	1.3	17.6	6.47	0.07	0.196	696	282
Chrysothamnus pulchellus	396	0.03	86	0.01	0.03	0.8	0.3	17.6	3.53	0.016	0.048	157	63
Atriplex canescens	132	0.01	29	0	0.01	0.3	0.1	5.9	0.59	0.011	0.026	113	46
Lycium pallidum	48	0	13	0	0.01	0.1	0	2.9	0.29	0.01	0.057	98	40
Atriplex cuneata	36	0	12	0	0.01	0.1	0	2.9	0.29	0.001	0.009	15	6
Yucca angustissima	0	0	0	0	0	0	0	0	0	0.001	0.009	15	6
Total	35508	2.94	11166	0.93	1.42	100	31.8			1.646	1.796	15569	6301
Grand Total	75143	6.19	35171	2.94	4.93		100.1						

Site: Sands

	GREEN PHYTOMASS g/m square Mean	GREEN PHYTOMASS g/m square Std.dev.	DRY PHYTOMASS g/m square Mean	DRY PHYTOMASS g/m square Std.dev.	DRY PHYTOMASS kg/ha Mean	DRY PHYTOMASS lb/ac Mean	Percentage of Group	Percentage of Total	CARRYING CAPACITY AUM'S/acre Cattle	Sheep	Horses	Deer
Annual Forbs												
Salsola iberica	11.12	31.46	4.14	12.27	41.44	36.99	70.8	4	0.0176	0.0176	0.0176	0.0176
Descurainia pinnata	1.71	5.7	1.39	4.72	13.94	12.44	23.8	1.4	0	0	0	0
Nama hispidum	0	0	0	0	0	0	0	0	0	0	0	0
Allium macropetalum	0	0	0	0	0	0	0	0	0	0	0	0
Cryptantha crassisepala	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex saccaria	0	0	0	0	0	0	0	0	0	0	0	0
Dithyrea wislizenii	0	0	0	0	0	0	0	0	0	0	0	0
Ambrosia acanthicarpa	0	0	0	0	0	0	0	0	0	0	0	0
Sisymbrium altissimum	0.53	3.09	0.32	1.84	3.15	2.81	5.4	0.3	0	0	0	0
Total	13.36	40.25	5.85	18.83	58.53	52.24	100	5.7	0.0176	0.0176	0.0176	0.0176
Annual Grasses												
Bromus tectorum	1.44	6.01	0.98	4.19	9.82	8.77	67.9	1	0	0	0	0
Vulpia octoflora	1.24	6.38	0.47	2.01	4.65	4.15	32.1	0.5	0	0	0	0
Total	2.68	12.39	1.45	6.2	14.47	12.92	100	1.4	0	0	0	0
Perennial Forbs												
Penstemon strictus	0.97	5.66	0.13	0.74	1.26	1.13	100	0.1	0.0001	0.0001	0.0001	0.0001
Leucelene ericoides	0	0	0	0	0	0	0	0	0	0	0	0
Dalea lanata	0	0	0	0	0	0	0	0	0	0	0	0
Sphaeralcea parviflora	0	0	0	0	0	0	0	0	0	0	0	0
Total	0.97	5.66	0.13	0.74	1.26	1.13	100	0.1	0.0001	0.0001	0.0001	0.0001
Perennial Grasses												
Oryzopsis hymenoides	28.09	29.29	18.19	25.1	181.88	162.35	40.8	17.7	0.1063	0.1063	0.1063	0
Sporobolus airoides	22.74	40.18	13.89	28.29	138.91	123.99	32.2	13.5	0.0738	0.0738	0.0738	0
Hilaria jamesii	13.59	21.59	8.15	13.36	81.53	72.77	18.3	7.9	0.039	0.035	0.035	0
Aristida purpurea	1.88	5.97	1.36	4.45	13.59	12.13	3	1.3	0.0022	0.0022	0.0022	0
Muhlenbergia pungens	3.97	13.72	2.97	10.02	29.71	26.52	6.7	2.9	0.0032	0.0032	0.0032	0.0016
Sporobolus cryptandrus	0	0	0	0	0	0	0	0	0	0	0	0
Sporobolus giganteus	0	0	0	0	0	0	0	0	0	0	0	0
Total	70.27	110.15	44.56	81.22	445.62	397.76	100	43.4	0.2245	0.221	0.221	0.0016
Shrubs												
Gutierrezia sarothrae	48.06	65.37	30.87	48.22	308.79	275.63	60.8	30	0	0	0	0
Atriplex confertifolia	11.68	45.74	7.06	29.65	70.56	62.98	13.9	6.9	0.0075	0.023	0.015	0.0075
Ephedra torreyana	5.12	20.9	3.1	12.65	31	27.67	6.1	3	0.0066	0.0066	0.0066	0.006
Atriplex obovata	14.65	70.79	6.89	33.12	68.85	61.46	13.6	6.7	0.0146	0.022	0.0146	0.0073
Eriogonum leptocladon	1.56	6.69	1.22	5.12	12.24	10.92	2.4	1.2	0	0	0	0
Chrysothamnus pulchellus	2.71	8.9	1	4.55	10.03	8.95	2	1	0.0011	0.002	0.0011	0.0005
Atriplex canescens	0.21	1.2	0.22	1.29	2.21	1.97	0.4	0.2	0.0011	0.0014	0.0011	0.0005
Lycium pallidum	0.79	4.63	0.42	2.42	4.15	3.7	0.8	0.4	0	0	0	0
Atriplex cuneata	0	0	0	0	0	0	0	0	0	0	0	0
Yucca angustissima	0	0	0	0	0	0	0	0	0	0	0	0
Total	84.78	225.22	50.78	137.02	507.83	453.28	100	49.4	0.0309	0.054	0.038	0.022
Grand Total	172.06	393.67	102.77	244.01	1027.7	917.33		100	0.2731	0.293	0.277	0.042

Site: Thin Breaks

	COVER (%)							CONSTANCY FREQUENCY		DENSITY			
	Foliar		Basal			Percentage	Percentage	%	%	#/m square		#/ha	#/acre
	mm	mean	mm	mean	Std.Dev.	of Group	of Total			Mean	Std.dev.	Mean	Mean
Annual Forbs													
Atriplex powellii	804	0.07	148	0.01	0.04	24.5	0.4	15	8.25				
Halogeton glomeratus	600	0.05	227	0.02	0.06	37.5	0.5	17.5	5.25				
Salsola iberica	600	0.05	64	0.01	0.01	19.5	0.2	22.5	8				
Descurainia pinnata	276	0.02	59	0.01	0.02	11.4	0.2	32.5	4.5				
Atriplex saccaria	132	0.01	26	0	0.01	4.3	0.1	2.5	1.25				
Eriogonum salsuginosum	84	0.01	17	0	0	2.8	0	10	3.25				
Eriogonum gordonii	60	0.01	12	0	0	2	0	5	2.25				
Sisymbrium altissimum	48	0	33	0	0.01	5.5	0.1	5	1				
Phacelia crenulata var. corrugata	24	0	6	0	0	1	0	5	0.5				
Plantago patagonica	12	0	3	0	0	0.5	0	7.5	0.75				
Total	2640	0.22	605	0.05	0.15	100.1	1.4						
Annual Grasses													
Bromus tectorum	1272	0.11	623	0.05	0.15	97.8	1.5	62.5	16.5				
Vulpia octoflora	24	0	14	0	0	2.2	0	7.5	0.75				
Total	1296	0.11	637	0.05	0.15	100	1.5						
Perennial Forbs													
Platyschkuhria integrif var. oblongifolia	936	0.08	285	0.02	0.06	63.6	0.7	20	4				
Sphaeralcea parviflora	348	0.03	163	0.01	0.03	36.4	0.4	22.5	2.75				
Total	1284	0.11	448	0.03	0.09	100	1.1						
Perennial Grasses													
Sporobolus airoides	10440	0.87	7433	0.62	0.8	52.7	17.6	67.5	23.75				
Hilaria jamesii	8568	0.71	5689	0.47	0.62	40.3	12.5	65	21.25				
Oryzopsis hymenoides	1884	0.16	989	0.08	0.24	7	2.3	35	6.75				
Total	20892	1.74	14111	1.17	1.86	100	33.5						
Shrubs													
Atriplex confertifolia	38484	3.21	18049	1.5	1.41	68.4	42.2	95	39	0.416	0.302	4162	1685
Atriplex obovata	11443	0.95	5575	0.46	0.96	21.1	13.2	40	11.5	0.158	0.276	1583	641
Ephedra torreyana	2880	0.24	490	0.04	0.11	1.9	1.2	15	4.5	0.017	0.041	171	69
Atriplex cuneata	2448	0.2	813	0.07	0.28	3.1	1.9	7.5	2	0.037	0.12	371	150
Gutierrezia sarothrae	2088	0.17	620	0.05	0.13	2.4	1.5	32.5	6.5	0.107	0.183	1067	432
Atriplex corrugata	1896	0.16	811	0.07	0.2	3.1	1.9	12.5	2.25	0.046	0.143	458	185
Suaeda torreyana	36	0	14	0	0	0.1	0	2.5	0.25	0	0.003	4	2
Sarcobatus vermiculatus	0	0	0	0	0	0	0	0	0	0	0.003	4	2
Chrysothamnus nauseosus	0	0	0	0	0	0	0	0	0	0.001	0.008	12	5
Total	59230	4.93	26372	2.19	3.09	100.1	62.5			0.782	1.079	7832	3171
Grand Total	85342	7.11	42173	3.49	5.34		100						

