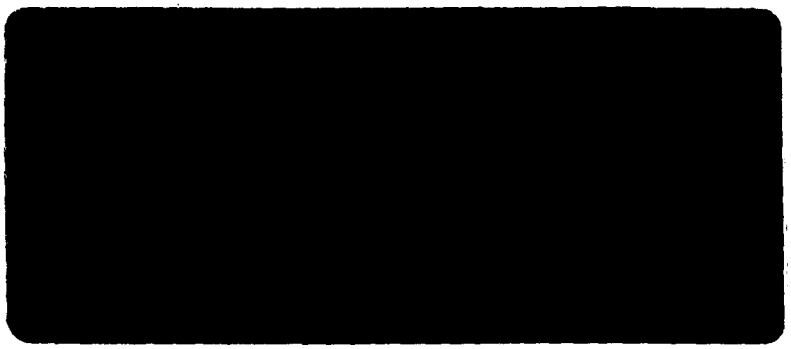
ESCO

KNAPWEED CONTROL

1997



ESCO

Report of Findings

Diffuse Knapweed Control Studies -
Tordon Spray Application
Boulder City and County Open Space
***1997** Data*

Prepared for:

City of Boulder Open Space
66 So. Cherryvale Rd.
Boulder, CO 80303

Prepared by:

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

INTRODUCTION

Studies reported here follow up on work undertaken in April 1996 with the intent of documenting effects of a planned application of Tordon herbicide to approximately 800 acres of land infested by diffuse knapweed (Acosta diffusa). Objectives were 1) assessment of the extent of knapweed before and after spraying and 2) assessment of the impact of the herbicide on other broadleaf plant species, especially the native species. 1997 observations were made at times selected to be comparable with early season observations from 1996 as well as those made later in 1996. The early season observations in 1996 were made in April to allow for gathering information prior to spraying. Inasmuch as a somewhat later period would have been ideal for best assessment of early season plant species, the 1997 observations were made in June. For the late season observations, the same late August timeframe was used in both 1996 and 1997.

This document is a data report for 1997 observations. No interpretation or discussion of results is included.

METHODS

Sample Location

Samples were located subjectively with consideration of incorporating the variability of each site. Sites S-1 and S-2 were within the sprayed area on the upland west of Coalton Road (see Map 1). Site S-3 was on a mid-slope area and site S-4 was placed in a swale area on deeper soils. Control sample C-1 was placed on an upland exposed site similar to spray sites S-1 and S-2. Control sample C-2 was more comparable to the less exposed sites of spray samples S-3 and S-4. Sample locations are shown on Map 1. At each sample location, the end points of the sample transect were marked with a rebar stake driven flush with the ground (for subsequent use with a metal detector) and a Carsonite flat fiberglass post.

Cover

The point intercept method of cover assessment was chosen because it provides superior objectivity and repeatability; the inherent tendency to

collect the most information on the more abundant species has been countered through use of a total vascular species inventory along the sample transect (see below). In addition, frequency plot data have been collected in one late summer and one spring sampling to provide further details of the abundance of less common species.

Point intercept cover sampling was developed early in the history of plant ecology (Levy and Madden 1933), and translated into varying forms by subsequent researchers (Goodall 1952, Winkworth and Goodall 1962).

Cover data were tabulated as interceptions of a point with plant species, soil, standing dead plant material (produced in a previous year), litter (fallen dead plant material), or rock. Plant material produced during the sample year and still standing was tallied by species. The point was optically projected using a Cover-Point Model 5 Optical Point Projector. The sample was taken at a randomly located and randomly oriented 50 m transect and consisted of a total of 100 projected points per transect. Permanent marking of the endpoints was accomplished as described above.

Frequency

Frequency data were collected in each of ten 1m x 5m plots located along each 50m transect, to the right side of the transect as viewed from the origin. In each plot, all species present were tallied. For each species, the number of plots in which the plant was observed was divided by the number of plots observed (10). Thus, for example, if Species A occurred in seven plots, its frequency for the transect is 7/10, or 70 percent. In addition, all species present within 1 meter to either side of the 50 meter sample transect were tallied and a value of species density expressed as number of species per 100 square meters calculated.

Density

In order to better assess the population dynamics of knapweed, the sample transects were revisited in June 1997 and August 1997 and the density of rosette-stage and bolted knapweed within each of the ten 1m x 1m frequency plots determined by direct count.

Sampling Dates

Inasmuch as that time of year was driven more by the need to get the herbicide applied than to the time at which early season sampling might yield the most information on plant community composition, the 1997 early season sampling was conducted in June. Late season sampling was conducted in mid to late August, as had been the case in 1996. Specifically, sampling was undertaken on June 25, 1997, and August 18, 1997.

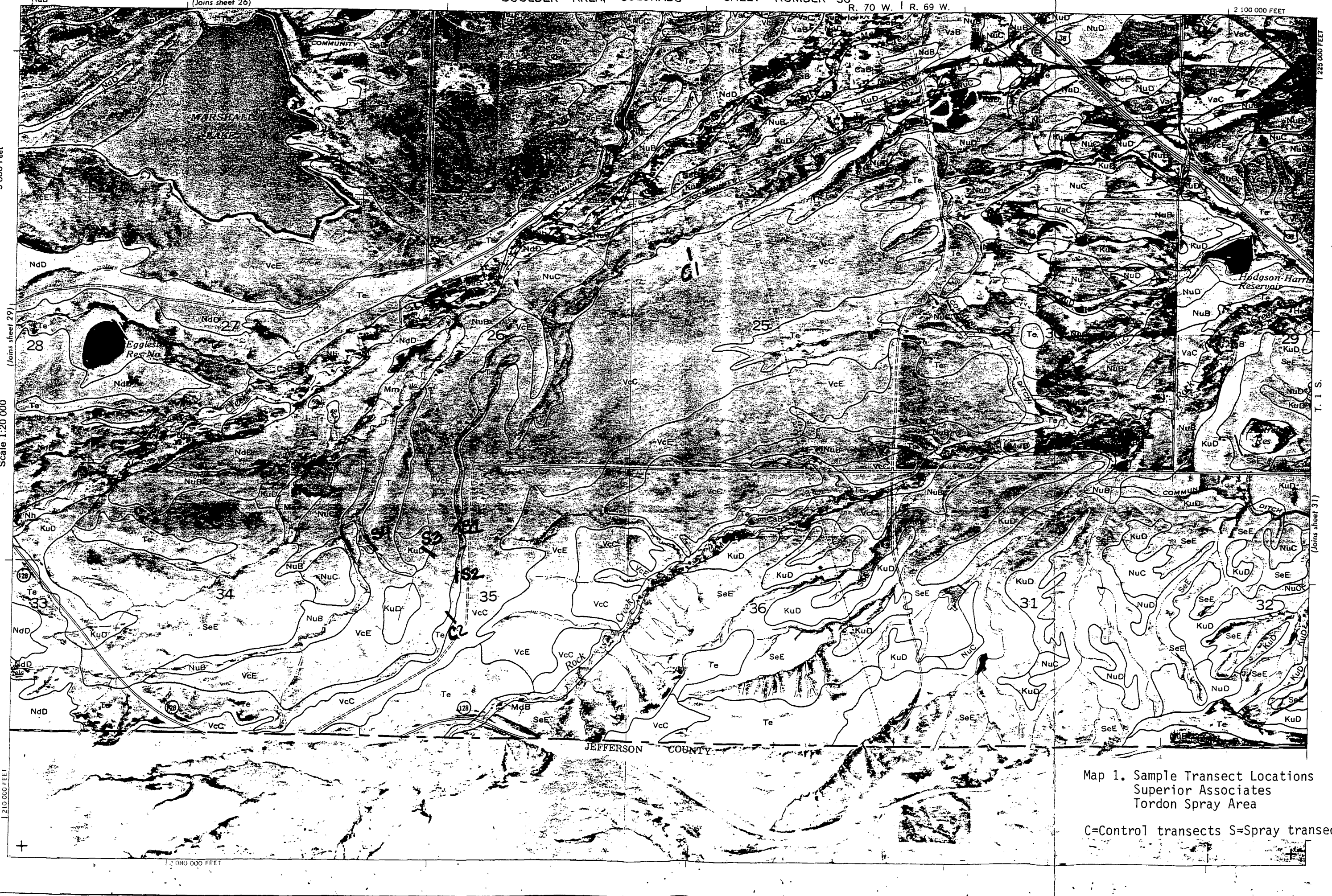
RESULTS

Results reported here are from 1997 observations. 1996 observations have been reported previously. Tabulated 1997 results are present in Tables 1 through 21. Cover data from the June 1997 observations of control transects are present in Tables 1a and 1b. June cover data from sprayed area transects are present in Table 2. Frequency data from June observations are found in Tables 3 and 4 for control area transects and Tables 5 through 8 for sprayed area transects. June 1997 knapweed density data are present in Table 9 and illustrated in Figure 2.

1997 late season (August) cover data from control transects are present in Tables 10a and 10b, while late season sprayed area cover data are located in Table 11. Frequency data from August observations are found in Tables 12 and 13 for control area transects and Tables 14 through 17 for sprayed area transects. August 1997 knapweed density data are present in Table 18 and illustrated in Figure 2. Knapweed cover and frequency results for 1996 and 1997 are graphically illustrated in Figure 1. Relative cover by lifeform based on 1997 data is depicted in Figure 3 and species density by lifeform is similarly depicted in Figure 4.

Table 21 is a compilation of species presence by transect for 1997 sampling.

