

**Report of Findings  
Monitoring Data Report  
Joder Arabian Ranch  
1998**

Boulder County, CO

Data Collected for:

City of Boulder Open Space Dept.  
P.O. Box 791  
Boulder, CO 80306

Data Collected by:

ESCO Associates, Inc.  
P.O. Box 18775  
Boulder, CO 80308

May 1999

## INTRODUCTION

Pursuant to provisions of a conservation easement entered into by Joder Arabian Ranch relative to their property north of Boulder, Colorado, a vegetation monitoring program was begun in September 1997 and continued in 1998. Objectives of this monitoring were to provide both parties to the conservation easement agreement with information for use in evaluating trends in the composition of plant communities. Although the southeast pasture area is disturbed, most of this site is in a high quality condition. It is hoped that monitoring will document the continued high quality condition of most areas and will show trends of improvement in the disturbed southeast pasture area. The second year of monitoring occurred in 1998 and is reported here.

## METHODS

### *Sample Locations*

Nine permanent sample locations were established in 1997 and were located subjectively to incorporate the variability of the easement area. At each sample location, the end points of the sample transect were marked with a "t" post driven into the ground with 3.5 to 4 feet extending above the ground. To make the posts highly visible and to reduce the possibility of injury to stock and riders, a section of 4 inch PVC pipe was placed around each above ground section of "t" post. Sample locations are indicated on Map 1.

### *Cover*

Cover data were collected using a point intercept method in which data were recorded as interceptions of a point with plant species, litter, standing dead plant material, soil or rock. Plant material produced during 1998 and still standing was tallied by species. Litter was considered to be any organic material that had fallen, or begun to fall to the soil surface. Standing dead was any dead plant material that was produced in previous years but which was still standing and had not lodged or broken off to become litter. Inorganic materials greater than 1 cm in diameter were considered rock. The cover sampling points were optically projected using a Cover-Point Optical Point Projection Device. One hundred points were collected at each transect and distributed evenly along the transect with a pair of points collected at each meter mark. The pair of points were sampled on opposite sides of the transect, 0.5 m from the transect.

The point intercept method of cover assessment was chosen because it provides superior objectivity and repeatability. This method collects more information about abundant species than about rare species. This inherent tendency has been countered through use of a total vascular species inventory along the sample transect (see "Species Diversity").

### *Species Diversity (Density)*

A full accounting of all plant species encountered within each of the areas sampled for cover was compiled. Along point intercept transects, species presence was noted within the area one meter to either side of the transect ( $50\text{m} \times 2\text{m} = 100\text{ m}^2$ ). These presence data along with point-intercept data themselves were used to produce values for species density expressed on a per 100 sq. m. basis.

### ***Sampling Date***

Sampling was conducted in late October 1998.

### ***Photographic Documentation***

A color photograph oriented along the transect from the origin was taken at each site. Copies of these photographs are attached to this report.

## **RESULTS**

Results of transect sampling completed in 1998 are presented in Table 1. Data from the individual transects are shown on pages 4 through 6 of Table 1 and will be of most value to future comparisons. As an additional aid to comparisons, Figure 1 illustrates total vegetation cover at all sample transects in both 1997 and 1998. Figure 2 illustrates species density by lifeform at all transects in both sample years and Figure 3 similarly illustrates relative vegetation cover.

Photographs 1 through 9 document the visual conditions along the transects in October 1998.

## **DISCUSSION**

A detailed evaluation of trends will be undertaken after a third year's data are available. However, between 1997 and 1998, the abundance of annual species (most of which are weedy in nature) has declined on the areas documented by Transects 1 through 4. This is especially of note on Transect 1 in the southeast quadrant where management of grazing has been actively directed toward improvement of condition. Total vegetation cover has increased on Transect 1 by nearly half between 1997 and 1998, primarily because of the expansion of rubber rabbitbrush and snakeweed. It is hoped that this represents merely the maturation of previously existing individuals and that the future will see the decline of these plants and the increase of palatable grasses.