Site: Thin Breaks

	GREEN PHYTOMASS g/m square Mean	GREEN PHYTOMASS g/m square Std.dev.	DRY PHYTOMASS g/m square Mean	DRY PHYTOMASS g/m square Std.dev.	DRY PHYTOMASS kg/ha Mean	DRY PHYTOMASS lb/ac Mean	Percentage of Group	Percentage of Total	CARRYING CAPACITY AUM'S/acre Cattle	Sheep	Horses	Deer
Annual Forbs												
Atriplex powellii	1.33	6.2	1.49	5.78	14.85	13.25	49.3	1.3	0.0032	0.0048	0.0032	0.0016
Halogeton glomeratus	1.88	10.5	0.08	0.47	0.75	0.67	2.5	0.1	0	0	0	0
Salsola iberica	1.48	4.54	0.77	2.15	7.68	6.85	25.5	0.7	0.0033	0.0033	0.0033	0.0033
Descurainia pinnata	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex saccaria	0	0	0.06	0.4	0.65	0.58	2.1	0.1	0.0001	0.0002	0.0001	0
Eriogonum salsuginosum	0.12	0.56	0.07	0.41	0.65	0.58	2.2	0.1	0.0001	0.0001	0.0001	0.0001
Eriogonum gordonii	0	0	0.56	2.94	5.55	4.95	19.4	0.5	0.001	0.001	0.001	0.001
Sisymbrium altissimum	0	0	0	0	0	0	0	0	0	0	0	0
Phacelia crenulata var. corrugata	0	0	0	0	0	0	0	0	0	0	0	0
Plantago patagonica	0	0	0	0	0	0	0	0	0	0	0	0
Total	4.86	21.8	3.03	12.15	30.11	26.87	100	2.6	0.0077	0.0094	0.0077	0.006
Annual Grasses												
Bromus tectorum	0.35	1.56	0.41	1.57	4.08	3.64	100	0.3	0	0	0	0
Vulpia octoflora	0	0	0	0	0	0	0	0	0	0	0	0
Total	0.35	1.56	0.41	1.57	4.08	3.64	100	0.3	0	0	0	0
Perennial Forbs												
Platyschkuhria integrif var. oblongifolia	1.45	6.16	0.74	3.69	7.43	6.63	50.8	0.6	0.0008	0.0008	0.0008	0.0008
Sphaeralcea parviflora	1.1	6.96	0.72	4.55	7.2	6.43	49.2	0.6	0.0008	0.0008	0.0008	0.0004
Total	2.55	13.12	1.46	7.44	14.63	13.06	100	1.2	0.0016	0.0016	0.0016	0.0012
Perennial Grasses												
Sporobolus airoides	14.95	23.12	11.23	16.55	112.33	100.25	64.3	9.6	0.0597	0.0597	0.0597	0
Hilaria jamesii	4.82	11.1	4.02	6.63	40.23	35.91	23	3.4	0.0192	0.0171	0.0171	0
Oryzopsis hymenoides	2.33	7.1	2.2	6.49	22	19.64	12.6	1.9	0.0129	0.0129	0.0129	0
Total	22.15	41.32	17.45	31.67	174.56	155.81	99.9	14.9	0.0918	0.0897	0.0897	0
Shrubs												
Atriplex confertifolia	91.48	137.7	64.22	94.11	642.23	573.25	67.5	54.7	0.0682	0.2046	0.1364	0.0682
Atriplex obovata	32.12	93.27	20.29	60.69	202.9	181.11	21.3	17.3	0.0431	0.0646	0.0431	0.0215
Ephedra torreyana	6.8	22.74	4.27	14.49	42.68	38.07	4.5	3.6	0.0091	0.0091	0.0068	0.0091
Atriplex cuneata	3.2	15.58	2.09	10.32	20.83	19.63	2.3	1.8	0.0044	0.0066	0.0044	0.0022
Gutierrezia sarothrae	3.58	11.62	2.71	8.61	27.05	24.15	3.3	2.3	0	0	0	0
Atriplex corrugata	2.4	10.6	1.59	7.04	15.93	14.23	1.7	1.4	0.0034	0.0051	0.0034	0.0017
Suaeda torreyana	0	0	0	0	0	0	0	0	0	0	0	0
Sarcobatus vermiculatus	0	0	0	0	0	0	0	0	0	0	0	0
Chrysothamnus nauseosus	0	0	0	0	0	0	0	0	0	0	0	0
Total	139.53	291.61	95.17	195.26	951.67	849.45	100	81	0.1282	0.29	0.1941	0.1027
Grand Total	169.49	369.41	117.52	248.09	1175.0	1048.3		100	0.2293	0.3907	0.2731	0.1045

Appendix 16-I

1986 Vegetation Data

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

ALKALI WASH

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	- DRY PRODUCT. - KG/HA	LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	/AC
*** ANNUAL FORB ***												
SALSOLA KALI/SALSOLA IBERICA	3658	0.30	34.51	17.82	31.05	27.70	42.83	16.77	95.00	55.25		
DESCURAINIA PINNATA	2857	0.24	26.95	13.92	10.07	8.99	13.90	5.44	67.50	35.75		
ATRIPLEX POWELLII	1310	0.11	12.36	6.38	15.47	13.81	21.34	8.36	55.00	23.25		
LAPPULA REDOWSKII	822	0.07	7.75	4.00	6.70	5.98	9.24	3.62	62.50	17.75		
ERIGERON FLEXUM	524	0.04	4.94	2.55	0.47	0.42	0.66	0.26	20.00	9.50		
CRYPTANTHA CRASSISEPALA	290	0.02	2.64	1.36	1.22	1.09	1.69	0.66	10.00	3.75		
HALOGETON GLOMERATUS	266	0.02	2.51	1.30	2.85	2.54	3.93	1.54	15.00	5.00		
MENTZELIA ALBICAULIS	218	0.02	2.06	1.06	0.32	0.29	0.45	0.18	22.50	6.25		
PLANTAGO PATAGONICA	140	0.01	1.32	0.68	0.65	0.58	0.90	0.35	15.00	3.75		
PHACELIA CORRUGATA	126	0.01	1.19	0.61	2.02	1.81	2.79	1.09	20.00	2.50		
CLEOME LUTEA	77	0.01	0.73	0.38	0.17	0.16	0.24	0.09	15.00	2.25		
CHAENACTIS STEVOIDES	68	0.01	0.64	0.33	0.75	0.67	1.03	0.41	10.00	2.75		
ERIOGONUM DIVARICATUM	58	0.00	0.55	0.28	0.30	0.27	0.41	0.16	7.50	2.50		
IPOMOPSIS LONGIFLORA	57	0.00	0.54	0.28	0.20	0.18	0.28	0.11	12.50	2.00		
IPOMOPSIS GUNNISONII	46	0.00	0.43	0.22	0.00	0.00	0.00	0.00	10.00	1.75		
TOWNSENDIA ANNUA	36	0.00	0.34	0.18	0.07	0.07	0.10	0.04	2.50	0.75		
GILIA LEPTOMERIA	32	0.00	0.30	0.16	0.02	0.02	0.03	0.01	7.50	1.50		
ERIOGONUM SALSUGINOSUM	20	0.00	0.19	0.10	0.00	0.00	0.00	0.00	5.00	0.50		
DESCURAINIA SOPHIA	5	0.00	0.05	0.02	0.00	0.00	0.00	0.00	2.50	0.25		
IPOMOPSIS POLYCLADON	0	0.00	0.00	0.00	0.12	0.11	0.17	0.07	0.00	0.00		
*** ANNUAL FORB TOTALS:	10600	0.86	100.00	51.63	72.50	64.68	99.99	39.16				
*** ANNUAL GRASS ***												
BROMUS TECTORUM	633	0.05	46.44	3.08	1.37	1.23	35.48	0.74	50.00	12.75		
HORDEUM PUSILLUM	409	0.03	30.01	1.99	0.85	0.76	21.94	0.46	12.50	5.25		
VULPIA OCTOFLORA	314	0.03	23.04	1.53	1.65	1.47	42.58	0.89	12.50	4.25		
BROMUS RUBENS	7	0.00	0.51	0.03	0.00	0.00	0.00	0.00	2.50	0.25		
*** ANNUAL GRASS TOTALS:	1363	0.11	100.00	6.64	3.87	3.46	100.00	2.09				
*** PERENNIAL FORB ***												
BAHIA OBLONGIFOLIA	58	0.00	65.91	0.28	0.87	0.78	100.00	0.47	2.50	0.25		
SPHAERALCEA COCCINEA	30	0.00	34.09	0.15	0.00	0.00	0.00	0.00	5.00	0.75		
*** PERENNIAL FORB TOTALS:	88	0.00	100.00	0.43	0.87	0.78	100.00	0.47				
*** PERENNIAL GRASS ***												
SPOROBOLUS AIROIDES	1151	0.10	58.25	5.61	15.12	13.49	74.42	8.17	32.50	8.00		
ORYZOPSIS HYMENOIDES	413	0.03	20.90	2.01	3.75	3.35	18.45	2.03	25.00	7.50		
HILARIA JAMESII	347	0.03	17.56	1.69	0.57	0.51	2.83	0.31	25.00	5.00		
SITANION HYSTRIX	36	0.00	1.82	0.18	0.40	0.36	1.97	0.22	5.00	0.50		
HORDEUM JUBATUM	29	0.00	1.47	0.14	0.47	0.42	2.34	0.26	2.50	1.00		
*** PERENNIAL GRASS TOTALS:	1976	0.16	100.00	9.62	20.32	18.13	100.01	10.98				