BOULDER AREA, COLORADO — SHEET NUMBER 30



Map 1. Sample Transect Locations
Superior Associates
Tordon Spray Area

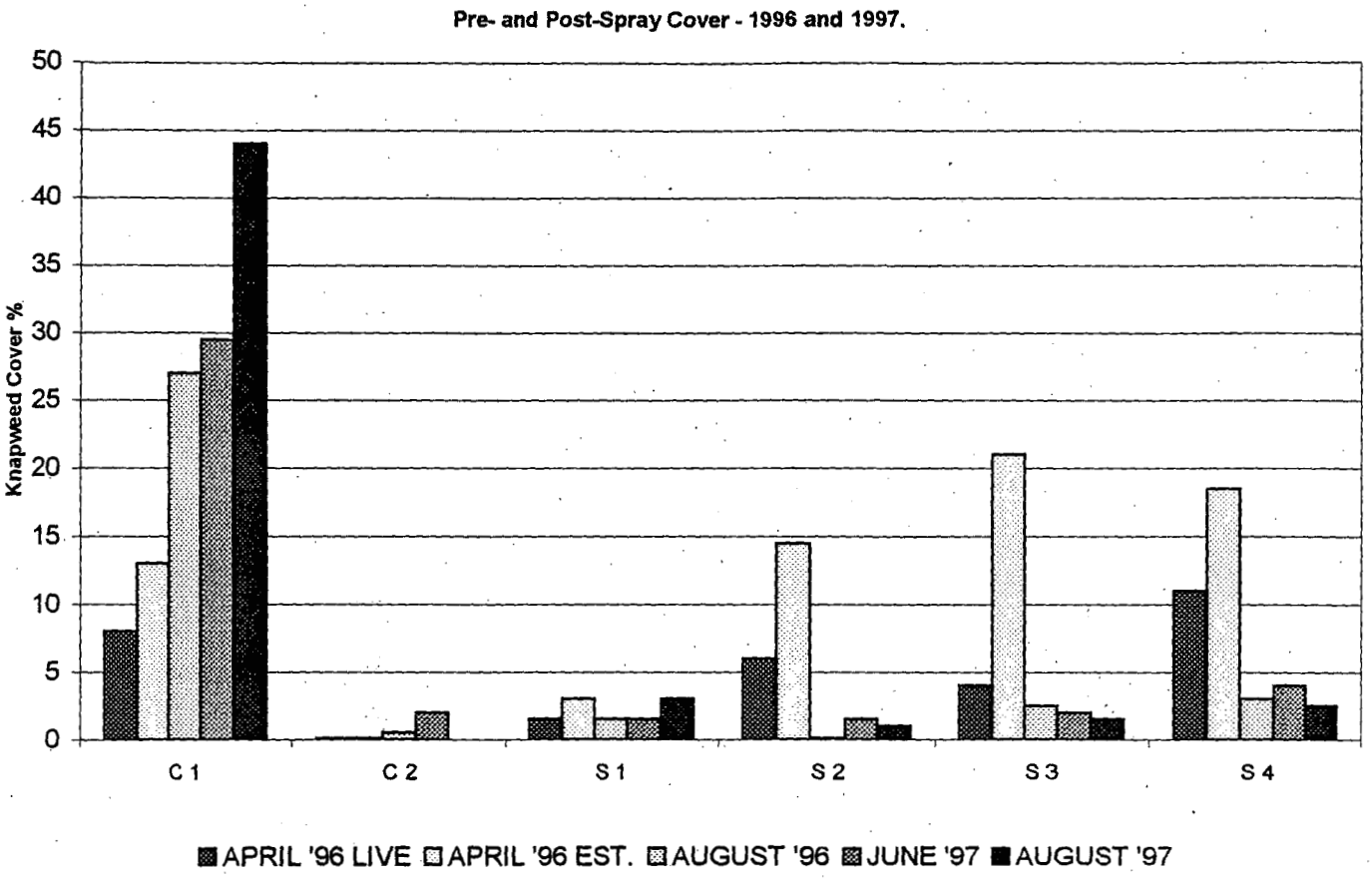
C=Control transects S=Spray transects

Land division corners are approximately positioned on this map.

Photobase from 1969 aerial photography. Positions of 5,000 foot grid ticks are approximate and based on the Colorado coordinate system, north zone.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Colorado Agricultural Experiment Station.

Figure 1. Knapweed Cover and Frequency Results - Pre- and Post-Spray 1996 and 1997
Acosta diffusa Tordon Study - Boulder City Open Space, CO.



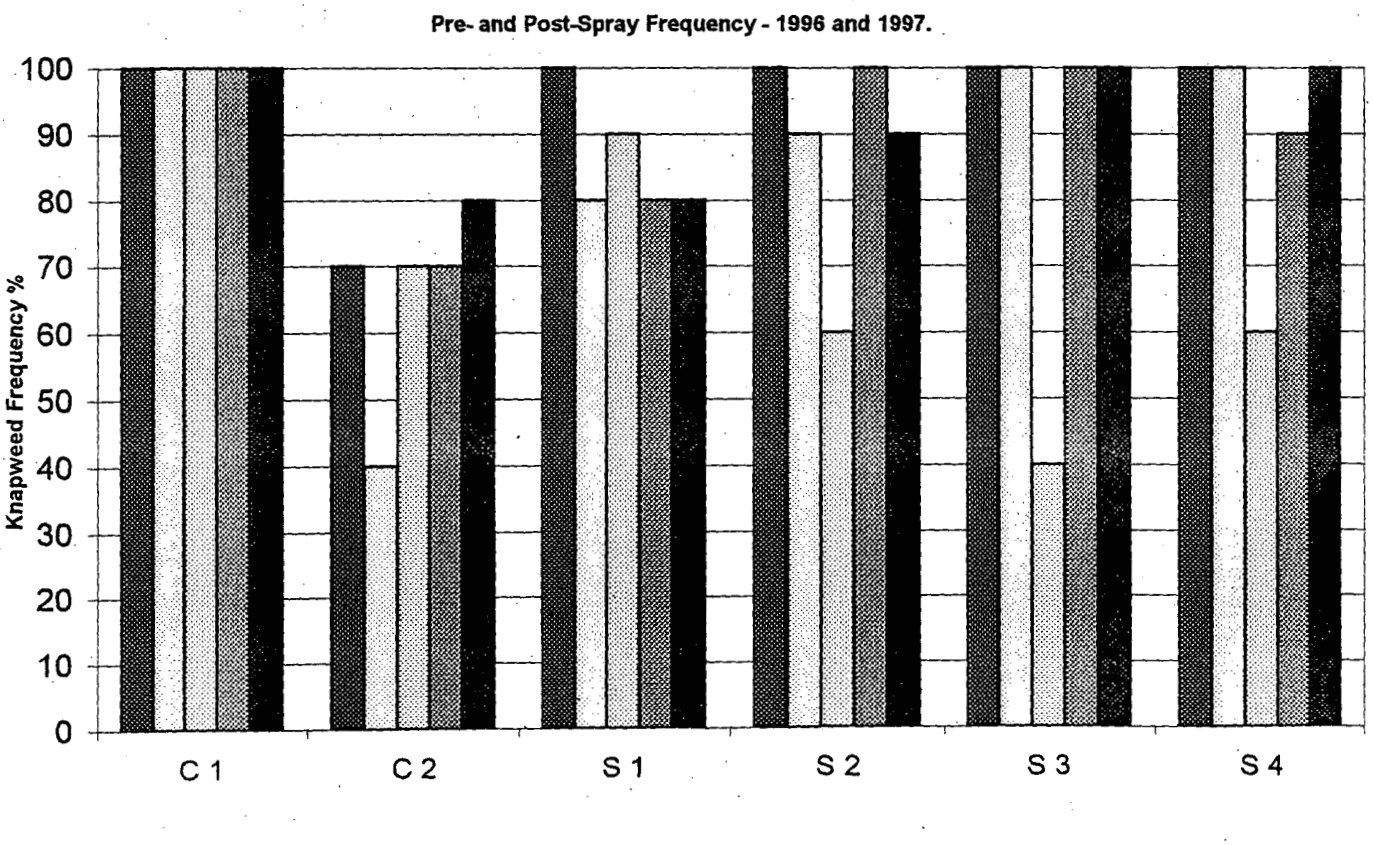


Figure 2. Knapweed Density - Post-Spray - Oct., '96 , June and August '97.

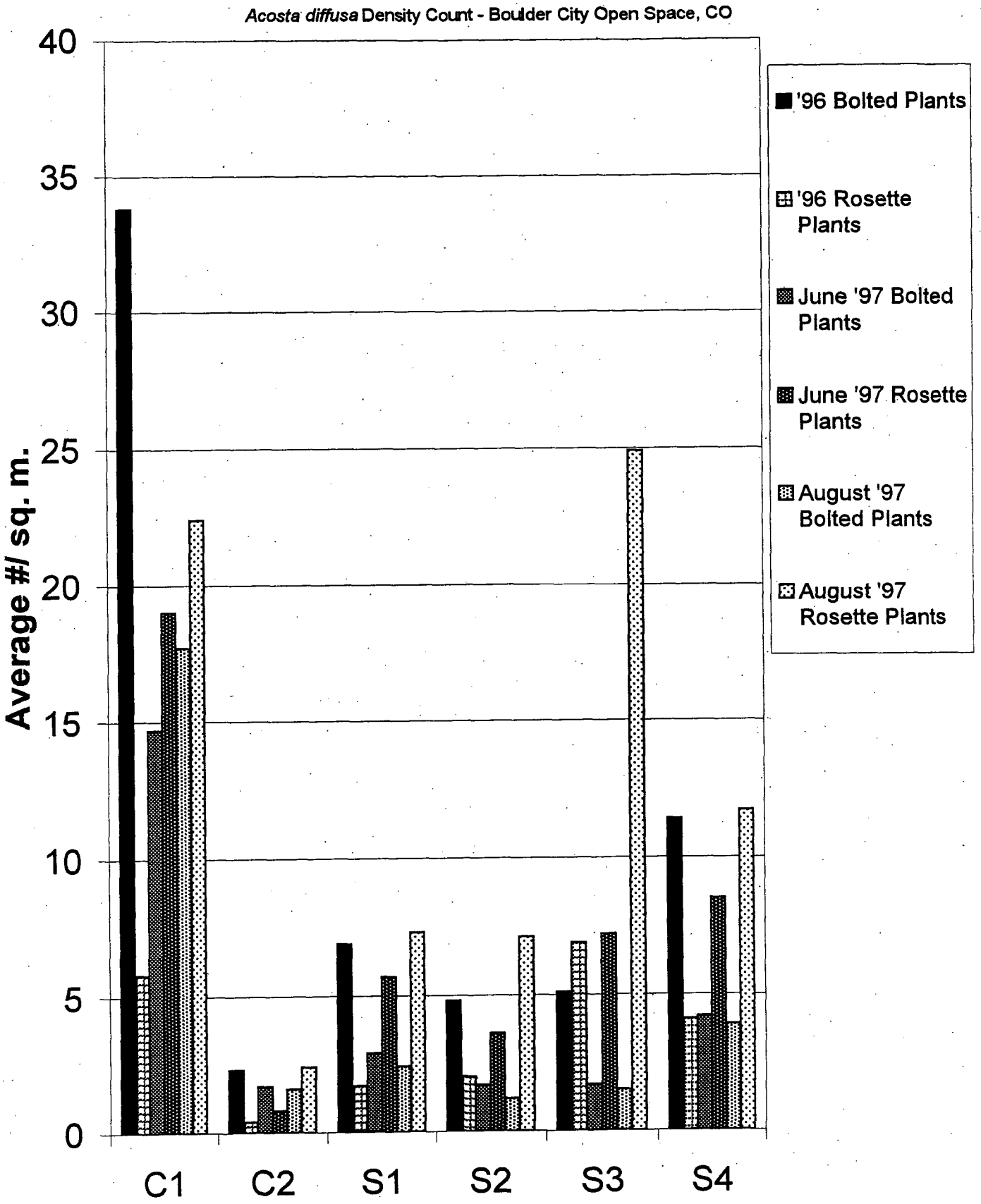


Figure 3. Relative Cover by Lifeform
Tordon Study, Boulder City Open Space
June and August 1997