Figure 1. Total Vegetation Cover - Joder Ranch, Boulder City Open Space, CO - 1998

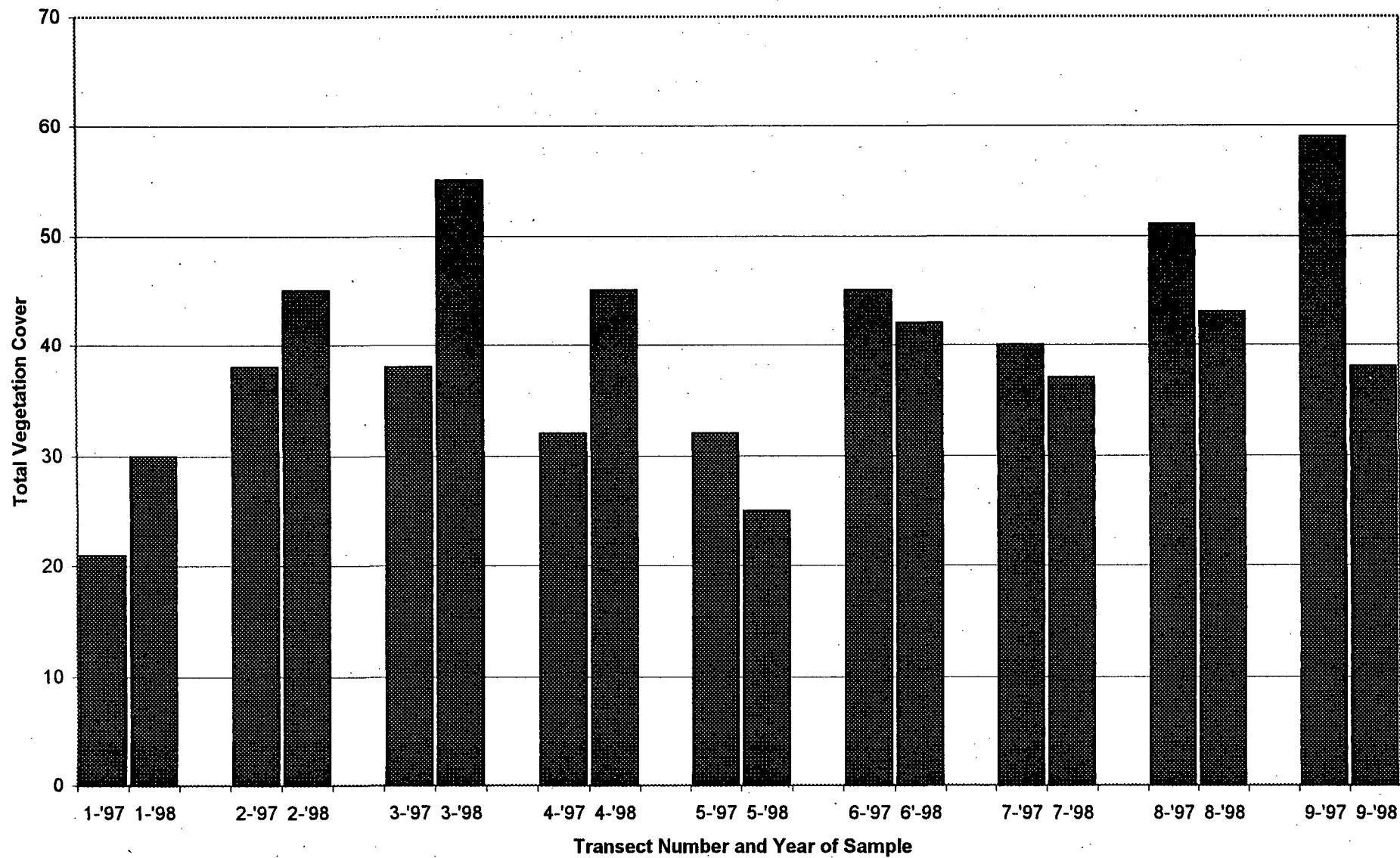




Figure 3. Relative Cover by Lifeform - Joder Ranch, City of Boulder Open Space- 1997 and 1998.