NAVAJO MINE
VEGETATION DATA REPORTING
1986

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

ALKALI WASH

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	- DRY PRODUCT. - KG/HA	LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	/AC
XXX PERENNIAL SHRUB XXX												
ATRIPLEX CUNEATA	2494	0.21	38.35	12.15	38.00	33.90	43.39	20.52	37.50	9.00	400.0	161.9
ATRIPLEX CONFERTIFOLIA	1624	0.14	24.97	7.91	12.10	10.80	13.82	6.54	22.50	6.50	416.7	168.6
SACROBATUS VERMICULATUS	1126	0.09	17.32	5.48	7.70	6.87	8.79	4.16	12.50	2.25	45.8	18.5
ATRIPLEX CORRUGATA	659	0.05	10.13	3.21	22.02	19.65	25.15	11.90	7.50	2.75	158.3	64.1
ATRIPLEX OBOVATA	380	0.03	5.84	1.85	6.37	5.69	7.28	3.44	7.50	0.75	45.8	18.5
GUTIERREZIA SAROTHRAE	170	0.01	2.61	0.83	1.37	1.23	1.57	0.74	5.00	1.00	145.8	59.0
ATRIPLEX CANESCENS	50	0.00	0.77	0.24	0.00	0.00	0.00	0.00	7.50	1.00	70.8	28.7
OPUNTIA POLYACANTHA	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.5	5.1
XXX PERENNIAL SHRUB TOTALS:	6503	0.53	99.99	31.68	87.57	78.13	100.00	47.30			1295.8	524.4
ALKALI WASH	20530	1.66		100.00	185.15	165.19		100.00			1295.8	524.4

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

ARROYO SHRUB

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	DRY PRODUCT. KG/HA	DRY PRODUCT. LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	DENSITY /AC
*** ANNUAL FORB ***												
SALSOLA KALI/SALSOLA IBERICA	2654	0.22	40.52	7.87	19.37	17.29	43.74	5.89	82.50	41.00		
DESCURAINIA PINNATA	1836	0.15	28.03	5.44	8.00	7.14	18.06	2.43	75.00	33.50		
LAPPULA REDOWSKII	964	0.08	14.72	2.86	11.75	10.48	26.52	3.57	55.00	20.50		
GILIA LEPTOMERIA	307	0.03	4.69	0.91	0.40	0.36	0.90	0.12	25.00	9.00		
AMBROSIA ACANTHICARPA	189	0.02	2.89	0.56	0.95	0.85	2.14	0.29	12.50	3.00		
CRYPTANTHA CRASSISEPALA	118	0.01	1.80	0.35	2.10	1.87	4.74	0.64	17.50	3.00		
CHAENACTIS STEVOIDES	104	0.01	1.59	0.31	0.30	0.27	0.68	0.09	10.00	2.50		
EUPHORBIA GLYPTOSPERMA	96	0.01	1.47	0.28	0.37	0.33	0.85	0.11	7.50	3.25		
CHENOPODIUM INCANUM	69	0.01	1.05	0.20	0.00	0.00	0.00	0.00	5.00	1.25		
VERBENA BRACTEATA	53	0.00	0.81	0.16	0.47	0.42	1.07	0.14	7.50	1.75		
PHACELIA CORRUGATA	41	0.00	0.63	0.12	0.10	0.09	0.23	0.03	2.50	1.00		
PLANTAGO PATAGONICA	32	0.00	0.49	0.09	0.12	0.11	0.28	0.04	10.00	1.50		
MENTZELIA ALBICAULIS	30	0.00	0.46	0.09	0.05	0.04	0.11	0.02	10.00	1.50		
TOWNSENDIA ANNUA	23	0.00	0.35	0.07	0.10	0.09	0.23	0.03	5.00	1.25		
ERIGERON FLEXUM	20	0.00	0.31	0.06	0.12	0.11	0.28	0.04	5.00	1.00		
MALCOMIA AFRICANA	14	0.00	0.21	0.04	0.00	0.00	0.00	0.00	2.50	0.25		
IPOMOPSIS GUNNISONII	0	0.00	0.00	0.00	0.07	0.07	0.17	0.02	0.00	0.00		
*** ANNUAL FORB TOTALS:	6550	0.54	100.02	19.42	44.30	39.52	100.00	13.46				
*** ANNUAL GRASS ***												
BROMUS TECTORUM	2560	0.21	56.19	7.59	8.97	7.92	50.93	2.70	82.50	41.25		
VULPIA OCTOFLORA	1972	0.16	43.28	5.85	8.45	7.54	48.49	2.57	65.00	27.75		
HORDEUM PUSILLUM	24	0.00	0.53	0.07	0.10	0.09	0.57	0.03	2.50	1.00		
*** ANNUAL GRASS TOTALS:	4556	0.37	100.00	13.51	17.42	15.55	99.99	5.29				
*** PERENNIAL FORB ***												
EUPHORBIA FENDLERI	101	0.01	38.70	0.30	0.10	0.09	5.88	0.03	5.00	1.25		
SPHAERALCEA COCCINEA	85	0.01	32.57	0.25	0.27	0.25	16.18	0.08	15.00	2.00		
SPHAERALCEA PARVIFOLIA	31	0.00	11.88	0.09	0.62	0.56	36.76	0.19	10.00	1.00		
PSORALEA LANCEOLATA	20	0.00	7.66	0.06	0.00	0.00	0.00	0.00	2.50	0.25		
HOFFMANSEGGIA JAMESII	10	0.00	3.83	0.03	0.00	0.00	0.00	0.00	2.50	0.25		
PENSTEMON STRICTUS	8	0.00	3.07	0.02	0.42	0.38	25.00	0.13	2.50	0.25		
LEUCELENE ERICOIDES	6	0.00	2.30	0.02	0.07	0.07	4.41	0.02	2.50	0.25		
ASTRAGALUS CERAMICUS	0	0.00	0.00	0.00	0.20	0.18	11.76	0.06	0.00	0.00		
*** PERENNIAL FORB TOTALS:	261	0.02	100.01	0.77	1.70	1.52	99.99	0.52				
*** PERENNIAL GRASS ***												
ORYZOPSIS HYMENOIDES	4943	0.41	47.22	14.65	63.20	56.39	46.26	19.20	87.50	49.75		
SPOROBOLUS AIROIDES	3227	0.27	30.83	9.57	46.95	41.89	34.36	14.27	57.50	17.75		
HILARIA JAMESII	1821	0.15	17.40	5.40	12.85	11.46	9.41	3.90	65.00	18.50		
SPOROBOLUS GIGANTEUS	233	0.02	2.23	0.69	11.50	10.26	8.42	3.49	12.50	1.50		