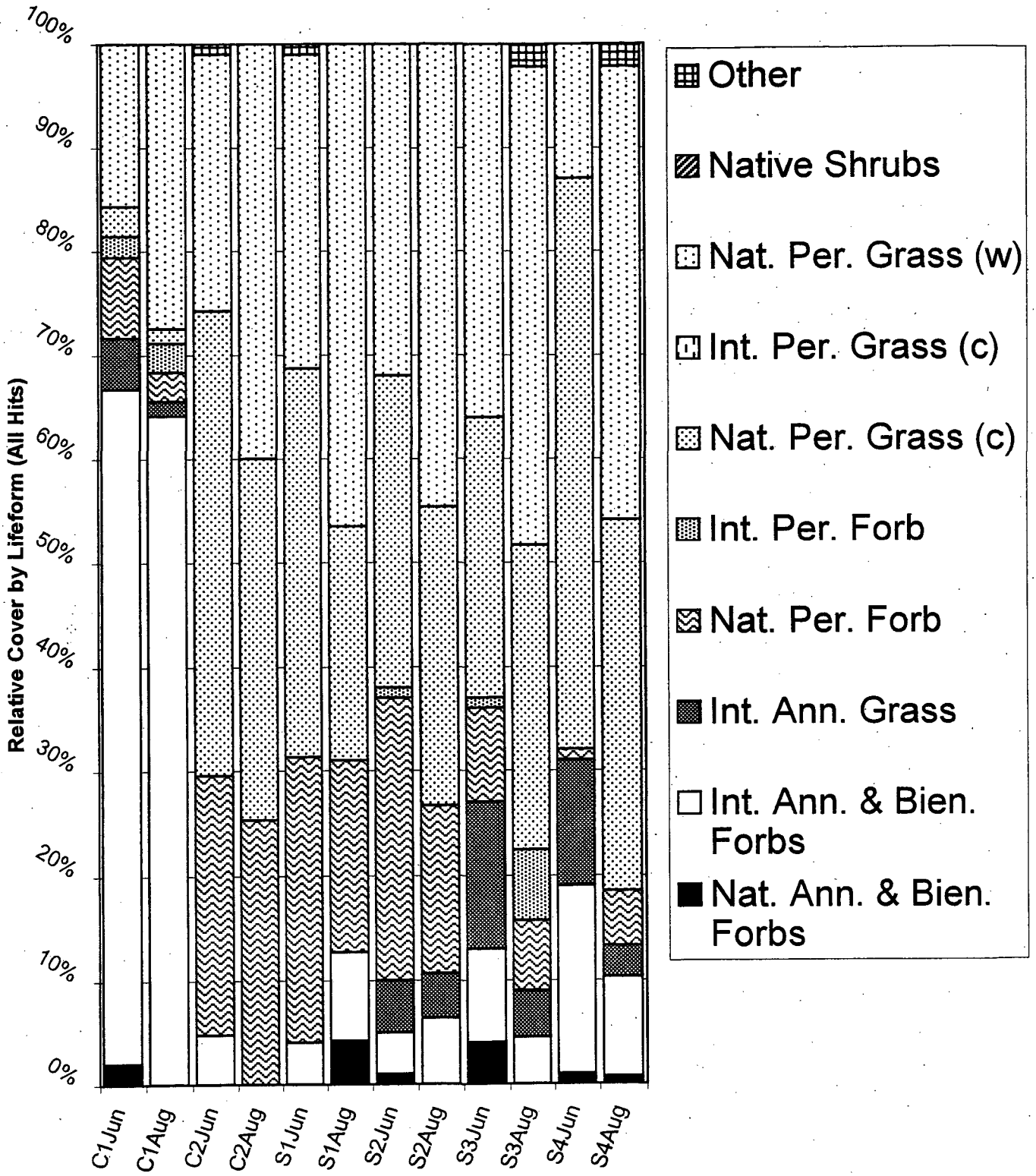


Figure 4. Species Density by Lifeform
Tordon Study, Boulder City Open Space
June and August 1997

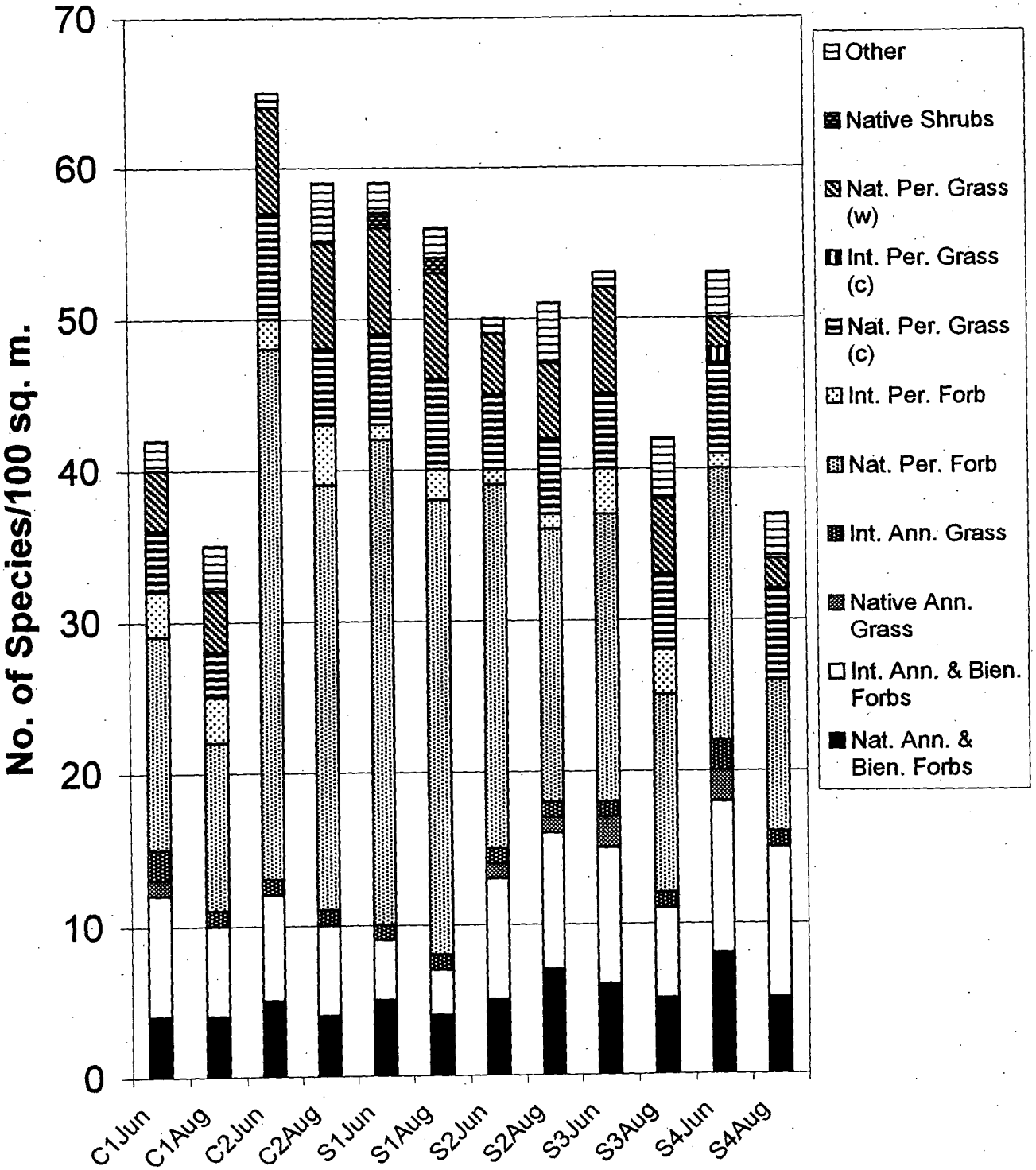


Table 1a. Cover Data – Control Area, Trans. 1, Tordon Post–Spray Study, Bldr City OS, CO – June 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER–ALL (%)	RELATIVE VEGETATION COVER–ALL (%)	Percent Foliar Cover* – SAMPLE NUMBER – 1
NATIVE ANNUAL & BIENNIAL FORBS						
Erigeron divergens	0.50	100.00	1.02	0.50	0.98	0.5
Grindelia squarrosa	0.00	100.00	0.00	0.00	0.00	P
Plantago patagonica	0.50	100.00	1.02	0.50	0.98	0.5
Silene antirrhina	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE ANN. & BIEN. FORBS	1.0	100.0	2.0	1.0	2.0	1.0
INTRODUCED ANNUAL & BIENNIAL FORBS						
Acosta diffusa	29.50	100.00	60.20	29.50	57.84	29.5
Alyssum minus	3.00	100.00	6.12	3.00	5.88	3.0
Carduus nutans ssp. macrolepis	0.00	100.00	0.00	0.00	0.00	P
Erodium cicutarium	0.00	100.00	0.00	0.00	0.00	P
Neolepia campestre	0.00	100.00	0.00	0.00	0.00	P
Plantago lanceolata	0.00	100.00	0.00	0.00	0.00	P
Podospermum laciniatum	0.00	100.00	0.00	0.00	0.00	P
Tragopogon dubius ssp. major	0.50	100.00	1.02	0.50	0.98	0.5
TOTAL INTRO. ANN. & BIEN. FORBS	33.0	100.0	67.3	33.0	64.7	33.0
NATIVE ANNUAL GRASSES						
Vulpia octoflora	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE ANN. GRASSES	0.0	100.0	0.0	0.0	0.0	P
INTRODUCED ANNUAL GRASSES						
Anisantha tectorum	1.50	100.00	3.06	2.00	3.92	1.5(0.5)
Bromus japonicus	0.50	100.00	1.02	0.50	0.98	0.5
TOTAL INTRO. ANN. GRASSES	2.0	100.0	4.1	2.5	4.9	2.0(0.5)
NATIVE PERENNIAL FORBS						
Achillea lanulosa	0.00	100.00	0.00	0.00	0.00	P
Agoseris glauca	0.00	100.00	0.00	0.00	0.00	P
Ambrosia psilostachya var. coronopifolia	0.00	100.00	0.00	0.00	0.00	P
Aphyllon fasciculatum	0.00	100.00	0.00	0.00	0.00	P
Artemisia frigida	0.50	100.00	1.02	0.50	0.98	0.5
Drymocallis fissa	0.00	100.00	0.00	0.00	0.00	P
Gutierrezia sarothrae	0.00	100.00	0.00	0.00	0.00	P
Heterotheca villosa	0.50	100.00	1.02	0.50	0.98	0.5
Liatris punctata	0.50	100.00	1.02	0.50	0.98	0.5
Oligosporus dracunculus ssp. glaucus	0.00	100.00	0.00	0.00	0.00	P
Psoralidium tenuiflorum	1.50	100.00	3.06	2.00	3.92	1.5(0.5)
Sphaeralcea coccinea	0.00	100.00	0.00	0.00	0.00	P
Virgulaster ascendens	0.00	100.00	0.00	0.00	0.00	P
Virgulus falcatus	0.50	100.00	1.02	0.50	0.98	0.5
TOTAL NATIVE PERENNIAL FORBS	3.5	100.0	7.1	4.0	7.8	3.5(0.5)
INTRODUCED PERENNIAL FORBS						
Convolvulus arvensis	0.50	100.00	1.02	0.50	0.98	0.5
Hypericum perforatum	0.00	100.00	0.00	0.00	0.00	P
Taraxacum officinale	0.00	100.00	0.00	0.50	0.98	(0.5)
TOTAL INTRO. PERENNIAL FORBS	0.5	100.0	1.0	1.0	2.0	0.5(0.5)
NATIVE PERENNIAL GRASSES (cool)						
Elymus longifolius	0.00	100.00	0.00	0.50	0.98	(0.5)
Pascopyrum smithii	1.00	100.00	2.04	1.00	1.96	1.0
Poa agassizensis	0.00	100.00	0.00	0.00	0.00	P
Poa compressa	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE PERENNIAL GRASSES (c)	1.0	100.0	2.0	1.5	2.9	1.0(0.5)
NATIVE PERENNIAL GRASSES (warm)						
Andropogon gerardii	2.00	100.00	4.08	2.00	3.92	2.0
Aristida purpurea	0.50	100.00	1.02	0.50	0.98	0.5
Buchloe dactyloides	3.00	100.00	6.12	3.00	5.88	3.0
Chondrosum gracile	2.50	100.00	5.10	2.50	4.90	2.5
TOTAL NATIVE PERENNIAL GRASSES (w)	8.0	100.0	16.3	8.0	15.7	8.0