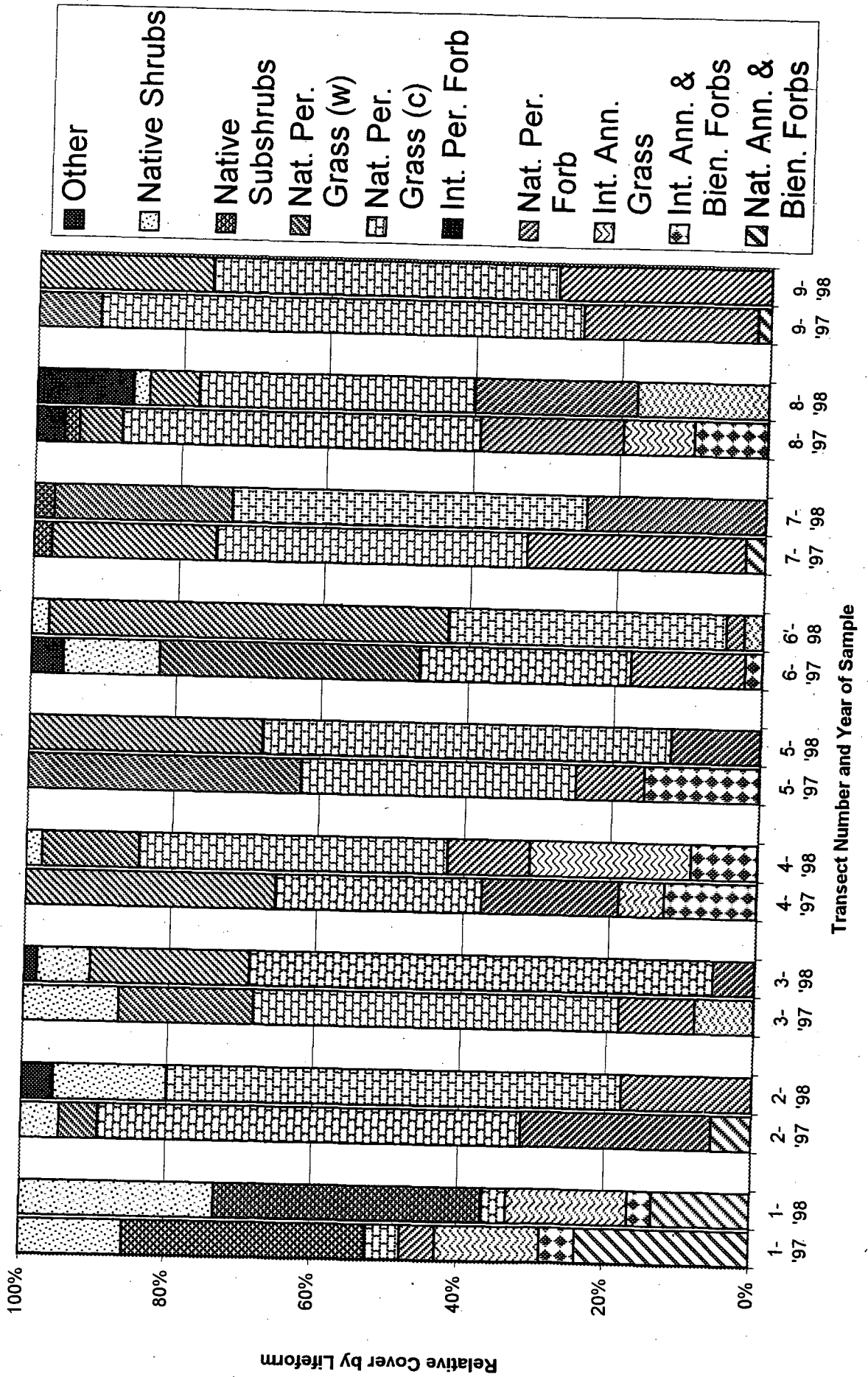


Table 1. Cover Data - Joder Ranch, City of Boulder Open Space, CO - 1998.