NAVAJO MINE
VEGETATION DATA REPORTING
1986

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

ARROYO SHRUB

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	- DRY PRODUCT. - KG/HA	LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	/AC
XXX PERENNIAL GRASS XXX												
SITANION HYSTRIX	73	0.01	0.70	0.22	0.10	0.09	0.07	0.03	10.00	1.25		
MUHLENBERGIA PUNGENS	64	0.01	0.61	0.19	0.92	0.83	0.68	0.28	5.00	1.25		
AGROPYRON SMITHII	56	0.00	0.54	0.17	0.25	0.22	0.18	0.08	10.00	1.50		
ARISTIDA PURPUREA	37	0.00	0.35	0.11	0.85	0.76	0.62	0.26	2.50	1.50		
DISTICHLIS SPICATA	13	0.00	0.12	0.04	0.00	0.00	0.00	0.00	2.50	0.25		
XXX PERENNIAL GRASS TOTALS:	10467	0.87	100.00	31.03	136.62	121.90	100.00	41.51				
XXX PERENNIAL SHRUB XXX												
SACROBATUS VERMICULATUS	4425	0.37	37.19	13.12	32.20	28.73	24.95	9.78	55.00	12.25	370.8	150.1
CHRYSOTHAMNUS NAUSEOSUS	4215	0.35	35.42	12.49	65.97	58.86	51.12	20.05	52.50	13.50	791.7	320.4
ATRIPLEX CANESCENS	1233	0.10	10.36	3.65	12.15	10.84	9.41	3.69	32.50	7.50	233.3	94.4
GUTIERREZIA SAROTHRAE	1128	0.09	9.48	3.34	13.12	11.71	10.17	3.99	42.50	10.25	1058.3	428.3
ATRIPLEX CUNEATA	399	0.03	3.35	1.19	3.27	2.92	2.54	1.00	15.00	3.50	162.5	65.8
ATRIPLEX CONFERTIFOLIA	306	0.03	2.57	0.91	1.85	1.65	1.43	0.56	22.50	3.00	225.0	91.1
SUAEDA TORREYANA	128	0.01	1.08	0.39	0.00	0.00	0.00	0.00	2.50	1.00	83.3	33.7
ATRIPLEX CORRUGATA	35	0.00	0.29	0.10	0.20	0.18	0.15	0.06	2.50	0.25	20.8	8.4
EPHEDRA TORREYANA	24	0.00	0.20	0.07	0.00	0.00	0.00	0.00	2.50	0.25	4.2	1.7
CERATOIDES LANATA	8	0.00	0.07	0.02	0.00	0.00	0.00	0.00	2.50	0.25	8.3	3.4
CHRYSOTHAMNUS VISCIDIFLORUS	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.3	3.4
OPUNTIA WHIPPLEI	0	0.00	0.00	0.00	0.27	0.25	0.21	0.08	0.00	0.00	8.3	3.4
YUCCA ANGUSTISSIMA	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.8	8.4
XXX PERENNIAL SHRUB TOTALS:	11901	0.98	100.00	35.28	129.05	115.14	99.98	39.21			2995.8	1212.4
ARROYO SHRUB	33735	2.79		100.00	329.10	293.62		100.00			2995.8	1212.4

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

BADLANDS

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	DRY PRODUCT. KG/HA	DRY PRODUCT. LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	DENSITY /AC
*** ANNUAL FORB ***												
SALSOLA KALI/SALSOLA IBERICA	3767	0.31	36.84	27.80	26.42	23.58	31.89	24.03	72.50	32.50		
ATRIPLEX POWELLII	2874	0.24	28.10	21.21	35.52	31.70	42.87	32.30	67.50	34.25		
ERIGERON FLEXUM	1755	0.15	17.16	12.95	7.60	6.78	9.17	6.91	60.00	25.25		
HALOGETON GLOMERATUS	873	0.07	8.54	6.44	8.82	7.87	10.65	8.02	20.00	10.25		
DESCURAINIA PINNATA	329	0.03	3.22	2.43	1.20	1.07	1.45	1.09	35.00	7.25		
LAPPULA REDOWSKII	225	0.02	2.20	1.66	0.45	0.40	0.54	0.41	40.00	6.75		
ATRIPLEX SACCARIA	77	0.01	0.75	0.57	0.72	0.65	0.87	0.66	5.00	1.25		
MENTZELIA ALBICAULIS	67	0.01	0.66	0.49	0.22	0.20	0.27	0.20	5.00	2.25		
PHACELIA CORRUGATA	56	0.00	0.55	0.41	0.52	0.47	0.63	0.48	7.50	1.50		
PLANTAGO PATAGONICA	53	0.00	0.52	0.39	0.15	0.13	0.18	0.14	10.00	1.25		
ERIOGONUM SALSUGINOSUM	41	0.00	0.40	0.30	0.97	0.87	1.18	0.89	5.00	0.50		
CRYPTANTHA CRASSISEPALA	40	0.00	0.39	0.30	0.00	0.00	0.00	0.00	2.50	1.00		
ERIOGONUM DIVARICATUM	22	0.00	0.22	0.16	0.00	0.00	0.00	0.00	2.50	0.25		
GILIA LEPTOMERIA	13	0.00	0.13	0.10	0.00	0.00	0.00	0.00	5.00	0.50		
CLEOME LUTEA	12	0.00	0.12	0.09	0.25	0.22	0.30	0.23	2.50	0.75		
ERIOGONUM WETHERILLI	10	0.00	0.10	0.07	0.00	0.00	0.00	0.00	2.50	0.25		
MALCOMIA AFRICANA	8	0.00	0.08	0.06	0.00	0.00	0.00	0.00	2.50	0.25		
IPOMOPSIS POLYCLADON	4	0.00	0.04	0.03	0.00	0.00	0.00	0.00	2.50	0.25		
*** ANNUAL FORB TOTALS:	10226	0.84	100.02	75.47	82.87	73.94	100.00	75.36				
*** ANNUAL GRASS ***												
VULPIA OCTOFLORA	149	0.01	65.35	1.10	0.22	0.20	10.11	0.20	7.50	2.75		
BROMUS TECTORUM	73	0.01	32.02	0.54	1.72	1.54	77.53	1.57	15.00	2.25		
HORDEUM PUSILLUM	6	0.00	2.63	0.04	0.27	0.25	12.36	0.25	2.50	0.25		
*** ANNUAL GRASS TOTALS:	228	0.02	100.00	1.68	2.22	1.99	100.00	2.02				
*** PERENNIAL FORB ***												
SPHAERALCEA COCCINEA	35	0.00	74.47	0.26	0.45	0.40	64.29	0.41	2.50	0.25		
BAHIA OBLONGIFOLIA	12	0.00	25.53	0.09	0.25	0.22	35.71	0.23	2.50	0.25		
*** PERENNIAL FORB TOTALS:	47	0.00	100.00	0.35	0.70	0.62	100.00	0.64				
*** PERENNIAL GRASS ***												
SPOROBOLUS AIROIDES	516	0.04	99.23	3.81	3.52	3.14	100.00	3.21	12.50	2.50		
HILARIA JAMESII	4	0.00	0.77	0.03	0.00	0.00	0.00	0.00	2.50	0.25		
*** PERENNIAL GRASS TOTALS:	520	0.04	100.00	3.84	3.52	3.14	100.00	3.21				
*** PERENNIAL SHRUB ***												
ATRIPLEX CORRUGATA	833	0.07	32.95	6.15	12.12	10.82	58.72	11.03	10.00	1.00	133.3	54.0
ATRIPLEX CONFERTIFOLIA	663	0.06	26.23	4.89	2.75	2.45	13.32	2.50	20.00	3.25	216.7	87.7
ATRIPLEX CUNEATA	523	0.04	20.69	3.86	3.10	2.77	15.01	2.82	20.00	2.75	112.5	45.5

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

BADLANDS

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	- DRY PRODUCT. - KG/HA	LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	/AC
XXX PERENNIAL SHRUB XXX												
SUAEDA TORREYANA	248	0.02	9.81	1.83	2.25	2.01	10.90	2.05	2.50	1.25	125.0	50.6
ATRIPLEX CANESCENS	195	0.02	7.71	1.44	0.00	0.00	0.00	0.00	2.50	0.25	62.5	25.3
SACROBATUS VERMICULATUS	26	0.00	1.03	0.19	0.00	0.00	0.00	0.00	2.50	0.25	8.3	3.4
ATRIPLEX OBOVATA	20	0.00	0.79	0.15	0.00	0.00	0.00	0.00	2.50	0.25	16.7	6.7
EPHEDRA VIRIDIS	20	0.00	0.79	0.15	0.00	0.00	0.00	0.00	2.50	0.50	0.0	0.0
GUTIERREZIA SAROTHRAE	0	0.00	0.00	0.00	0.42	0.38	2.06	0.39	0.00	0.00	8.3	3.4
OPUNTIA POLYACANTHA	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.2	1.7
XXX PERENNIAL SHRUB TOTALS:	2528	0.21	100.00	18.66	20.65	19.42	100.01	19.78			687.5	278.2
BADLANDS	13549	1.11		100.00	109.97	98.12		100.00			687.5	278.2