Table 1a. Cover Data – Control Area, Trans. 1, Tordon Post–Spray Study, Bldr City OS, CO – June 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER–ALL (%)	RELATIVE VEGETATION COVER–ALL (%)	Percent Foliar Cover* – SAMPLE NUMBER – 1
SUCCULENT						
Echinocereus viridiflorus	0.00	100.00	0.00	0.00	0.00	P
Opuntia macrorhiza	0.00	100.00	0.00	0.00	0.00	P
TOTAL SUCCULENT	0.0	100.0	0.0	0.0	0.0	P
Standing dead	1.00	100.00		1.00		1.0
Litter	47.00	100.00		47.00		47.0
Bare soil	2.50	100.00		2.50		2.5
Rock	0.50	100.00		0.50		0.5
TOTALS	100.0			102.0		100
TOTAL VEGETATION COVER	49.0 (s=0.0)		100.0	51.0 (s=0.0)	100.0	49.0(2.0)
GROUND COVER (Litter+Rock+Veg+St.Dead)	97.5			99.5		98(2)
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 42.0 Std.Dev.= 0.0)						42

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

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER–ALL (%)	RELATIVE VEGETATION COVER–ALL (%)	Percent Foliar Cover* – SAMPLE NUMBER 2
NATIVE ANNUAL & BIENNIAL FORBS						
Draba reptans	0.00	100.00	0.00	0.00	0.00	P
Erysimum asperum	0.00	100.00	0.00	0.00	0.00	P
Grindelia squarrosa	0.00	100.00	0.00	0.00	0.00	P
Plantago patagonica	0.00	100.00	0.00	0.00	0.00	P
Pterogonum alatum	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE ANN. & BIEN. FORBS	0.0	100.0	0.0	0.0	0.0	P
INTRODUCED ANNUAL & BIENNIAL FORBS						
Acosta diffusa	2.00	100.00	4.04	2.50	4.76	2.0(0.5)
Alyssum minus	0.00	100.00	0.00	0.00	0.00	P
Camelina microcarpa	0.00	100.00	0.00	0.00	0.00	P
Carduus nutans ssp. macrolepis	0.00	100.00	0.00	0.00	0.00	P
Lepidium densiflorum	0.00	100.00	0.00	0.00	0.00	P
Podospermum laciniatum	0.00	100.00	0.00	0.00	0.00	P
Tragopogon dubius ssp. major	0.00	100.00	0.00	0.00	0.00	P
TOTAL INTRO. ANN. & BIEN. FORBS	2.0	100.0	4.0	2.5	4.8	2.0(0.5)
INTRODUCED ANNUAL GRASSES						
Bromus japonicus	0.00	100.00	0.00	0.00	0.00	P
TOTAL INTRO. ANN. GRASSES	0.0	100.0	0.0	0.0	0.0	P
NATIVE PERENNIAL FORBS						
Artemisia frigida	0.00	100.00	0.00	0.00	0.00	P
Artemisia ludoviciana	1.00	100.00	2.02	1.00	1.90	1.0
Aster porteri	0.00	100.00	0.00	0.00	0.00	P
Astragalus agrestis	0.00	100.00	0.00	0.00	0.00	P
Castilleja sessiliflora	0.00	100.00	0.00	0.00	0.00	P
Comandra umbellata ssp. pallida	0.00	100.00	0.00	0.00	0.00	P
Dalea purpurea	0.00	100.00	0.00	0.00	0.00	P
Eremogone fendleri	0.00	100.00	0.00	0.00	0.00	P
Erigeron flagellaris	1.00	100.00	2.02	1.50	2.86	1.0(0.5)
Gaillardia aristata	0.50	100.00	1.01	0.50	0.95	0.5
Gaura coccinea	0.00	100.00	0.00	0.00	0.00	P
Gutierrezia sarothrae	2.50	100.00	5.05	2.50	4.76	2.5
Helianthus pumilus	0.00	100.00	0.00	0.00	0.00	P
Heterotheca fulcrata	0.00	100.00	0.00	0.00	0.00	P
Heterotheca villosa	4.00	100.00	8.08	4.50	8.57	4.0(0.5)
Hymenopappus filifolius	0.00	100.00	0.00	0.00	0.00	P
Ipomopsis spicata	0.00	100.00	0.00	0.00	0.00	P
Lesquerella montana	0.50	100.00	1.01	0.50	0.95	0.5
Liatris punctata	0.50	100.00	1.01	0.50	0.95	0.5
Lithospermum ruderale	0.00	100.00	0.00	0.00	0.00	P
Mertensia lanceolata	0.00	100.00	0.00	0.00	0.00	P
Musineon divaricatum	0.00	100.00	0.00	0.00	0.00	P
Nothocalais cuspidata	0.00	100.00	0.00	0.00	0.00	P
Oxybaphus linearis	0.00	100.00	0.00	0.00	0.00	P
Oxytropis x sericea	0.00	100.00	0.00	0.00	0.00	P
Paronychia jamesii	0.50	100.00	1.01	0.50	0.95	0.5
Penstemon strictus	0.50	100.00	1.01	0.50	0.95	0.5
Psoralidium tenuiflorum	0.50	100.00	1.01	0.50	0.95	0.5
Ratibida columnifera	0.00	100.00	0.00	0.00	0.00	P
Senecio integerrimus	0.00	100.00	0.00	0.00	0.00	P
Sphaeralcea coccinea	0.00	100.00	0.00	0.00	0.00	P
Tithymalus brachyceras	0.00	100.00	0.00	0.00	0.00	P
Townsendia exscapa	0.50	100.00	1.01	0.50	0.95	0.5
Viola nuttallii	0.00	100.00	0.00	0.00	0.00	P
Virgulus falcatus	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE PERENNIAL FORBS	12.0	100.0	24.2	13.0	24.8	12.0(1.0)
INTRODUCED PERENNIAL FORBS						
Hypericum perforatum	0.00	100.00	0.00	0.00	0.00	P
Taraxacum officinale	0.00	100.00	0.00	0.00	0.00	P
TOTAL INTRO. PERENNIAL FORBS	0.0	100.0	0.0	0.0	0.0	P

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER–ALL (%)	RELATIVE VEGETATION COVER–ALL (%)	Percent Foliar Cover* SAMPLE NUMBER 2
NATIVE PERENNIAL GRASSES (cool)						
Carex pensylvanica ssp. heliophila	6.00	100.00	12.12	6.50	12.38	6.0(0.5)
Elymus longifolius	0.50	100.00	1.01	0.50	0.95	0.5
Hesperostipa comata	2.50	100.00	5.05	2.50	4.76	2.5
Koeleria macrantha	6.00	100.00	12.12	6.00	11.43	6.0
Pascopyrum smithii	8.00	100.00	16.16	8.00	15.24	8.0
Poa compressa	0.00	100.00	0.00	0.00	0.00	P
Poa secunda	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE PERENNIAL GRASSES (c)	23.0	100.0	46.5	23.5	44.8	23.0(0.5)
NATIVE PERENNIAL GRASSES (warm)						
Andropogon gerardii	1.00	100.00	2.02	1.00	1.90	1.0
Aristida purpurea	1.50	100.00	3.03	1.50	2.86	1.5
Bouteloua curtipendula	2.00	100.00	4.04	2.00	3.81	2.0
Buchloe dactyloides	4.50	100.00	9.09	5.50	10.48	4.5(1.0)
Chondrosum gracile	2.50	100.00	5.05	2.50	4.76	2.5
Chondrosum hirsutum	0.00	100.00	0.00	0.00	0.00	P
Schizachyrium scoparium	0.50	100.00	1.01	0.50	0.95	0.5
TOTAL NATIVE PERENNIAL GRASSES (w)	12.0	100.0	24.2	13.0	24.8	12.0(1.0)
SUCCULENT						
Opuntia macrorhiza	0.50	100.00	1.01	0.50	0.95	0.5
TOTAL SUCCULENT	0.5	100.0	1.0	0.5	1.0	0.5
Standing dead	2.00	100.00		2.00		2.0
Litter	31.00	100.00		31.00		31.0
Bare soil	13.50	100.00		13.50		13.5
Rock	4.00	100.00		4.00		4.0
TOTALS	100.0			103.0		100
TOTAL VEGETATION COVER	49.5 (s=0.0)		100.0	52.5 (s=0.0)	100.0	49.5(3.0)
GROUND COVER (Litter+Rock+Veg+St.Dead)	86.5			89.5		87(3)
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 65.0 Std.Dev.= 0.0)						65