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)
<b>NATIVE ANNUAL &amp; BIENNIAL FORBS</b>					
<i>Cirsium undulatum</i>	0.00	33.33	0.00	0.00	0.00
<i>Epilobium brachycarpum</i>	0.00	11.11	0.00	0.00	0.00
<i>Erigeron divergens</i>	0.44	11.11	1.11	0.44	1.08
<i>Grindelia squarrosa</i>	0.00	44.44	0.00	0.00	0.00
<i>Polygonum douglasii</i>	0.00	11.11	0.00	0.00	0.00
<i>Pterogonum alatum</i>	0.00	22.22	0.00	0.00	0.00
<i>Silene antirrhina</i>	0.00	11.11	0.00	0.00	0.00
<b>TOTAL NATIVE ANN. &amp; BIEN. FORBS</b>	<b>0.4</b>	<b>88.9</b>	<b>1.1</b>	<b>0.4</b>	<b>1.1</b>
<b>INTRODUCED ANNUAL &amp; BIENNIAL FORBS</b>					
<i>Alyssum minus</i>	0.56	77.78	1.39	0.56	1.35
<i>Chenopodium album</i>	0.00	11.11	0.00	0.00	0.00
<i>Lactuca serriola</i>	0.00	66.67	0.00	0.00	0.00
<i>Tragopogon dubius ssp. major</i>	0.00	44.44	0.00	0.00	0.00
<b>TOTAL INTRO. ANN. &amp; BIEN. FORBS</b>	<b>0.6</b>	<b>100.0</b>	<b>1.4</b>	<b>0.6</b>	<b>1.3</b>
<b>INTRODUCED ANNUAL GRASSES</b>					
<i>Bromus japonicus</i>	2.56	88.89	6.39	2.78	6.74
<b>TOTAL INTRO. ANN. GRASSES</b>	<b>2.6</b>	<b>88.9</b>	<b>6.4</b>	<b>2.8</b>	<b>6.7</b>
<b>NATIVE PERENNIAL FORBS</b>					
<i>Adenolinum lewisii</i>	0.11	22.22	0.28	0.11	0.27
<i>Allium spp.</i>	0.00	11.11	0.00	0.00	0.00
<i>Ambrosia psilostachya var. coronopifolia</i>	1.22	100.00	3.06	1.22	2.96
<i>Antennaria rosea</i>	0.00	11.11	0.00	0.00	0.00
<i>Artemisia ludoviciana</i>	0.56	88.89	1.39	0.56	1.35
<i>Asclepias pumila</i>	0.00	11.11	0.00	0.00	0.00
<i>Aster porteri</i>	0.11	33.33	0.28	0.11	0.27
<i>Astragalus flexuosus</i>	0.00	11.11	0.00	0.00	0.00
<i>Dalea candida var. oligophylla</i>	0.00	11.11	0.00	0.00	0.00
<i>Dalea purpurea</i>	0.11	44.44	0.28	0.11	0.27
<i>Drymocallis fissa</i>	0.11	11.11	0.28	0.11	0.27
<i>Eriogonum jamesii</i>	0.00	11.11	0.00	0.00	0.00
<i>Eriogonum umbellatum</i>	0.00	11.11	0.00	0.00	0.00
<i>Evolvulus nuttallianus</i>	0.00	11.11	0.00	0.00	0.00
<i>Gaillardia aristata</i>	0.00	11.11	0.00	0.00	0.00
<i>Gaura coccinea</i>	0.00	11.11	0.00	0.00	0.00
<i>Geranium richardsonii</i>	0.56	66.67	1.39	0.56	1.35
<i>Helianthus pumilus</i>	0.56	44.44	1.39	0.56	1.35
<i>Heterotheca fulcrata</i>	0.67	44.44	1.67	0.67	1.62
<i>Heterotheca villosa</i>	0.00	11.11	0.00	0.00	0.00
<i>Liatris punctata</i>	0.00	11.11	0.00	0.00	0.00
<i>Lithospermum incisum</i>	0.00	11.11	0.00	0.00	0.00
<i>Oligosporus dracunculoides ssp. glaucus</i>	0.00	11.11	0.00	0.00	0.00
<i>Onosmodium molle ssp. occidentale</i>	0.00	44.44	0.00	0.00	0.00
<i>Oxalis dillenii</i>	0.00	11.11	0.00	0.00	0.00
<i>Oxytropis sericea</i>	0.00	11.11	0.00	0.00	0.00
<i>Oxytropis x sericea</i>	0.00	11.11	0.00	0.00	0.00
<i>Paronychia jamesii</i>	0.00	11.11	0.00	0.00	0.00
<i>Penstemon secundiflorus</i>	0.00	11.11	0.00	0.00	0.00
<i>Phacelia heterophylla</i>	0.00	11.11	0.00	0.00	0.00
<i>Physalis spp.</i>	0.00	11.11	0.00	0.00	0.00
<i>Physalis virginiana</i>	0.00	11.11	0.00	0.00	0.00

Table 1. Cover Data - Joder Ranch, City of Boulder Open Space, CO - 1998.