NAVAJO MINE
VEGETATION DATA REPORTING
1986

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

CALCAREOUS SANDS

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	DRY PRODUCT. KG/HA	DRY PRODUCT. LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	DENSITY /AC
*** ANNUAL FORB ***												
DESCURAINIA PINNATA	6321	0.53	62.59	18.53	35.87	32.01	55.34	11.54	85.00	57.75		
SALSOLA KALI/SALSOLA IBERICA	1407	0.12	13.93	4.12	13.80	12.31	21.29	4.44	60.00	23.00		
GILIA LEPTOMERIA	827	0.07	8.19	2.42	1.47	1.32	2.28	0.47	52.50	18.75		
LAPPULA REDOWSKII	357	0.03	3.54	1.05	4.87	4.35	7.52	1.57	40.00	9.25		
CRYPTANTHA CRASSISEPALA	353	0.03	3.50	1.03	4.80	4.28	7.40	1.54	37.50	8.25		
IPOMOPSIS LONGIFLORA	255	0.02	2.53	0.75	0.62	0.56	0.96	0.20	12.50	6.75		
MENTZELIA ALBICAULIS	194	0.02	1.92	0.57	0.77	0.69	1.20	0.25	32.50	7.50		
ERIGERON FLEXUM	167	0.01	1.65	0.49	1.27	1.14	1.97	0.41	10.00	4.25		
IPOMOPSIS GUNNISONII	152	0.01	1.51	0.45	0.60	0.54	0.93	0.19	12.50	3.00		
CHAENACTIS STEVOIDES	43	0.00	0.43	0.13	0.00	0.00	0.00	0.00	7.50	1.50		
AMBROSIA ACANTHICARPA	9	0.00	0.09	0.03	0.22	0.20	0.35	0.07	2.50	0.50		
PHACELIA CORRUGATA	8	0.00	0.08	0.02	0.00	0.00	0.00	0.00	2.50	0.25		
MALCOMIA AFRICANA	6	0.00	0.06	0.02	0.25	0.22	0.39	0.08	2.50	0.25		
PLANTAGO PATAGONICA	0	0.00	0.00	0.00	0.12	0.11	0.19	0.04	0.00	0.00		
TOWNSENDIA ANNUA	0	0.00	0.00	0.00	0.12	0.11	0.19	0.04	0.00	0.00		
*** ANNUAL FORB TOTALS:	10099	0.84	100.02	29.60	64.82	57.84	100.01	20.85				
*** ANNUAL GRASS ***												
BROMUS TECTORUM	321	0.03	92.52	0.94	4.62	4.13	100.00	1.49	40.00	9.50		
HORDEUM PUSILLUM	52	0.00	13.37	0.15	0.00	0.00	0.00	0.00	2.50	1.25		
VULPIA OCTOFLORA	16	0.00	4.11	0.05	0.00	0.00	0.00	0.00	5.00	0.50		
*** ANNUAL GRASS TOTALS:	399	0.03	100.00	1.14	4.62	4.13	100.00	1.49				
*** BIENNIAL FORB ***												
MACHERANTHERA CANESCENS	0	0.00		0.00	0.57	0.51	100.00	0.18	0.00	0.00		
*** BIENNIAL FORB TOTALS:	0	0.00	0.00	0.00	0.57	0.51	100.00	0.18				
*** PERENNIAL FORB ***												
SPHAERALCEA PARVIFOLIA	12	0.00	50.00	0.04	0.12	0.11	22.73	0.04	5.00	0.50		
LEUCELENE ERICOIDES	8	0.00	33.33	0.02	0.30	0.27	54.55	0.10	2.50	0.25		
SPHAERALCEA COCCINEA	4	0.00	16.67	0.01	0.12	0.11	22.73	0.04	2.50	0.25		
*** PERENNIAL FORB TOTALS:	24	0.00	100.00	0.07	0.55	0.49	100.01	0.18				
*** PERENNIAL GRASS ***												
ORYZOPSIS HYMENOIDES	7846	0.65	47.18	23.00	80.57	71.89	53.61	25.91	100.00	68.50		
HILARIA JAMESII	4440	0.37	26.70	13.01	26.07	23.26	17.35	8.39	95.00	50.25		
SPOROBOLUS AIROIDES	4298	0.36	25.84	12.60	42.87	38.25	28.53	13.79	50.00	26.25		
ARISTIDA PURPUREA	18	0.00	0.11	0.05	0.00	0.00	0.00	0.00	2.50	0.25		
MUHLENBERGIA PUNGENS	18	0.00	0.11	0.05	0.32	0.29	0.22	0.10	5.00	0.50		
SPOROBOLUS GIGANTEUS	10	0.00	0.06	0.03	0.00	0.00	0.00	0.00	2.50	0.25		

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

CALCAREOUS SANDS

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	DRY PRODUCT. KG/HA	DRY PRODUCT. LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	DENSITY /AC
XXX PERENNIAL GRASS XXX												
HORDEUM JUBATUM	0	0.00	0.00	0.00	0.45	0.40	0.30	0.14	0.00	0.00		
XXX PERENNIAL GRASS TOTALS:	16630	1.38	100.00	48.75	150.30	134.10	100.01	48.34				
XXX PERENNIAL SHRUB XXX												
ATRIPLEX CONFERTIFOLIA	6237	0.52	89.43	18.29	77.52	69.17	86.09	24.93	97.50	41.50	2987.5	1209.0
GUTIERREZIA SAROTHRAE	617	0.05	8.85	1.81	10.77	9.61	11.97	3.47	17.50	5.50	762.5	308.6
CERATOIDES LANATA	61	0.01	0.87	0.18	1.75	1.56	1.94	0.56	5.00	0.75	104.2	42.2
ATRIPLEX CANESCENS	59	0.00	0.85	0.17	0.00	0.00	0.00	0.00	7.50	1.00	41.7	16.9
ATRIPLEX OBOVATA	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.3	3.4
OPUNTIA POLYACANTHA	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.8	8.4
XXX PERENNIAL SHRUB TOTALS:	6974	0.58	100.00	20.44	90.05	80.34	100.00	28.96			3925.0	1588.4
CALCAREOUS SANDS	34116	2.83		100.00	310.92	277.40		100.00			3925.0	1588.4

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

DUNES

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	DRY PRODUCT. KG/HA	DRY PRODUCT. LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	DENSITY /AC
*** ANNUAL FORB ***												
SALSOLA KALI/SALSOLA IBERICA	1270	0.11	39.72	3.86	15.97	14.25	47.90	4.37	52.50	19.00		
DESCURAINIA PINNATA	540	0.05	16.89	1.64	2.27	2.03	6.82	0.62	42.50	11.50		
CRYPTANTHA CRASSISEPALA	497	0.04	15.23	1.48	8.30	7.41	24.89	2.27	20.00	9.50		
ATRIPLEX SACCARIA	170	0.01	5.32	0.52	0.00	0.00	0.00	0.00	2.50	0.25		
AMBROSIA ACANTHICARPA	165	0.01	5.16	0.50	2.10	1.87	6.30	0.57	47.50	7.00		
GILIA LEPTOMERIA	142	0.01	4.44	0.43	0.52	0.47	1.57	0.14	27.50	5.75		
ASTRAGALUS SABULONUM	81	0.01	2.53	0.25	1.95	1.74	5.85	0.53	10.00	1.75		
ERIGERON FLEXUM	67	0.01	2.10	0.20	0.00	0.00	0.00	0.00	5.00	1.75		
STEPHANOMERIA EXIGUA	52	0.00	1.63	0.16	0.00	0.00	0.00	0.00	5.00	1.00		
STREPTANTHELLA LONGITROSTRIS	49	0.00	1.53	0.15	0.07	0.07	0.22	0.02	12.50	1.75		
LYGODESMIA GRANDIFLORA	31	0.00	0.97	0.09	0.00	0.00	0.00	0.00	7.50	1.00		
NAMA HISPIDUM	31	0.00	0.97	0.09	0.00	0.00	0.00	0.00	5.00	0.75		
MENTZELIA ALBICAULIS	28	0.00	0.88	0.09	0.77	0.69	2.32	0.21	2.50	1.25		
MALCOMIA AFRICANA	22	0.00	0.69	0.07	0.82	0.74	2.47	0.23	5.00	0.50		
VERBENA BRACTEATA	18	0.00	0.56	0.05	0.35	0.31	1.05	0.10	5.00	0.75		
PLANTAGO PATAGONICA	14	0.00	0.44	0.04	0.00	0.00	0.00	0.00	2.50	0.75		
DITHYRAEA WISLIZENII	9	0.00	0.28	0.03	0.00	0.00	0.00	0.00	2.50	0.50		
LAPPULA REDOWSKII	9	0.00	0.28	0.03	0.10	0.09	0.30	0.03	5.00	0.50		
CHAENACTIS STEVOIDES	6	0.00	0.19	0.02	0.10	0.09	0.30	0.03	2.50	0.25		
IPOMOPSIS POLYCLADON	6	0.00	0.19	0.02	0.00	0.00	0.00	0.00	2.50	0.50		
*** ANNUAL FORB TOTALS:	3197	0.25	100.00	9.71	33.35	29.75	99.99	9.12				
*** ANNUAL GRASS ***												
VULPIA OCTOFLORA	516	0.04	76.67	1.57	1.30	1.16	46.85	0.36	40.00	12.00		
BROMUS TECTORUM	123	0.01	18.28	0.37	1.07	0.96	38.74	0.29	27.50	5.25		
BOUTELOUA BARBATA	34	0.00	5.05	0.10	0.40	0.36	14.41	0.11	2.50	0.50		
*** ANNUAL GRASS TOTALS:	673	0.05	100.00	2.04	2.77	2.48	100.00	0.76				
*** PERENNIAL FORB ***												
ERIOGONUM LEPTOPHYLLUM	352	0.03	27.91	1.07	10.15	9.06	48.62	2.77	27.50	7.00		
PENSTEMON STRICTUS	343	0.03	27.20	1.04	4.67	4.17	22.40	1.28	30.00	6.00		
LEUCELENE ERICOIDES	242	0.02	19.19	0.73	2.57	2.30	12.34	0.70	27.50	5.50		
HOFFMANSEGGIA JAMESII	167	0.01	13.24	0.51	2.42	2.16	11.62	0.66	7.50	0.75		
SPHAERALCEA PARVIFOLIA	64	0.01	5.08	0.19	0.00	0.00	0.00	0.00	12.50	1.50		
SPHAERALCEA COCCINEA	44	0.00	3.49	0.13	0.87	0.78	4.19	0.24	7.50	1.75		
ERIOGONUM LONCHOPHYLLUM	26	0.00	2.06	0.08	0.00	0.00	0.00	0.00	2.50	0.75		
LINUM ARISTATUM	23	0.00	1.82	0.07	0.17	0.16	0.84	0.05	10.00	1.25		
*** PERENNIAL FORB TOTALS:	1261	0.10	99.99	3.83	20.87	18.62	100.01	5.71				
*** PERENNIAL GRASS ***												
ORYZOPSIS HYMENOIDES	10221	0.85	61.74	31.04	132.47	118.19	71.07	36.21	97.50	78.75		