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

Table 2. Cover Data – Spray Area, Tordon Post–Spray Study,Bldr City OS, CO – June 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER–ALL (%)	RELATIVE VEGETATION COVER–ALL (%)
NATIVE ANNUAL & BIENNIAL FORBS					
Androsace occidentalis	0.13	50.00	0.26	0.13	0.24
Cirsium undulatum	0.00	25.00	0.00	0.00	0.00
Collomia linearis	0.00	50.00	0.00	0.00	0.00
Descurainia pinnata	0.00	25.00	0.00	0.00	0.00
Draba reptans	0.00	75.00	0.00	0.00	0.00
Erigeron divergens	0.13	50.00	0.26	0.13	0.24
Erysimum asperum	0.00	50.00	0.00	0.00	0.00
Grindelia squarrosa	0.00	25.00	0.00	0.00	0.00
Hedeoma hispidum	0.00	50.00	0.00	0.00	0.00
Plantago patagonica	0.38	100.00	0.79	0.38	0.71
Pterogonum alatum	0.00	25.00	0.00	0.00	0.00
Silene antirrhina	0.25	75.00	0.53	0.25	0.47
TOTAL NATIVE ANN. & BIEN. FORBS	0.9	100.0	1.8	0.9	1.7
INTRODUCED ANNUAL & BIENNIAL FORBS					
Acosta diffusa	2.25	100.00	4.75	2.63	4.98
Alyssum minus	1.38	100.00	2.90	1.63	3.08
Camelina microcarpa	0.13	100.00	0.26	0.13	0.24
Erodium cicutarium	0.00	25.00	0.00	0.00	0.00
Lactuca serriola	0.00	100.00	0.00	0.00	0.00
Lepidium densiflorum	0.00	75.00	0.00	0.00	0.00
Neolepia campestre	0.00	25.00	0.00	0.00	0.00
Noccaea montana	0.13	50.00	0.26	0.13	0.24
Plantago lanceolata	0.00	50.00	0.00	0.00	0.00
Podospermum laciniatum	0.00	50.00	0.00	0.00	0.00
Tragopogon dubius ssp. major	0.13	50.00	0.26	0.13	0.24
Verbascum blattaria	0.13	50.00	0.26	0.13	0.24
TOTAL INTRO. ANN. & BIEN. FORBS	4.1	100.0	8.7	4.8	9.0
NATIVE ANNUAL GRASSES					
Critesion pusillum	0.00	50.00	0.00	0.00	0.00
Vulpia octoflora	0.00	75.00	0.00	0.00	0.00
TOTAL NATIVE ANN. GRASSES	0.0	75.0	0.0	0.0	0.0
INTRODUCED ANNUAL GRASSES					
Anisantha tectorum	0.00	25.00	0.00	0.00	0.00
Bromus japonicus	4.38	100.00	9.23	4.50	8.53
TOTAL INTRO. ANN. GRASSES	4.4	100.0	9.2	4.5	8.5
NATIVE PERENNIAL FORBS					
Achillea lanulosa	0.00	75.00	0.00	0.00	0.00
Agoseris glauca	0.00	25.00	0.00	0.00	0.00
Allium textile	0.00	50.00	0.00	0.00	0.00
Antennaria rosea	0.00	50.00	0.00	0.00	0.00
Arnica fulgens	0.00	25.00	0.00	0.00	0.00
Artemisia frigida	0.25	75.00	0.53	0.25	0.47
Artemisia ludoviciana	0.13	50.00	0.26	0.13	0.24
Aster porteri	0.25	50.00	0.53	0.25	0.47
Astragalus agrestis	0.00	50.00	0.00	0.00	0.00
Astragalus tridactylicus	0.00	25.00	0.00	0.00	0.00
Castilleja sessiliflora	0.13	75.00	0.26	0.13	0.24
Comandra umbellata ssp. pallida	0.00	50.00	0.00	0.00	0.00
Dalea candida var. oligophylla	0.00	50.00	0.00	0.00	0.00
Dalea purpurea	0.13	75.00	0.26	0.13	0.24
Erigeron flagellaris	0.00	75.00	0.00	0.00	0.00
Gastrolychnis drummondii	0.00	25.00	0.00	0.00	0.00
Gaura coccinea	0.00	100.00	0.00	0.00	0.00
Gutierrezia sarothrae	1.38	100.00	2.90	1.63	3.08
Heterotheca fulcrata	0.00	25.00	0.00	0.00	0.00
Heterotheca villosa	1.00	100.00	2.11	1.00	1.90
Hymenopappus filifolius	0.25	25.00	0.53	0.25	0.47
Lesquerella montana	0.00	50.00	0.00	0.00	0.00
Leucocrinum montanum	0.00	50.00	0.00	0.00	0.00
Liatris punctata	0.63	50.00	1.32	0.75	1.42

Table 2. Cover Data – Spray Area, Tordon Post–Spray Study,Bldr City OS, CO – June 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER–ALL (%)	RELATIVE VEGETATION COVER–ALL (%)
NATIVE PERENNIAL FORBS (concluded)					
Lomatium orientale	0.13	25.00	0.26	0.13	0.24
Musineon divaricatum	0.13	50.00	0.26	0.13	0.24
Nothocalais cuspidata	0.00	25.00	0.00	0.00	0.00
Oenothera villosa	0.00	25.00	0.00	0.00	0.00
Oligosporus dracunculus ssp. glaucus	0.00	50.00	0.00	0.00	0.00
Oxybaphus linearis	0.00	50.00	0.00	0.00	0.00
Oxytropis x sericea	0.00	25.00	0.00	0.00	0.00
Paronychia jamesii	0.00	25.00	0.00	0.00	0.00
Penstemon spp.	0.00	25.00	0.00	0.00	0.00
Psoralidium tenuiflorum	2.50	100.00	5.28	2.63	4.98
Ratibida columnifera	0.00	50.00	0.00	0.00	0.00
Senecio integerrimus	0.00	75.00	0.00	0.00	0.00
Solidago nana	0.00	25.00	0.00	0.00	0.00
Solidago simplex var. nana	0.00	25.00	0.00	0.00	0.00
Sphaeralcea coccinea	0.00	75.00	0.00	0.00	0.00
Stachys palustris ssp. pilosa	0.00	25.00	0.00	0.00	0.00
Tithymalus brachyceras	0.00	50.00	0.00	0.00	0.00
Townsendia exscapa	0.13	25.00	0.26	0.13	0.24
Townsendia hookeri	0.00	25.00	0.00	0.00	0.00
Tradescantia occidentalis	0.00	25.00	0.00	0.00	0.00
Vicia americana	0.00	25.00	0.00	0.00	0.00
Viola nuttallii	0.00	75.00	0.00	0.00	0.00
Virgulus falcatus	0.25	100.00	0.53	0.25	0.47
TOTAL NATIVE PERENNIAL FORBS	7.3	100.0	15.3	7.8	14.7
INTRODUCED PERENNIAL FORBS					
Convolvulus arvensis	0.00	25.00	0.00	0.00	0.00
Hypericum perforatum	0.00	25.00	0.00	0.00	0.00
Taraxacum officinale	0.13	100.00	0.26	0.25	0.47
TOTAL INTRO. PERENNIAL FORBS	0.1	100.0	0.3	0.3	0.5
NATIVE PERENNIAL GRASSES (cool)					
Carex pensylvanica ssp. heliophila	2.63	100.00	5.54	2.88	5.45
Elymus longifolius	0.00	25.00	0.00	0.00	0.00
Hesperostipa comata	0.00	25.00	0.00	0.00	0.00
Juncus interior	0.00	25.00	0.00	0.00	0.00
Koeleria macrantha	3.00	100.00	6.33	3.38	6.40
Nassella viridula	0.13	25.00	0.26	0.13	0.24
Pascopyrum smithii	9.88	100.00	20.84	11.13	21.09
Poa agassizensis	2.00	50.00	4.22	2.25	4.27
Poa compressa	0.00	75.00	0.00	0.00	0.00
Poa secunda	0.00	25.00	0.00	0.00	0.00
TOTAL NATIVE PERENNIAL GRASSES (c)	17.6	100.0	37.2	19.8	37.4
INTRODUCED PERENNIAL GRASSES (cool)					
Dactylis glomerata	0.00	25.00	0.00	0.00	0.00
TOTAL INTRO. PERENNIAL GRASSES (c)	0.0	25.0	0.0	0.0	0.0
NATIVE PERENNIAL GRASSES (warm)					
Andropogon gerardii	0.25	50.00	0.53	0.25	0.47
Aristida purpurea	0.38	75.00	0.79	0.38	0.71
Bouteloua curtipendula	2.38	75.00	5.01	2.63	4.98
Buchloe dactyloides	4.00	100.00	8.44	4.88	9.24
Chondrosum gracile	4.88	100.00	10.29	5.63	10.66
Chondrosum hirsutum	0.25	25.00	0.53	0.25	0.47
Schizachyrium scoparium	0.63	50.00	1.32	0.63	1.18
Sporobolus asper	0.13	25.00	0.26	0.13	0.24
TOTAL NATIVE PERENNIAL GRASSES (w)	12.9	100.0	27.2	14.8	28.0
NATIVE SHRUBS					
Yucca glauca	0.00	25.00	0.00	0.00	0.00
TOTAL NATIVE SHRUBS	0.0	25.0	0.0	0.0	0.0

Table 2. Cover Data – Spray Area, Tordon Post–Spray Study,Bldr City OS, CO – June 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER–ALL (%)	RELATIVE VEGETATION COVER–ALL (%)
LICHEN					
Xanthoparmelia chlorochloa	0.00	50.00	0.00	0.00	0.00
TOTAL LICHEN	0.0	50.0	0.0	0.0	0.0
SUCCULENT					
Opuntia fragilis	0.00	25.00	0.00	0.00	0.00
Opuntia macrorhiza	0.13	100.00	0.26	0.13	0.24
TOTAL SUCCULENT	0.1	100.0	0.3	0.1	0.2
Standing dead	3.00	100.00		3.00	
Litter	37.63	100.00		37.63	
Bare soil	10.38	100.00		10.38	
Rock	1.63	75.00		1.63	
TOTALS	100.0			105.4	
TOTAL VEGETATION COVER	47.4 (s=7.1)		100.0	52.8 (s=10.3)	100.0
GROUND COVER (Litter+Rock+Veg+St.Dead)	89.6			95.0	
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 53.8 Std.Dev.= 3.8)					

Table 2. Cover Data – Spray Area, Tordon Post–Spray Study,Bldr City OS, CO – June 1997