PLANT SPECIES	AVERAGE		RELATIVE	RELATIVE	
	COVER (%)	FREQUENCY (%)	VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	VEGETATION COVER-ALL (%)
<b>NATIVE PERENNIAL FORBS (concluded)</b>					
<i>Pneumonanthe bigelovii</i>	0.00	11.11	0.00	0.00	0.00
<i>Pseudocymopterus montanus</i>	0.00	11.11	0.00	0.00	0.00
<i>Psoralidium tenuiflorum</i>	0.44	66.67	1.11	0.44	1.08
<i>Ratibida columnifera</i>	0.00	33.33	0.00	0.00	0.00
<i>Senecio spartioides</i>	0.00	22.22	0.00	0.00	0.00
<i>Sphaeralcea coccinea</i>	0.00	22.22	0.00	0.00	0.00
<i>Tithymalus brachyceras</i>	0.00	11.11	0.00	0.00	0.00
<i>Tragia ramosa</i>	0.78	55.56	1.94	0.78	1.89
<i>Virgulus falcatus</i>	0.33	44.44	0.83	0.33	0.81
<b>TOTAL NATIVE PERENNIAL FORBS</b>	<b>5.6</b>	<b>100.0</b>	<b>13.9</b>	<b>5.6</b>	<b>13.5</b>
<b>INTRODUCED PERENNIAL FORBS</b>					
<i>Convolvulus arvensis</i>	0.00	11.11	0.00	0.00	0.00
<b>TOTAL INTRO. PERENNIAL FORBS</b>	<b>0.0</b>	<b>11.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>NATIVE PERENNIAL GRASSES (cool)</b>					
<i>Achnatherum scribneri</i>	0.11	11.11	0.28	0.11	0.27
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>	1.00	33.33	2.50	1.00	2.43
<i>Elymus elymoides</i>	0.11	11.11	0.28	0.11	0.27
<i>Elymus longifolius</i>	0.11	11.11	0.28	0.11	0.27
<i>Hesperostipa comata</i>	6.11	66.67	15.28	6.33	15.36
<i>Koeleria macrantha</i>	0.00	22.22	0.00	0.00	0.00
<i>Pascopyrum smithii</i>	3.44	44.44	8.61	3.56	8.63
<i>Poa agassizensis</i>	4.22	44.44	10.56	4.33	10.51
<i>Poa compressa</i>	3.22	66.67	8.06	3.33	8.09
<b>TOTAL NATIVE PERENNIAL GRASSES (c)</b>	<b>18.3</b>	<b>100.0</b>	<b>45.8</b>	<b>18.9</b>	<b>45.8</b>
<b>NATIVE PERENNIAL GRASSES (warm)</b>					
<i>Andropogon gerardii</i>	3.33	66.67	8.33	3.67	8.89
<i>Aristida purpurea</i>	0.00	11.11	0.00	0.00	0.00
<i>Bouteloua curtipendula</i>	0.89	88.89	2.22	0.89	2.16
<i>Chondrosium gracile</i>	1.00	77.78	2.50	1.00	2.43
<i>Schizachyrium scoparium</i>	2.22	44.44	5.56	2.22	5.39
<i>Sporobolus airoides</i>	0.00	11.11	0.00	0.00	0.00
<i>Sporobolus cryptandrus</i>	0.22	22.22	0.56	0.22	0.54
<i>Sporobolus heterolepis</i>	0.11	22.22	0.28	0.11	0.27
<b>TOTAL NATIVE PERENNIAL GRASSES (w)</b>	<b>7.8</b>	<b>88.9</b>	<b>19.4</b>	<b>8.1</b>	<b>19.7</b>
<b>NATIVE SUBSHRUBS</b>					
<i>Artemisia frigida</i>	0.11	66.67	0.28	0.11	0.27
<i>Gutierrezia sarothrae</i>	1.22	44.44	3.06	1.22	2.96
<b>TOTAL NATIVE SUBSHRUBS</b>	<b>1.3</b>	<b>77.8</b>	<b>3.3</b>	<b>1.3</b>	<b>3.2</b>
<b>NATIVE SHRUBS</b>					
<i>Cercocarpus montanus</i>	0.11	11.11	0.28	0.11	0.27
<i>Chrysothamnus nauseosus</i>	0.89	11.11	2.22	0.89	2.16
<i>Mahonia repens</i>	0.33	11.11	0.83	0.33	0.81
<i>Rhus aromatica</i> ssp. <i>trilobata</i>	0.22	22.22	0.56	0.22	0.54
<i>Rosa sayi</i>	0.56	33.33	1.39	0.56	1.35
<i>Symphoricarpos rotundifolius</i>	0.00	11.11	0.00	0.00	0.00
<i>Yucca glauca</i>	0.33	66.67	0.83	0.44	1.08
<b>TOTAL NATIVE SHRUBS</b>	<b>2.4</b>	<b>88.9</b>	<b>6.1</b>	<b>2.6</b>	<b>6.2</b>



Table 1. Cover Data - Joder Ranch, City of Boulder Open Space, CO - 1998.