NAVAJO MINE
VEGETATION DATA REPORTING
1986

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

DUNES

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	DRY PRODUCT. KG/HA	DRY PRODUCT. LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	DENSITY /AC
*** PERENNIAL GRASS ***												
HILARIA JAMESII	2106	0.18	12.72	6.40	22.50	20.07	12.07	6.15	80.00	43.50		
MUHLENBERGIA PUNGENS	1674	0.14	10.11	5.08	4.75	4.24	2.55	1.30	17.50	6.75		
ARISTIDA PURPUREA	1185	0.10	7.16	3.60	13.05	11.64	7.00	3.57	22.50	9.25		
SPOROBOLUS AIROIDES	696	0.06	4.20	2.11	6.85	6.11	3.67	1.87	22.50	8.50		
HORDEUM JUBATUM	256	0.02	1.55	0.78	5.20	4.64	2.79	1.42	12.50	4.00		
SPOROBOLUS GIGANTEUS	147	0.01	0.89	0.45	0.20	0.18	0.11	0.05	22.50	3.75		
SPOROBOLUS CRYPTANDRUS	135	0.01	0.82	0.41	1.37	1.23	0.74	0.38	10.00	2.50		
MUHLENBERGIA ASPERIFOLIA	131	0.01	0.79	0.40	0.00	0.00	0.00	0.00	2.50	0.50		
AGROPYRON SMITHII	4	0.00	0.02	0.01	0.00	0.00	0.00	0.00	2.50	0.25		
*** PERENNIAL GRASS TOTALS:	16555	1.38	100.00	50.28	186.40	166.30	100.00	50.95				
*** PERENNIAL SHRUB ***												
GUTIERREZIA SAROTHRAE	4446	0.37	39.55	13.50	51.00	45.50	41.65	13.94	55.00	30.50	4125.0	1669.4
CHRYSOTHAMNUS PULCHELLUS	1617	0.13	14.38	4.91	21.72	19.38	17.74	5.94	12.50	4.00	283.3	114.7
ARTEMISIA FILIFOLIA	1463	0.12	13.01	4.44	9.97	8.90	8.15	2.73	15.00	4.50	391.7	158.5
CHRYSOTHAMNUS NAUSEOSUS	1209	0.10	10.76	3.67	11.85	10.57	9.68	3.24	25.00	3.50	191.7	77.6
CHRYSOTHAMNUS GREENEI	804	0.07	7.15	2.44	11.40	10.17	9.31	3.12	20.00	7.50	441.7	178.7
ATRIPLEX CONFERTIFOLIA	506	0.04	4.50	1.54	1.90	1.70	1.55	0.52	5.00	1.25	87.5	35.4
YUCCA ANGUSTISSIMA	362	0.03	3.22	1.10	0.00	0.00	0.00	0.00	5.00	0.50	50.0	20.2
ATRIPLEX CANESCENS	320	0.03	2.85	0.97	6.72	6.00	5.49	1.84	37.50	5.00	216.7	87.7
EPHEDRA TORREYANA	314	0.03	2.79	0.95	2.97	2.65	2.43	0.81	17.50	2.75	112.5	45.5
EPHEDRA VIRIDIS	167	0.01	1.49	0.51	4.90	4.37	4.00	1.34	12.50	1.50	137.5	55.6
OPUNTIA POLYACANTHA	28	0.00	0.25	0.09	0.00	0.00	0.00	0.00	2.50	0.25	29.2	11.8
BACCHARIS WRIGHTII	5	0.00	0.04	0.02	0.00	0.00	0.00	0.00	2.50	0.25	0.0	0.0
CERATOIDES LANATA	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.5	5.1
*** PERENNIAL SHRUB TOTALS:	11241	0.93	99.99	34.14	122.45	109.25	100.00	33.47			6079.2	2460.2
DUNES	32927	2.71		100.00	365.85	326.41		100.00			6079.2	2460.2

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

SANDS

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	DRY PRODUCT. KG/HA	DRY PRODUCT. LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	DENSITY /AC
*** ANNUAL FORB ***												
SALSOLA KALI/SALSOLA IBERICA	916	0.08	23.26	2.94	13.50	12.04	34.70	4.48	60.00	19.25		
PLANTAGO PATAGONICA	699	0.06	17.75	2.24	9.57	8.54	24.61	3.18	35.00	12.50		
CRYPTANTHA CRASSISEPALA	655	0.05	16.63	2.10	7.22	6.45	18.57	2.40	45.00	15.50		
GILIA LEPTOMERIA	612	0.05	15.54	1.96	2.35	2.10	6.04	0.78	47.50	14.75		
LAPPULA REDOWSKII	373	0.03	9.47	1.20	1.52	1.36	3.92	0.51	27.50	8.50		
DESCURAINIA SOPHIA	360	0.03	9.14	1.15	2.82	2.52	7.26	0.94	5.00	2.25		
DESCURAINIA PINNATA	127	0.01	3.22	0.41	0.00	0.00	0.00	0.00	20.00	3.75		
ERIGERON FLEXUM	110	0.01	2.79	0.35	1.67	1.49	4.31	0.56	5.00	2.00		
IPOMOPSIS GUNNISONII	42	0.00	1.07	0.13	0.00	0.00	0.00	0.00	7.50	1.00		
MENTZELIA ALBICAULIS	25	0.00	0.63	0.08	0.00	0.00	0.00	0.00	7.50	1.00		
ATRIPLEX POWELLII	7	0.00	0.18	0.02	0.00	0.00	0.00	0.00	2.50	0.25		
IPOMOPSIS LONGIFLORA	7	0.00	0.18	0.02	0.00	0.00	0.00	0.00	2.50	0.25		
MALCOMIA AFRICANA	5	0.00	0.13	0.02	0.22	0.20	0.58	0.07	2.50	0.25		
*** ANNUAL FORB TOTALS:	3938	0.32	99.99	12.62	38.90	34.71	99.99	12.91				
*** ANNUAL GRASS ***												
VULPIA OCTOFLORA	3453	0.29	96.08	11.07	20.27	18.09	99.51	6.73	52.50	32.50		
BROMUS TECTORUM	127	0.01	3.53	0.41	0.10	0.09	0.49	0.03	37.50	6.75		
BOUTELOUA BARBATA	14	0.00	0.39	0.04	0.00	0.00	0.00	0.00	2.50	0.25		
*** ANNUAL GRASS TOTALS:	3594	0.30	100.00	11.52	20.37	18.18	100.00	6.76				
*** PERENNIAL FORB ***												
LEUCELENE ERICOIDES	154	0.01	38.50	0.49	1.42	1.27	56.44	0.47	17.50	3.75		
BAHIA OBLONGIFOLIA	93	0.01	23.25	0.30	0.00	0.00	0.00	0.00	2.50	0.50		
PENSTEMON STRICTUS	58	0.00	14.50	0.19	0.90	0.80	35.64	0.30	12.50	1.25		
ERIOGONUM LEPTOPHYLLUM	46	0.00	11.50	0.15	0.00	0.00	0.00	0.00	5.00	0.50		
ABRONIA FRAGRANS	22	0.00	5.50	0.07	0.00	0.00	0.00	0.00	2.50	0.25		
LINUM ARISTATUM	19	0.00	4.75	0.06	0.10	0.09	3.96	0.03	5.00	0.75		
SPHAERALCEA COCCINEA	8	0.00	2.00	0.03	0.10	0.09	3.96	0.03	2.50	0.25		
*** PERENNIAL FORB TOTALS:	400	0.02	100.00	1.28	2.52	2.25	100.00	0.84				
*** PERENNIAL GRASS ***												
ORYZOPSIS HYMENOIDES	8202	0.68	46.11	26.29	67.50	60.22	44.48	22.40	85.00	49.75		
SPOROBOLUS AIROIDES	5588	0.47	31.42	17.91	53.07	47.35	34.98	17.62	72.50	39.75		
HILARIA JAMESII	3694	0.31	20.77	11.84	28.77	25.67	18.96	9.55	95.00	59.25		
ARISTIDA PURPUREA	277	0.02	1.56	0.89	2.40	2.14	1.58	0.80	20.00	4.00		
AGROPYRON SMITHII	18	0.00	0.10	0.06	0.00	0.00	0.00	0.00	2.50	0.50		
MUHLENBERGIA PUNGENS	8	0.00	0.04	0.03	0.00	0.00	0.00	0.00	2.50	0.25		
*** PERENNIAL GRASS TOTALS:	17787	1.48	100.00	57.02	151.75	135.39	100.00	50.37				