PLANT SPECIES	Percent Foliar Cover*			
	SAMPLE NUMBER			
	1	2	3	4
NATIVE ANNUAL & BIENNIAL FORBS				
Androsace occidentalis			0.5	P
Cirsium undulatum	P			
Collomia linearis			P	P
Descurainia pinnata				P
Draba reptans		P	P	P
Erigeron divergens	P			0.5
Erysimum asperum	P	P		
Grindelia squarrosa		P		
Hedeoma hispidum			P	P
Plantago patagonica	P	0.5	1.0	P
Pterogonum alatum	P			
Silene antirrhina		P	1.0	P
TOTAL NATIVE ANN. & BIEN. FORBS	P	0.5	2.5	0.5
INTRODUCED ANNUAL & BIENNIAL FORBS				
Acosta diffusa	1.5	1.5	2.0(1.5)	4.0
Alyssum minus	P	0.5	0.5(0.5)	4.5(0.5)
Camelina microcarpa	P	P	P	0.5
Erodium cicutarium				P
Lactuca serriola	P	P	P	P
Lepidium densiflorum		P	P	P
Neolepia campestre				P
Noccaea montana		P	0.5	
Plantago lanceolata		P		P
Podospermum laciniatum		P	P	
Tragopogon dubius ssp. major			0.5	P
Verbascum blattaria			P	0.5
TOTAL INTRO. ANN. & BIEN. FORBS	1.5	2.0	3.5(2.0)	9.5(0.5)
NATIVE ANNUAL GRASSES				
Critesion pusillum			P	P
Vulpia octoflora		P	P	P
TOTAL NATIVE ANN. GRASSES	---	P	P	P
INTRODUCED ANNUAL GRASSES				
Anisantha tectorum				P
Bromus japonicus	P	2.5	8.5(0.5)	6.5
TOTAL INTRO. ANN. GRASSES	P	2.5	8.5(0.5)	6.5
NATIVE PERENNIAL FORBS				
Achillea lanulosa		P	P	P
Agoseris glauca				P
Allium textile	P	P		
Antennaria rosea	P	P		
Arnica fulgens				P
Artemisia frigida	P	0.5		0.5
Artemisia ludoviciana	P		0.5	
Aster porteri		1.0	P	
Astragalus agrestis	P		P	
Astragalus tridactylicus	P			
Castilleja sessiliflora	0.5	P	P	
Comandra umbellata ssp. pallida	P		P	
Dalea candida var. oligophylla	P	P		
Dalea purpurea	0.5	P	P	
Erigeron flagellaris	P	P	P	
Gastrolychnis drummondii			P	
Gaura coccinea	P	P	P	P
Gutierrezia sarothrae	P	5.0(1.0)	0.5	P
Heterotheca fulcrata	P			
Heterotheca villosa	4.0	P	P	P
Hymenopappus filifolius	1.0			
Lesquerella montana	P	P		
Leucocrinum montanum	P		P	
Liatris punctata	1.5	1.0(0.5)		

Table 2. Cover Data – Spray Area, Tordon Post–Spray Study,Bldr City OS, CO – June 1997

Percent Foliar Cover*

PLANT SPECIES	SAMPLE NUMBER 1	2	3	4
LICHEN				
Xanthoparmelia chlorochloa	P			P
TOTAL LICHEN	P	---	---	P
SUCCULENT				
Opuntia fragilis				P
Opuntia macrorhiza	0.5	P	P	P
TOTAL SUCCULENT	0.5	P	P	P
Standing dead	0.5	2.5	6.0	3.0
Litter	47.5	29.0	32.0	42.0
Bare soil	9.0	21.5	6.5	4.5
Rock	4.5	1.5	0.5	
TOTALS	100	100	100	100
TOTAL VEGETATION COVER	38.5(0.5)	45.5(7.5)	55.0(9.0)	50.5(4.5)
GROUND COVER (Litter+Rock+Veg+St.Dead)	91(1)	79(8)	94(9)	96(5)
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 53.8 Std.Dev.= 3.8)	59	50	53	53

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

Table 3. Freq. Data – Control Area, Trans. 1, Tordon Post–Spray Study, Bldr City OS, CO – June 1997

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS											
Erigeron divergens	100.00	P	P	P	P	P	P	P	P	P	P
Grindelia squarrosa	30.00		P			P					P
Plantago patagonica	10.00										P
Silene antirrhina	10.00					P					
TOTAL NATIVE ANN. & BIEN. FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS											
Acosta diffusa	100.00	P	P	P	P	P	P	P	P	P	P
Alyssum minus	80.00			P	P	P	P	P	P	P	P
Carduus nutans ssp. macrolepis	20.00					P		P			
Erodium cicutarium	10.00										P
Neolepia campestre	30.00				P	P	P				
Podospermum laciniatum	10.00									P	
Tragopogon dubius ssp. major	20.00		P							P	
TOTAL INTRO. ANN. & BIEN. FORBS	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE ANNUAL GRASSES											
Vulpia octoflora	10.00								P		
TOTAL NATIVE ANN. GRASSES	10.0	---	---	---	---	---	---	---	P	---	---
INTRODUCED ANNUAL GRASSES											
Anisantha tectorum	30.00				P	P			P		
Bromus japonicus	100.00	P	P	P	P	P	P	P	P	P	P
TOTAL INTRO. ANN. GRASSES	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE PERENNIAL FORBS											
Achillea lanulosa	10.00				P						
Agoseris glauca	20.00							P			P
Ambrosia psilostachya var. coronopifolia	10.00										P
Aphyllon fasciculatum	10.00								P		
Artemisia frigida	80.00			P	P	P	P	P	P	P	P
Drymocallis fissa	30.00				P		P		P		
Gutierrezia sarothrae	50.00	P	P		P					P	P
Heterotheca villosa	60.00	P	P		P				P	P	P
Liatris punctata	10.00				P						
Oligosporus dracunculus ssp. glaucus	30.00	P	P				P				
Psoralidium tenuiflorum	80.00	P	P	P			P	P	P	P	P
Sphaeralcea coccinea	50.00						P	P	P	P	P
Virgulaster ascendens	10.00		P								
Virgulus falcatus	40.00			P			P			P	P
TOTAL NATIVE PERENNIAL FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED PERENNIAL FORBS											
Convolvulus arvensis	20.00									P	P
Hypericum perforatum	20.00						P				P
Taraxacum officinale	40.00					P			P	P	P
TOTAL INTRO. PERENNIAL FORBS	50.0	---	---	---	---	P	P	---	P	P	P
NATIVE PERENNIAL GRASSES (cool)											
Elymus longifolius	30.00	P	P								P
Pascopyrum smithii	100.00	P	P	P	P	P	P	P	P	P	P
Poa agassizensis	30.00			P	P		P				
Poa compressa	50.00			P	P	P		P	P		
TOTAL NATIVE PERENNIAL GRASSES (c)	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE PERENNIAL GRASSES (warm)											
Andropogon gerardii	20.00	P	P								
Aristida purpurea	20.00						P	P			
Buchloe dactyloides	90.00	P	P	P		P	P	P	P	P	P
Chondrosum gracile	90.00	P		P	P	P	P	P	P	P	P
TOTAL NATIVE PERENNIAL GRASSES (w)	100.0	P	P	P	P	P	P	P	P	P	P

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
SUCCULENT											
Echinocereus viridiflorus	40.00		P						P	P	P
Opuntia macrorhiza	50.00		P		P				P	P	P
TOTAL SUCCULENT	50.0	---	P	---	P	---	---	---	P	P	P
SPECIES DENSITY (# of species/5 sq.m.) (AVERAGE= 16.5 Std.Dev.= 3.6)		12	16	12	17	15	17	14	19	19	24

*P=Present within 1m X 5m plot on right side (when standing at origin and facing the endpoint) of the cover transect.

PLANT SPECIES	FREQUENCY (%)	PRESENCE* – SAMPLE NUMBER – 1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS											
Draba reptans	10.00					P					
Erysimum asperum	40.00			P	P				P	P	
Grindelia squarrosa	10.00		P								
Plantago patagonica	30.00	P	P			P					
Pterogonum alatum	70.00	P		P	P	P			P	P	P
TOTAL NATIVE ANN. & BIEN. FORBS	80.0	P	P	P	P	P	---	---	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS											
Acosta diffusa	70.00	P	P	P	P	P	P	P			
Alyssum minus	60.00	P	P	P	P	P		P			
Camelina microcarpa	10.00							P			
Carduus nutans ssp. macrolepis	20.00		P			P					
Lepidium densiflorum	20.00	P	P								
Podospermum laciniatum	30.00	P	P	P							
Tragopogon dubius ssp. major	30.00			P	P		P				
TOTAL INTRO. ANN. & BIEN. FORBS	70.0	P	P	P	P	P	P	P	---	---	---
INTRODUCED ANNUAL GRASSES											
Bromus japonicus	90.00	P	P	P	P	P		P	P	P	P
TOTAL INTRO. ANN. GRASSES	90.0	P	P	P	P	P	---	P	P	P	P
NATIVE PERENNIAL FORBS											
Artemisia frigida	100.00	P	P	P	P	P	P	P	P	P	P
Artemisia ludoviciana	20.00				P				P		
Aster porteri	20.00							P	P		
Astragalus agrestis	30.00			P	P	P					
Castilleja sessiliflora	70.00	P	P		P	P	P	P			P
Comandra umbellata ssp. pallida	10.00									P	
Dalea purpurea	50.00			P	P		P			P	P
Eremogone fendleri	50.00					P		P	P	P	P
Erigeron flagellaris	70.00	P	P	P	P	P	P			P	
Gaillardia aristata	30.00								P	P	P
Gaura coccinea	30.00			P			P			P	
Gutierrezia sarothrae	70.00	P	P	P	P	P	P		P		
Helianthus pumilus	10.00										P
Heterotheca fulcrata	10.00										P
Heterotheca villosa	90.00		P	P	P	P	P	P	P	P	P
Hymenopappus filifolius	40.00	P		P					P	P	
Ipomopsis spicata	20.00									P	P
Lesquerella montana	70.00				P	P	P	P	P	P	P
Liatris punctata	100.00	P	P	P	P	P	P	P	P	P	P
Lithospermum ruderale	10.00				P						
Mertensia lanceolata	10.00								P		
Musineon divaricatum	10.00				P						
Nothocalais cuspidata	20.00					P	P				
Oxybaphus linearis	20.00					P			P		
Oxytropis x sericea	20.00									P	P
Paronychia jamesii	30.00		P					P			P
Penstemon strictus	50.00				P	P			P	P	P
Psoralidium tenuiflorum	90.00	P	P	P	P	P		P	P	P	P
Ratibida columnifera	80.00	P	P	P	P	P	P	P		P	
Senecio integerrimus	50.00	P			P				P	P	P
Sphaeralcea coccinea	10.00		P								
Tithymalus brachyceras	10.00									P	
Townsendia exscapa	50.00			P	P	P				P	P
Viola nuttallii	10.00									P	
Virgulus falcatus	10.00						P				
TOTAL NATIVE PERENNIAL FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED PERENNIAL FORBS											
Hypericum perforatum	20.00			P						P	
Taraxacum officinale	30.00	P	P	P							
TOTAL INTRO. PERENNIAL FORBS	40.0	P	P	P	---	---	---	---	---	P	---

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
NATIVE PERENNIAL GRASSES (cool)											
Carex pensylvanica ssp. heliophila	90.00		P	P	P	P	P	P	P	P	P
Elymus longifolius	40.00							P	P	P	P
Hesperostipa comata	70.00				P	P	P	P	P	P	P
Koeleria macrantha	100.00	P	P	P	P	P	P	P	P	P	P
Pascopyrum smithii	70.00	P	P	P	P	P	P	P			
Poa compressa	10.00	P									
Poa secunda	10.00	P									
TOTAL NATIVE PERENNIAL GRASSES (c)	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE PERENNIAL GRASSES (warm)											
Andropogon gerardii	20.00									P	P
Aristida purpurea	100.00	P	P	P	P	P	P	P	P	P	P
Bouteloua curtipendula	80.00			P	P	P	P	P	P	P	P
Buchloe dactyloides	50.00	P			P	P	P		P		
Chondrosum gracile	90.00	P	P	P	P	P	P	P	P		P
Chondrosum hirsutum	10.00									P	
Schizachyrium scoparium	10.00								P		
TOTAL NATIVE PERENNIAL GRASSES (w)	100.0	P	P	P	P	P	P	P	P	P	P
SUCCULENT											
Opuntia macrorhiza	30.00	P	P	P							
TOTAL SUCCULENT	30.0	P	P	P	---	---	---	---	---	---	---
SPECIES DENSITY (# of species/5 sq.m.) (AVERAGE= 26.9 Std.Dev.= 3.5)		25	25	28	31	30	22	22	27	32	27

*P=Present within 1m X 5m plot on right side (when standing at origin and facing the endpoint) of the cover transect.