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)
<b>NATIVE TREES</b>					
<i>Pinus ponderosa</i> ssp. <i>scopulorum</i>	0.00	11.11	0.00	0.00	0.00
<b>TOTAL NATIVE TREES</b>	0.0	11.1	0.0	0.0	0.0
<b>BRYOPHYTES</b>					
Moss	0.00	22.22	0.00	0.00	0.00
<b>TOTAL BRYOPHYTES</b>	0.0	22.2	0.0	0.0	0.0
<b>LICHEN</b>					
<i>Xanthoparmelia chlorochroa</i>	0.11	44.44	0.28	0.11	0.27
<b>TOTAL LICHEN</b>	0.1	44.4	0.3	0.1	0.3
<b>SUCCULENT</b>					
<i>Echinocereus viridiflorus</i>	0.00	22.22	0.00	0.00	0.00
<i>Opuntia macrorhiza</i>	0.44	88.89	1.11	0.44	1.08
<i>Opuntia polyacantha</i>	0.44	55.56	1.11	0.44	1.08
<b>TOTAL SUCCULENT</b>	0.9	88.9	2.2	0.9	2.2
Standing dead	0.11	11.11		0.11	
Litter	34.89	100.00		34.89	
Bare soil	17.33	88.89		17.33	
Rock	7.67	88.89		7.67	
<b>TOTALS</b>	100.0			101.2	
<b>TOTAL VEGETATION COVER</b>	40.0 (s=8.8)		100.0	41.2 (s=9.4)	100.0
<b>GROUND COVER (Litter+Rock+Veg+St. Dead)</b>	82.7			83.9	
<b>SPECIES DENSITY (# of species/100 sq.m.)</b> (AVERAGE= 26.4 Std.Dev.= 7.4)					

Table 1. Cover Data - Joder Ranch, City of Boulder Open Space, CO - 1998.

PLANT SPECIES	Percent Foliar Cover*								
	—SAMPLE NUMBER—								
	1	2	3	4	5	6	7	8	9
<b>NATIVE ANNUAL &amp; BIENNIAL FORBS</b>									
<i>Cirsium undulatum</i>					P			P	P
<i>Epilobium brachycarpum</i>		P							
<i>Erigeron divergens</i>	4								
<i>Grindelia squarrosa</i>			P	P			P		P
<i>Polygonum douglasii</i>	P								
<i>Pterogonum alatum</i>			P				P		
<i>Silene antirrhina</i>									P
<b>TOTAL NATIVE ANN. &amp; BIEN. FORBS</b>	4	P	P	P	P	—	P	P	P
<b>INTRODUCED ANNUAL &amp; BIENNIAL FORBS</b>									
<i>Alyssum minus</i>	1	P		4	P	P	P	P	
<i>Chenopodium album</i>		P							
<i>Lactuca serriola</i>		P	P	P		P	P		P
<i>Tragopogon dubius ssp. major</i>		P					P	P	P
<b>TOTAL INTRO. ANN. &amp; BIEN. FORBS</b>	1	P	P	4	P	P	P	P	P
<b>INTRODUCED ANNUAL GRASSES</b>									
<i>Bromus japonicus</i>	5	P		10	P	1(1)	P	7(1)	P
<b>TOTAL INTRO. ANN. GRASSES</b>	5	P	—	10	P	1(1)	P	7(1)	P
<b>NATIVE PERENNIAL FORBS</b>									
<i>Adenolinum lewisii</i>								P	1
<i>Allium spp.</i>							P		
<i>Ambrosia psilostachya var. coronopifolia</i>	P	6	P	P	P	P	1	2	2
<i>Antennaria rosea</i>									P
<i>Artemisia ludoviciana</i>	P	P	P	1	1	1		1	1
<i>Asclepias pumila</i>		P							
<i>Aster porteri</i>		P	P						1
<i>Astragalus flexuosus</i>						P			
<i>Dalea candida var. oligophylla</i>					P				
<i>Dalea purpurea</i>						P	1		P
<i>Drymocallis fissa</i>			1						
<i>Eriogonum jamesii</i>			P						
<i>Eriogonum umbellatum</i>							P		
<i>Evolvulus nuttallianus</i>	P								
<i>Gaillardia aristata</i>			P						
<i>Gaura coccinea</i>			P						
<i>Geranium richardsonii</i>		P	2			P	P	P	3
<i>Helianthus pumilus</i>					1	P	P	4	
<i>Heterotheca fulcrata</i>					P	P	6	P	
<i>Heterotheca villosa</i>							P		
<i>Liatris punctata</i>			P						
<i>Lithospermum incisum</i>									P
<i>Oligosporus dracunculus ssp. glaucus</i>					P				
<i>Onosmodium molle ssp. occidentale</i>			P	P		P		P	
<i>Oxalis dillenii</i>			P						
<i>Oxytropis sericea</i>					P				
<i>Oxytropis x sericea</i>							P		
<i>Paronychia jamesii</i>							P		
<i>Penstemon secundiflorus</i>							P		
<i>Phacelia heterophylla</i>									P
<i>Physalis spp.</i>				P					
<i>Physalis virginiana</i>				P					