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

SANDS

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	- DRY PRODUCT. - KG/HA	LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	/AC
*** PERENNIAL SHRUB ***												
GUTIERREZIA SAROTHRAE	3198	0.27	58.23	10.22	47.40	42.29	54.03	15.73	70.00	34.75	4316.7	1746.9
ATRIPLEX CONFERTIFOLIA	1006	0.08	18.37	3.22	32.60	29.09	37.16	10.82	22.50	5.50	220.8	89.4
ATRIPLEX CUNEATA	498	0.04	8.91	1.56	4.25	3.79	4.84	1.41	10.00	1.75	54.2	21.9
EPHEDRA TORREYANA	363	0.03	6.63	1.16	0.00	0.00	0.00	0.00	5.00	0.50	12.5	5.1
ATRIPLEX CANESCENS	354	0.03	6.47	1.13	3.47	3.10	3.96	1.15	15.00	2.50	112.5	45.5
EPHEDRA VIRIDIS	35	0.00	0.64	0.11	0.00	0.00	0.00	0.00	2.50	0.25	4.2	1.7
PARRYELLA FILIFOLIA	26	0.00	0.47	0.08	0.00	0.00	0.00	0.00	2.50	0.50	20.8	8.4
SACROBATUS VERMICULATUS	15	0.00	0.27	0.05	0.00	0.00	0.00	0.00	2.50	0.25	16.7	6.7
ATRIPLEX CORRUGATA	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.7	6.7
ATRIPLEX OBOVATA	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.5	5.1
CERATOIDES LANATA	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.5	5.1
CHRYSOTHAMNUS NAUSEOSUS	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.8	8.4
OPUNTIA POLYACANTHA	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.3	13.5
YUCCA ANGUSTISSIMA	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.3	3.4
*** PERENNIAL SHRUB TOTALS:	5475	0.45	99.99	17.55	87.72	78.27	99.99	29.12			4862.5	1967.8
SANDS	31194	2.57		100.00	301.27	268.79		100.00			4862.5	1967.8

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

SALINE SANDS

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	DRY PRODUCT. KG/HA	DRY PRODUCT. LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	DENSITY /AC
*** ANNUAL FORB ***												
SALSOLA KALI/SALSOLA IBERICA	1933	0.16	37.86	5.23	10.77	9.61	41.52	4.11	60.00	24.75		
DESCURAINIA PINNATA	875	0.07	17.14	2.37	2.75	2.45	10.60	1.05	50.00	18.50		
CRYPTANTHA CRASSISEPALA	867	0.07	16.98	2.34	6.42	5.73	24.76	2.45	45.00	13.25		
GILIA LEPTOMERIA	700	0.06	13.71	1.89	1.70	1.52	6.55	0.65	47.50	20.75		
LAPPULA REDOWSKII	145	0.01	2.84	0.39	1.67	1.49	6.45	0.64	27.50	4.00		
ERIGERON FLEXUM	136	0.01	2.66	0.37	0.00	0.00	0.00	0.00	7.50	2.00		
PLANTAGO PATAGONICA	117	0.01	2.29	0.32	1.40	1.25	5.39	0.53	20.00	3.75		
PHACELIA CORRUGATA	106	0.01	2.08	0.29	0.25	0.22	0.96	0.10	15.00	3.50		
MALCOMIA AFRICANA	92	0.01	1.61	0.22	0.00	0.00	0.00	0.00	10.00	1.00		
IPOMOPSIS POLYCLADON	50	0.00	0.98	0.14	0.32	0.29	1.25	0.12	7.50	1.50		
CHENOPODIUM INCANUM	30	0.00	0.59	0.08	0.00	0.00	0.00	0.00	2.50	0.25		
MENTZELIA ALBICAULIS	20	0.00	0.39	0.05	0.00	0.00	0.00	0.00	7.50	0.75		
IPOMOPSIS GUNNISONII	11	0.00	0.22	0.03	0.25	0.22	0.96	0.10	5.00	0.50		
ATRIPLEX POWELLII	9	0.00	0.18	0.02	0.10	0.09	0.39	0.04	5.00	0.50		
IPOMOPSIS LONGIFLORA	8	0.00	0.16	0.02	0.05	0.04	0.19	0.02	2.50	0.25		
HALOGETON GLOMERATUS	5	0.00	0.10	0.01	0.25	0.22	0.96	0.10	2.50	0.25		
CHAENACTIS STEVOIDES	4	0.00	0.08	0.01	0.00	0.00	0.00	0.00	2.50	0.25		
ERIOGONUM DIVARICATUM	3	0.00	0.06	0.01	0.00	0.00	0.00	0.00	2.50	0.25		
CLEOME LUTEA	2	0.00	0.04	0.01	0.00	0.00	0.00	0.00	2.50	0.25		
ERIOGONUM SALSUGINOSUM	2	0.00	0.04	0.01	0.00	0.00	0.00	0.00	2.50	0.25		
*** ANNUAL FORB TOTALS:	5105	0.41	100.01	13.80	25.95	23.15	99.98	9.89				
*** ANNUAL GRASS ***												
VULPIA OCTOFLORA	5098	0.42	92.01	13.76	17.57	15.68	90.36	6.70	55.00	35.00		
BROMUS TECTORUM	442	0.04	7.99	1.20	1.87	1.67	9.64	0.71	42.50	10.25		
*** ANNUAL GRASS TOTALS:	5530	0.46	100.00	14.95	19.45	17.35	100.00	7.41				
*** PERENNIAL FORB ***												
SPHAERALCEA COCCINEA	73	0.01	84.88	0.20	0.00	0.00	0.00	0.00	7.50	0.75		
LEUCELENE ERICOIDES	13	0.00	15.12	0.04	0.00	0.00	0.00	0.00	2.50	0.25		
SPHAERALCEA PARVIFOLIA	0	0.00	0.00	0.00	0.10	0.09	100.00	0.04	0.00	0.00		
*** PERENNIAL FORB TOTALS:	86	0.01	100.00	0.23	0.10	0.09	100.00	0.04				
*** PERENNIAL GRASS ***												
SPOROBOLUS AIROIDES	10934	0.91	50.96	29.57	74.62	66.58	49.62	28.45	85.00	51.25		
ORYZOPSIS HYMENOIDES	6467	0.54	30.14	17.49	55.42	49.45	36.85	21.13	75.00	40.75		
HILARIA JAMESII	3856	0.32	17.97	10.43	19.32	17.24	12.85	7.37	85.00	43.75		
ARISTIDA PURPUREA	201	0.02	0.94	0.54	1.02	0.91	0.68	0.39	10.00	1.75		
*** PERENNIAL GRASS TOTALS:	21458	1.79	100.01	58.02	150.40	134.19	100.00	57.33				

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

SALINE SANDS

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	- DRY PRODUCT. - KG/HA	LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	/AC
XXX PERENNIAL SHRUB XXX												
ATRIPLEX CONFERTIFOLIA	1365	0.11	28.43	3.69	10.17	9.08	15.32	3.88	27.50	7.75	425.0	172.0
SACROBATUS VERMICULATUS	1315	0.11	27.38	3.56	25.50	22.75	38.39	9.72	7.50	1.00	16.7	6.7
GUTIERREZIA SAROTHRAE	1278	0.11	26.61	3.46	19.07	17.02	28.72	7.27	30.00	9.50	1150.0	465.4
ATRIPLEX CUNEATA	532	0.04	11.08	1.44	7.52	6.71	11.33	2.87	10.00	2.50	145.8	59.0
ATRIPLEX OBOVATA	150	0.01	3.12	0.41	4.15	3.70	6.25	1.58	2.50	0.75	54.2	21.9
CERATOIDES LANATA	95	0.01	1.98	0.26	0.00	0.00	0.00	0.00	2.50	0.25	25.0	10.1
OPUNTIA POLYACANTHA	42	0.00	0.87	0.11	0.00	0.00	0.00	0.00	2.50	0.25	20.8	8.4
ATRIPLEX CANESCENS	25	0.00	0.52	0.07	0.00	0.00	0.00	0.00	5.00	0.50	16.7	6.7
CHRYSOTHAMNUS NAUSEOSUS	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.7	6.7
EPHEDRA TORREYANA	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.2	1.7
LYCIUM PALLIDUM	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.5	5.1
XXX PERENNIAL SHRUB TOTALS:	4802	0.39	99.99	12.99	66.42	59.26	100.01	25.32			1887.5	763.9
SALINE SANDS	36981	3.06		100.00	262.32	234.04		100.00			1887.5	763.9