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS											
Erigeron divergens	40.00							P	P	P	P
Erysimum asperum	10.00		P								
Plantago patagonica	30.00				P					P	P
Pterogonum alatum	80.00	P	P	P	P	P	P			P	P
TOTAL NATIVE ANN. & BIEN. FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS											
Acosta diffusa	80.00	P	P		P	P	P		P	P	P
Alyssum minus	30.00			P	P						P
Camelina microcarpa	10.00		P								
Lactuca serriola	10.00	P									
TOTAL INTRO. ANN. & BIEN. FORBS	90.0	P	P	P	P	P	P	---	P	P	P
INTRODUCED ANNUAL GRASSES											
Bromus japonicus	30.00	P			P					P	
TOTAL INTRO. ANN. GRASSES	30.0	P	---	---	P	---	---	---	---	P	---
NATIVE PERENNIAL FORBS											
Allium textile	20.00	P	P								
Antennaria rosea	20.00	P	P								
Artemisia frigida	40.00		P			P			P	P	
Artemisia ludoviciana	10.00				P						
Astragalus agrestis	30.00	P			P		P				
Astragalus tridactylicus	20.00						P				P
Castilleja sessiliflora	50.00					P		P	P	P	P
Comandra umbellata ssp. pallida	10.00										P
Dalea candida var. oligophylla	30.00							P	P	P	
Dalea purpurea	70.00	P	P	P		P	P		P	P	
Erigeron flagellaris	30.00	P					P	P			
Gaura coccinea	10.00						P				
Gutierrezia sarothrae	70.00		P	P	P			P	P	P	P
Heterotheca villosa	70.00	P	P	P	P		P	P	P		
Hymenopappus filifolius	80.00		P	P	P	P	P	P	P		P
Lesquerella montana	40.00			P				P	P	P	
Leucocrinum montanum	10.00										P
Liatris punctata	80.00	P	P	P			P	P	P	P	P
Lomatium orientale	30.00		P		P					P	
Nothocalais cuspidata	30.00				P		P				P
Oxytropis x sericea	60.00				P		P	P	P	P	P
Paronychia jamesii	80.00		P		P	P	P	P	P	P	P
Penstemon spp.	10.00									P	
Psoralidium tenuiflorum	100.00	P	P	P	P	P	P	P	P	P	P
Ratibida columnifera	20.00									P	P
Senecio integerrimus	60.00			P	P	P	P	P			P
Solidago simplex var. nana	20.00			P	P						
Tithymalus brachyceras	20.00		P	P							
Townsendia exscapa	100.00	P	P	P	P	P	P	P	P	P	P
Viola nuttallii	50.00				P	P		P	P		P
Virgulus falcatus	50.00	P			P			P	P		P
TOTAL NATIVE PERENNIAL FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED PERENNIAL FORBS											
Taraxacum officinale	10.00										P
TOTAL INTRO. PERENNIAL FORBS	10.0	---	---	---	---	---	---	---	---	---	P
NATIVE PERENNIAL GRASSES (cool)											
Carex pensylvanica ssp. heliophila	90.00	P	P	P	P	P		P	P	P	P
Elymus longifolius	60.00	P	P	P	P	P					P
Hesperostipa comata	20.00	P	P								
Koeleria macrantha	100.00	P	P	P	P	P	P	P	P	P	P
Nassella viridula	30.00						P	P			P
Pascopyrum smithii	60.00					P	P	P	P	P	P
TOTAL NATIVE PERENNIAL GRASSES (c)	100.0	P	P	P	P	P	P	P	P	P	P

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
NATIVE PERENNIAL GRASSES (warm)											
Andropogon gerardii	40.00			P	P	P	P				
Aristida purpurea	80.00	P	P	P	P	P		P	P	P	
Bouteloua curtipendula	100.00	P	P	P	P	P	P	P	P	P	P
Buchloe dactyloides	70.00	P	P			P		P	P	P	P
Chondrosum gracile	20.00							P	P		
Chondrosum hirsutum	60.00	P	P	P	P	P	P				
Schizachyrium scoparium	60.00		P	P	P		P	P			P
TOTAL NATIVE PERENNIAL GRASSES (w)	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE SHRUBS											
Yucca glauca	30.00					P	P	P			
TOTAL NATIVE SHRUBS	30.0	---	---	---	---	P	P	P	---	---	---
LICHEN											
Xanthoparmelia chlorochloa	20.00			P				P			
TOTAL LICHEN	20.0	---	---	P	---	---	---	P	---	---	---
SUCCULENT											
Opuntia macrorhiza	10.00									P	
TOTAL SUCCULENT	10.0	---	---	---	---	---	---	---	---	P	---
SPECIES DENSITY (# of species/5 sq.m.) (AVERAGE= 25.0 Std.Dev.= 2.9)		22	26	22	28	21	24	27	24	26	30

*P=Present within 1m X 5m plot on right side (when standing at origin and facing the endpoint) of the cover transect.

Table 6. Freq. Data – Spray Area, Trans. 2, Tordon Post–Spray Study, Bldr City OS, CO – June 1997

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS											
Draba reptans	20.00								P	P	
Erysimum asperum	10.00		P								
Grindelia squarrosa	30.00	P						P	P		
Plantago patagonica	90.00		P	P	P	P	P	P	P	P	P
Silene antirrhina	60.00	P	P		P	P	P			P	
TOTAL NATIVE ANN. & BIEN. FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS											
Acosta diffusa	100.00	P	P	P	P	P	P	P	P	P	P
Alyssum minus	60.00			P			P	P	P	P	P
Camelina microcarpa	30.00		P	P			P				
Lactuca serriola	30.00	P		P				P			
Lepidium densiflorum	60.00	P		P		P	P	P	P		
Noccaea montana	20.00		P	P							
Plantago lanceolata	10.00	P									
Podospermum laciniatum	30.00		P			P	P				
TOTAL INTRO. ANN. & BIEN. FORBS	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE ANNUAL GRASSES											
Vulpia octoflora	20.00			P	P						
TOTAL NATIVE ANN. GRASSES	20.0	---	---	P	P	---	---	---	---	---	---
INTRODUCED ANNUAL GRASSES											
Bromus japonicus	100.00	P	P	P	P	P	P	P	P	P	P
TOTAL INTRO. ANN. GRASSES	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE PERENNIAL FORBS											
Achillea lanulosa	10.00							P			
Allium textile	10.00		P								
Antennaria rosea	10.00					P					
Artemisia frigida	60.00	P	P		P			P		P	P
Aster porteri	40.00		P	P		P	P				
Castilleja sessiliflora	50.00	P	P		P	P	P				
Dalea candida var. oligophylla	30.00				P			P			P
Dalea purpurea	30.00			P	P	P					
Erigeron flagellaris	90.00	P	P	P	P	P	P	P	P	P	
Gaura coccinea	50.00			P	P	P				P	P
Gutierrezia sarothrae	100.00	P	P	P	P	P	P	P	P	P	P
Heterotheca villosa	10.00				P						
Lesquerella montana	60.00	P	P	P			P		P		P
Liatris punctata	80.00	P	P	P		P	P	P		P	P
Musineon divaricatum	100.00	P	P	P	P	P	P	P	P	P	P
Oenothera villosa	10.00				P						
Oligosporus dracunculus ssp. glaucus	10.00			P							
Oxybaphus linearis	20.00							P			P
Psoralidium tenuiflorum	90.00	P	P	P		P	P	P	P	P	P
Senecio integerrimus	30.00	P			P				P		
Sphaeralcea coccinea	10.00									P	
Townsendia hookeri	10.00				P						
Viola nuttallii	40.00			P	P	P					P
Virgulus falcatus	50.00	P					P	P		P	P
TOTAL NATIVE PERENNIAL FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED PERENNIAL FORBS											
Taraxacum officinale	30.00	P	P						P		
TOTAL INTRO. PERENNIAL FORBS	30.0	P	P	---	---	---	---	---	P	---	---
NATIVE PERENNIAL GRASSES (cool)											
Carex pensylvanica ssp. heliophila	80.00	P	P	P	P		P	P		P	P
Koeleria macrantha	100.00	P	P	P	P	P	P	P	P	P	P
Pascopyrum smithii	100.00	P	P	P	P	P	P	P	P	P	P
Poa compressa	30.00	P		P			P				
Poa secunda	20.00	P						P			
TOTAL NATIVE PERENNIAL GRASSES (c)	100.0	P	P	P	P	P	P	P	P	P	P

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
NATIVE PERENNIAL GRASSES (warm)											
Aristida purpurea	50.00		P	P				P		P	P
Bouteloua curtipendula	100.00	P	P	P	P	P	P	P	P	P	P
Buchloe dactyloides	100.00	P	P	P	P	P	P	P	P	P	P
Chondrosum gracile	90.00	P	P	P	P	P	P	P		P	P
TOTAL NATIVE PERENNIAL GRASSES (w)	100.0	P	P	P	P	P	P	P	P	P	P
SUCCULENT											
Opuntia macrorhiza	20.00	P					P				
TOTAL SUCCULENT	20.0	P	---	---	---	---	P	---	---	---	---
SPECIES DENSITY (# of species/5 sq.m.) (AVERAGE= 23.9 Std.Dev.= 3.0)		27	26	28	24	22	25	25	18	22	22

*P=Present within 1m X 5m plot on right side (when standing at origin and facing the endpoint) of the cover transect.