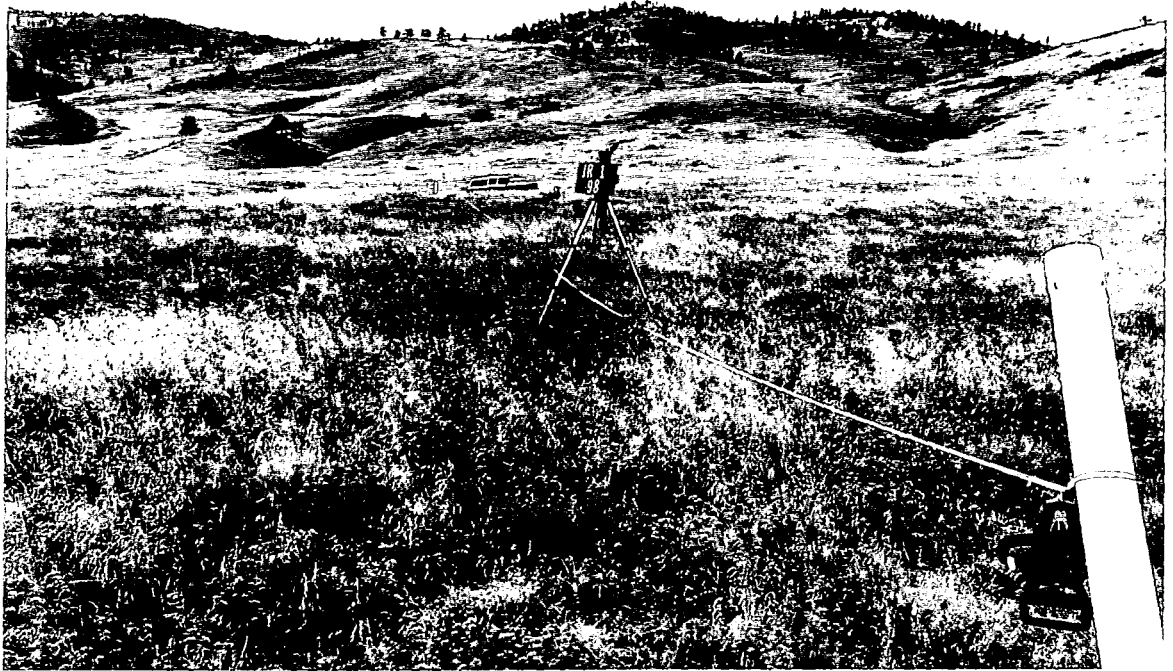
Table 1. Cover Data - Joder Ranch, City of Boulder Open Space, CO - 1998.

PLANT SPECIES	Percent Foliar Cover*								
	—SAMPLE NUMBER—								
	1	2	3	4	5	6	7	8	9
<b>NATIVE PERENNIAL FORBS (concluded)</b>									
<i>Pneumonanthe bigelovii</i>							P		
<i>Pseudocymopterus montanus</i>			P	2	1			P	
<i>Psoralidium tenuiflorum</i>		1	P				P	P	
<i>Ratibida columnifera</i>		P	P				P		
<i>Senecio spartioides</i>		P							P
<i>Sphaeralcea coccinea</i>	P							P	
<i>Tithymalus brachyceras</i>									P
<i>Tragia ramosa</i>		1		2	P		1	3	
<i>Virgulus falcatus</i>	P	P	P						3
<b>TOTAL NATIVE PERENNIAL FORBS</b>	<b>P</b>	<b>8</b>	<b>3</b>	<b>5</b>	<b>3</b>	<b>1</b>	<b>9</b>	<b>10</b>	<b>11</b>
<b>INTRODUCED PERENNIAL FORBS</b>									
<i>Convolvulus arvensis</i>	P								
<b>TOTAL INTRO. PERENNIAL FORBS</b>	<b>P</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>
<b>NATIVE PERENNIAL GRASSES (cool)</b>									
<i>Achnatherum scribneri</i>		1							
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>						2	4		3
<i>Elymus elymoides</i>							1		
<i>Elymus longifolius</i>	1								
<i>Hesperostipa comata</i>			5	3	14	8	11(1)	14(1)	
<i>Koeleria macrantha</i>		P					P		
<i>Pascopyrum smithii</i>		12(1)	3	16				P	
<i>Poa agassizensis</i>		14(1)	8			5			11
<i>Poa compressa</i>		1	19			1(1)	2	2	4
<b>TOTAL NATIVE PERENNIAL GRASSES (c)</b>	<b>1</b>	<b>28(2)</b>	<b>35</b>	<b>19</b>	<b>14</b>	<b>16(1)</b>	<b>18(1)</b>	<b>16(1)</b>	<b>18</b>
<b>NATIVE PERENNIAL GRASSES (warm)</b>									
<i>Andropogon gerardii</i>		(1)		5(2)		20	3	1	1
<i>Aristida purpurea</i>		P							
<i>Bouteloua curtipendula</i>		P	P	P	1	3	2	1	1
<i>Chondrosium gracile</i>		P		1	7	P	P	1	P
<i>Schizachyrium scoparium</i>			11			P	4		5
<i>Sporobolus airoides</i>						P			
<i>Sporobolus cryptandrus</i>					P				2
<i>Sporobolus heterolepis</i>			1						P
<b>TOTAL NATIVE PERENNIAL GRASSES (w)</b>	<b>—</b>	<b>(1)</b>	<b>12</b>	<b>6(2)</b>	<b>8</b>	<b>23</b>	<b>9</b>	<b>3</b>	<b>9</b>
<b>NATIVE SUBSHRUBS</b>									
<i>Artemisia frigida</i>	P	P			P	P	1		P
<i>Gutierrezia sarothrae</i>	11	P						P	P
<b>TOTAL NATIVE SUBSHRUBS</b>	<b>11</b>	<b>P</b>	<b>—</b>	<b>—</b>	<b>P</b>	<b>P</b>	<b>1</b>	<b>P</b>	<b>P</b>
<b>NATIVE SHRUBS</b>									
<i>Cercocarpus montanus</i>			1						
<i>Chrysothamnus nauseosus</i>	8								
<i>Mahonia repens</i>		3							
<i>Rhus aromatica</i> ssp. <i>trilobata</i>		2		P					
<i>Rosa sayi</i>		2	3			P			
<i>Symphoricarpos rotundifolius</i>			P						
<i>Yucca glauca</i>			P	1	P	1(1)	P	1	
<b>TOTAL NATIVE SHRUBS</b>	<b>8</b>	<b>7</b>	<b>4</b>	<b>1</b>	<b>P</b>	<b>1(1)</b>	<b>P</b>	<b>1</b>	<b>—</b>