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

THINBREAKS

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	- DRY PRODUCT. - KG/HA	LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	/AC
*** ANNUAL FORB ***												
SALSOLA KALI/SALSOLA IBERICA	3204	0.27	45.71	16.02	17.97	16.04	35.47	10.56	70.00	38.25		
DESCURAINIA PINNATA	734	0.06	10.47	3.67	3.97	3.55	7.84	2.33	67.50	20.75		
HALOGETON GLOMERATUS	705	0.06	10.06	3.52	8.25	7.36	16.28	4.85	35.00	12.25		
ERIGERON FLEXUM	697	0.06	9.94	3.48	2.40	2.14	4.74	1.41	32.50	11.25		
ATRIPLEX POWELLII	434	0.04	6.19	2.17	8.45	7.54	16.67	4.96	22.50	8.75		
PHACELIA CORRUGATA	414	0.03	5.91	2.07	3.92	3.41	7.55	2.25	37.50	10.75		
CHAENACTIS STEVOIDES	188	0.02	2.68	0.94	1.05	0.94	2.07	0.62	12.50	5.00		
LAPPULA REDOWSKII	166	0.01	2.37	0.83	0.32	0.29	0.64	0.19	30.00	6.75		
ERIOGONUM SALSUGINOSUM	152	0.01	2.17	0.76	0.97	0.87	1.92	0.57	5.00	2.25		
PLANTAGO PATAGONICA	102	0.01	1.46	0.51	0.95	0.76	1.68	0.50	10.00	3.75		
GILIA LEPTOMERIA	49	0.00	0.70	0.24	0.00	0.00	0.00	0.00	5.00	1.25		
AMBROSIA ACANTHICARPA	44	0.00	0.63	0.22	0.00	0.00	0.00	0.00	7.50	1.25		
ERIOGONUM DIVARICATUM	38	0.00	0.54	0.19	0.27	0.25	0.54	0.16	2.50	1.50		
IPOMOPSIS GUNNISONII	35	0.00	0.50	0.17	1.22	1.09	2.42	0.72	10.00	1.00		
MENTZELIA ALBICAULIS	21	0.00	0.30	0.10	0.12	0.11	0.25	0.07	7.50	1.00		
ATRIPLEX SACCARIA	14	0.00	0.20	0.07	0.52	0.47	1.04	0.31	2.50	0.50		
IPOMOPSIS LONGIFLORA	8	0.00	0.11	0.04	0.00	0.00	0.00	0.00	2.50	0.25		
CLEOME LUTEA	5	0.00	0.07	0.02	0.00	0.00	0.00	0.00	2.50	0.25		
IPOMOPSIS POLYCLADON	0	0.00	0.00	0.00	0.45	0.40	0.89	0.26	0.00	0.00		
*** ANNUAL FORB TOTALS:	7010	0.57	100.01	35.04	50.67	45.21	100.00	29.76				
*** ANNUAL GRASS ***												
VULPIA OCTOFLORA	267	0.02	52.05	1.33	0.40	0.36	45.71	0.23	7.50	2.25		
BROMUS TECTORUM	246	0.02	47.95	1.23	0.47	0.42	54.29	0.28	17.50	4.50		
*** ANNUAL GRASS TOTALS:	513	0.04	100.00	2.56	0.87	0.78	100.00	0.51				
*** PERENNIAL FORB ***												
BAHIA OBLONGIFOLIA	274	0.02	56.49	1.37	2.97	2.65	78.29	1.75	7.50	2.00		
SPHAERALCEA COCCINEA	141	0.01	29.07	0.70	0.82	0.74	21.71	0.48	15.00	2.00		
ASTRAGALUS LONCHOCARPUS	32	0.00	6.60	0.16	0.00	0.00	0.00	0.00	2.50	0.25		
ERIOGONUM CORYMBOSUM	16	0.00	3.30	0.08	0.00	0.00	0.00	0.00	2.50	0.25		
SPHAERALCEA PARVIFOLIA	13	0.00	2.68	0.06	0.00	0.00	0.00	0.00	2.50	0.25		
ERIOGONUM LEPTOPHYLLUM	9	0.00	1.86	0.04	0.00	0.00	0.00	0.00	2.50	0.25		
*** PERENNIAL FORB TOTALS:	485	0.03	100.00	2.42	3.80	3.39	100.00	2.23				
*** PERENNIAL GRASS ***												
SPOROBOLUS AIROIDES	1350	0.11	44.25	6.75	13.30	11.87	69.18	7.81	35.00	9.25		
HILARIA JAMESII	1048	0.09	34.35	5.24	0.87	0.78	4.55	0.51	45.00	9.25		
ORYZOPSIS HYMENOIDES	653	0.05	21.40	3.26	5.05	4.51	26.27	2.97	30.00	7.00		
*** PERENNIAL GRASS TOTALS:	3051	0.25	100.00	15.25	19.22	17.15	100.00	11.29				

COVER, PRODUCTION, CONSTANCY, FREQUENCY, AND SHRUB DENSITY BY SPECIES

UNDISTURBED AREAS

THINBREAKS

N (COVER) = 40
N (PROD.) = 40

SPECIES	COVER (MM.)	COVER (%)	% OF GROUP COVER	% OF TOTAL COVER	- DRY PRODUCT. - KG/HA	LB/AC	% OF GROUP PROD.	% OF TOTAL PROD.	CONST.	FREQ.	DENSITY /HA	/AC
XXX PERENNIAL SHRUB XXX												
ATRIPLEX CONFERTIFOLIA	7056	0.59	78.87	35.27	57.60	51.39	60.19	33.83	72.50	29.25	2095.8	848.2
GUTIERREZIA SAROTHRAE	1196	0.10	13.26	5.93	11.45	10.22	11.96	6.72	37.50	9.50	812.5	328.8
ATRIPLEX CORRUGATA	294	0.02	3.29	1.47	13.10	11.69	13.69	7.69	7.50	3.75	266.7	107.9
ATRIPLEX CUNEATA	193	0.02	2.16	0.96	10.65	9.50	11.13	6.25	10.00	1.75	100.0	40.5
SUAEDA TORREYANA	163	0.01	1.82	0.81	2.47	2.21	2.59	1.45	10.00	1.00	58.3	23.6
ATRIPLEX OBOVATA	25	0.00	0.28	0.12	0.42	0.38	0.44	0.25	2.50	0.50	37.5	15.2
ATRIPLEX CANESCENS	16	0.00	0.18	0.08	0.00	0.00	0.00	0.00	2.50	0.75	33.3	13.5
OPUNTIA POLYACANTHA	13	0.00	0.15	0.06	0.00	0.00	0.00	0.00	2.50	0.25	29.2	11.8
BACCHARIS WRIGHTII	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.3	3.4
EPHEDRA TORREYANA	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.3	3.4
XXX PERENNIAL SHRUB TOTALS:	8946	0.74	100.01	44.72	95.70	85.38	100.00	56.20			3450.0	1396.2
THINBREAKS	20005	1.63		100.00	170.27	151.92		100.00			3450.0	1396.2

16-I-17

SUMMARY OF RANGE STATISTICAL TOTALS -- UNDISTURBED AREAS

	% COVER & (% TOTAL COVER)			DRY PRODUCTION IN #/ACRE & (% TOTAL PROD.)			SHRUB DENS.
	HERBACEOUS	SHRUB	TOTAL	HERBACEOUS	SHRUB	TOTAL	(UNIT/ACRE)
ALKALI WASH	1.13 (68.32)	0.53 (31.68)	1.65	87.06 (52.70)	78.13 (47.30)	165.19	524.4
ARROYO SHRUB	1.79 (64.32)	0.98 (35.25)	2.77	178.48 (60.79)	115.14 (39.21)	293.62	1205.7
BADLANDS	0.90 (81.34)	0.21 (18.66)	1.11	79.69 (81.22)	18.42 (18.78)	98.12	278.2
CALCAREOUS SANDS	2.25 (79.56)	0.58 (20.44)	2.83	197.06 (71.04)	80.34 (28.96)	277.40	1588.4
DUNES	1.78 (65.86)	0.93 (34.14)	2.71	217.16 (66.53)	109.25 (33.47)	326.41	2460.2
SANDS	2.07 (82.26)	0.45 (17.55)	2.52	190.53 (70.98)	78.27 (29.12)	268.79	1967.8
SALINE SANDS	2.67 (87.01)	0.39 (12.99)	3.06	174.78 (74.68)	59.26 (25.32)	234.04	763.9
THINBREAKS	0.89 (55.28)	0.74 (44.72)	1.63	66.54 (43.80)	85.38 (56.20)	151.92	1396.2