Table 1. Cover Data - Joder Ranch, City of Boulder Open Space, CO - 1998.

PLANT SPECIES	Percent Foliar Cover*								
	—SAMPLE NUMBER—								
	1	2	3	4	5	6	7	8	9
<b>NATIVE TREES</b>									
<i>Pinus ponderosa</i> ssp. <i>scopulorum</i>			P						
<b>TOTAL NATIVE TREES</b>	--	--	P	--	--	--	--	--	--
<b>BRYOPHYTES</b>									
Moss							P	P	
<b>TOTAL BRYOPHYTES</b>	--	--	--	--	--	--	P	P	--
<b>LICHEN</b>									
<i>Xanthoparmelia chlorochroa</i>		1				P	P	P	
<b>TOTAL LICHEN</b>	--	1	--	--	--	P	P	P	--
<b>SUCCULENT</b>									
<i>Echinocereus viridiflorus</i>				P			P		
<i>Opuntia macrorhiza</i>		1	P	P	P	P	P	3	P
<i>Opuntia polyacantha</i>			1	P		P	P	3	
<b>TOTAL SUCCULENT</b>	--	1	1	P	P	P	P	6	P
Standing dead							1		
Litter	25	30	2	41	52	36	32	37	59
Bare soil	38	12	38		21	11	21	12	3
Rock	7	13	5	14	2	11	9	8	
<b>TOTALS</b>	100	100	100	100	100	100	100	100	100
<b>TOTAL VEGETATION COVER</b>	30	45(3)	55	45(2)	25	42(3)	37(1)	43(2)	38
<b>GROUND COVER (Litter+Rock+Veg+St. Dead)</b>	62	88(3)	62	100(2)	79	89(3)	79(1)	88(2)	97
<b>SPECIES DENSITY (# of species/100 sq.m.)</b> (AVERAGE= 26.4 Std.Dev.= 7.4)	14	32	33	21	19	26	37	26	30

\* P = Present within 1 m. on either side of the cover transect, but not quantitatively encountered.



Photograph 1. Joder Ranch Vegetation Monitoring '98, Sample 1.



Photograph 2. Joder Ranch Vegetation Monitoring '98, Sample 2.



Photograph 3. Joder Ranch Vegetation Monitoring '98, Sample 3.



Photograph 4. Joder Ranch Vegetation Monitoring '98, Sample 4.



Photograph 5. Joder Ranch Vegetation Monitoring '98, Sample 5.



Photograph 6. Joder Ranch Vegetation Monitoring '98, Sample 6.



Photograph 7. Joder Ranch Vegetation Monitoring '98, Sample 7.



Photograph 8. Joder Ranch Vegetation Monitoring '98, Sample 8.





Photograph 9. Joder Ranch Vegetation Monitoring '98, Sample 9.