PLANT SPECIES	FREQUENCY (%)	PRESENCE* – SAMPLE NUMBER – 1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS											
Androsace occidentalis	10.00						P				
Collomia linearis	30.00				P	P			P		
Draba reptans	60.00					P	P	P	P	P	P
Hedeoma hispidum	40.00		P			P				P	P
Plantago patagonica	100.00	P	P	P	P	P	P	P	P	P	P
Silene antirrhina	80.00	P		P	P	P	P	P	P		P
TOTAL NATIVE ANN. & BIEN. FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS											
Acosta diffusa	100.00	P	P	P	P	P	P	P	P	P	P
Alyssum minus	100.00	P	P	P	P	P	P	P	P	P	P
Camelina microcarpa	60.00		P	P		P	P	P	P		
Lactuca serriola	10.00								P		
Lepidium densiflorum	20.00						P		P		
Noccaea montana	80.00	P	P	P	P	P		P	P		P
Podospermum laciniatum	40.00			P				P		P	P
Tragopogon dubius ssp. major	60.00	P	P	P	P					P	P
TOTAL INTRO. ANN. & BIEN. FORBS	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE ANNUAL GRASSES											
Critesion pusillum	30.00						P	P	P		
Vulpia octoflora	50.00					P	P	P		P	P
TOTAL NATIVE ANN. GRASSES	60.0	---	---	---	---	P	P	P	P	P	P
INTRODUCED ANNUAL GRASSES											
Bromus japonicus	100.00	P	P	P	P	P	P	P	P	P	P
TOTAL INTRO. ANN. GRASSES	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE PERENNIAL FORBS											
Achillea lanulosa	10.00								P		
Artemisia ludoviciana	20.00	P	P								
Aster porteri	10.00	P									
Astragalus agrestis	30.00	P	P						P		
Castilleja sessiliflora	40.00	P	P					P	P		
Comandra umbellata ssp. pallida	10.00	P									
Dalea purpurea	10.00	P									
Erigeron flagellaris	100.00	P	P	P	P	P	P	P	P	P	P
Gastrolychnis drummondii	10.00				P						
Gaura coccinea	30.00	P	P		P						
Gutierrezia sarothrae	60.00		P	P	P				P	P	P
Heterotheca villosa	50.00	P		P		P			P	P	
Leucocrinum montanum	10.00		P								
Musineon divaricatum	40.00		P	P	P				P		
Psoralidium tenuiflorum	90.00	P	P	P		P	P	P	P	P	P
Ratibida columnifera	20.00			P	P						
Sphaeralcea coccinea	50.00		P		P	P		P			P
Tithymalus brachyceras	10.00	P									
Virgulus falcatus	90.00	P	P		P	P	P	P	P	P	P
TOTAL NATIVE PERENNIAL FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED PERENNIAL FORBS											
Hypericum perforatum	20.00			P	P						
Taraxacum officinale	70.00		P		P	P		P	P	P	P
TOTAL INTRO. PERENNIAL FORBS	80.0	---	P	P	P	P	---	P	P	P	P
NATIVE PERENNIAL GRASSES (cool)											
Carex pensylvanica ssp. heliophila	40.00	P	P			P				P	
Koeleria macrantha	80.00	P	P	P			P	P	P	P	P
Pascopyrum smithii	100.00	P	P	P	P	P	P	P	P	P	P
Poa agassizensis	70.00		P	P		P	P	P	P		P
Poa compressa	30.00		P	P	P						
TOTAL NATIVE PERENNIAL GRASSES (c)	100.0	P	P	P	P	P	P	P	P	P	P

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
NATIVE PERENNIAL GRASSES (warm)											
Andropogon gerardii	10.00	P									
Bouteloua curtipendula	60.00	P	P	P	P		P		P		
Buchloe dactyloides	100.00	P	P	P	P	P	P	P	P	P	P
Chondrosum gracile	100.00	P	P	P	P	P	P	P	P	P	P
TOTAL NATIVE PERENNIAL GRASSES (w)	100.0	P	P	P	P	P	P	P	P	P	P
SUCCULENT											
Opuntia macrorhiza	20.00		P					P			
TOTAL SUCCULENT	20.0	---	P	---	---	---	---	P	---	---	---
SPECIES DENSITY (# of species/5 sq.m.) (AVERAGE= 23.6 Std.Dev.= 3.1)		26	29	23	23	22	20	23	28	20	22

*P=Present within 1m X 5m plot on right side (when standing at origin and facing the endpoint) of the cover transect.

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS											
Androsace occidentalis	10.00		P								
Collomia linearis	10.00								P		
Descurainia pinnata	10.00	P									
Draba reptans	10.00		P								
Erigeron divergens	60.00	P	P	P	P		P			P	
Hedeoma hispidum	30.00	P	P	P							
Plantago patagonica	60.00	P	P	P				P	P		P
Silene antirrhina	30.00	P		P	P						
TOTAL NATIVE ANN. & BIEN. FORBS	90.0	P	P	P	P	---	P	P	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS											
Acosta diffusa	90.00	P	P	P	P		P	P	P	P	P
Alyssum minus	100.00	P	P	P	P	P	P	P	P	P	P
Camelina microcarpa	50.00	P	P	P	P		P				
Erodium cicutarium	50.00				P	P	P	P	P		
Lactuca serriola	80.00	P	P	P	P	P			P	P	P
Lepidium densiflorum	20.00		P	P							
Neolepia campestre	30.00				P	P	P				
Podospermum laciniatum	10.00								P		
Tragopogon dubius ssp. major	40.00		P					P	P	P	
Verbascum blattaria	10.00						P				
TOTAL INTRO. ANN. & BIEN. FORBS	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE ANNUAL GRASSES											
Critesion pusillum	20.00		P					P			
Vulpia octoflora	20.00		P						P		
TOTAL NATIVE ANN. GRASSES	30.0	---	P	---	---	---	---	P	P	---	---
INTRODUCED ANNUAL GRASSES											
Anisantha tectorum	20.00	P	P								
Bromus japonicus	100.00	P	P	P	P	P	P	P	P	P	P
TOTAL INTRO. ANN. GRASSES	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE PERENNIAL FORBS											
Achillea lanulosa	30.00		P		P					P	
Agoseris glauca	40.00	P		P			P		P		
Arnica fulgens	10.00				P						
Artemisia frigida	10.00	P									
Gaura coccinea	20.00			P							P
Gutierrezia sarothrae	60.00	P	P	P	P				P		P
Heterotheca villosa	30.00	P	P								P
Oxybaphus linearis	10.00							P			
Psoralidium tenuiflorum	90.00	P	P	P		P	P	P	P	P	P
Senecio integerrimus	10.00		P								
Solidago nana	10.00								P		
Sphaeralcea coccinea	30.00	P		P						P	
Tradescantia occidentalis	10.00						P				
Vicia americana	10.00			P							
Viola nuttallii	20.00	P						P			
Virgulus falcatus	80.00	P	P	P	P		P		P	P	P
TOTAL NATIVE PERENNIAL FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED PERENNIAL FORBS											
Taraxacum officinale	50.00	P	P	P	P			P			
TOTAL INTRO. PERENNIAL FORBS	50.0	P	P	P	P	---	---	P	---	---	---
NATIVE PERENNIAL GRASSES (cool)											
Carex pensylvanica ssp. heliophila	80.00	P	P	P	P			P	P	P	P
Juncus interior	10.00				P						
Koeleria macrantha	30.00				P				P	P	
Pascopyrum smithii	80.00	P	P	P			P	P	P	P	P
Poa agassizensis	50.00			P	P	P		P	P		
Poa compressa	40.00		P	P	P	P					
TOTAL NATIVE PERENNIAL GRASSES (c)	100.0	P	P	P	P	P	P	P	P	P	P

PLANT SPECIES	FREQUENCY (%)	PRESENCE* – SAMPLE NUMBER – 1	2	3	4	5	6	7	8	9	10
INTRODUCED PERENNIAL GRASSES (cool)											
Dactylis glomerata	10.00				P						
TOTAL INTRO. PERENNIAL GRASSES (c)	10.0	---	---	---	P	---	---	---	---	---	---
NATIVE PERENNIAL GRASSES (warm)											
Buchloe dactyloides	90.00	P	P	P	P		P	P	P	P	P
Chondrosum gracile	40.00					P	P		P	P	
TOTAL NATIVE PERENNIAL GRASSES (w)	100.0	P	P	P	P	P	P	P	P	P	P
LICHEN											
Xanthoparmelia chlorochloa	10.00			P							
TOTAL LICHEN	10.0	---	---	P	---	---	---	---	---	---	---
SUCCULENT											
Opuntia fragilis	10.00							P			
Opuntia macrorhiza	40.00	P	P				P		P		
TOTAL SUCCULENT	50.0	P	P	---	---	---	P	P	P	---	---
SPECIES DENSITY (# of species/5 sq.m.) (AVERAGE= 18.7 Std.Dev.= 5.7)		24	27	24	21	9	16	16	22	15	13

*P=Present within 1m X 5m plot on right side (when standing at origin and facing the endpoint) of the cover transect.

Table 9. Knapweed (*Acosta diffusa*) Density, Tordon Post-Spray Study, Bldr City OS - June 1997

			Subplot Number # individuals/sq. m.									
	AVERAGE	MAXIMUM	1	2	3	4	5	6	7	8	9	10
C1 BOLT	14.7	37	24	37	15	9	13	21	12	7	6	3
C1 ROSETTE	19	68	14	29	62	68	5	5	4	2	0	1
C1 DEAD	1.3	6	0	0	6	0	3	1	0	0	1	2
C2 BOLT	1.7	12	12	5	0	0	0	0	0	0	0	0
C2 ROSETTE	0.8	3	3	2	1	1	0	0	1	0	0	0
C2 DEAD	0	0	0	0	0	0	0	0	0	0	0	0
S1 BOLT	2.9	18	0	0	0	2	1	1	2	2	18	3
S1 ROSETTE	5.7	36	0	0	0	2	0	0	3	6	36	10
S1 DEAD	0.6	3	0	0	0	0	0	0	3	0	1	2
S2 BOLT	1.7	10	3	1	2	0	10	0	1	0	0	0
S2 ROSETTE	3.6	13	5	2	3	8	13	1	3	0	1	0
S2 DEAD	0	0	0	0	0	0	0	0	0	0	0	0
S3 BOLT	1.7	8	2	0	7	8	0	0	0	0	0	0
S3 ROSETTE	7.2	48	9	0	48	6	0	0	4	1	0	4
S3 DEAD	0.2	2	0	0	0	2	0	0	0	0	0	0
S4 BOLT	4.2	22	7	22	4	0	0	0	3	0	0	6
S4 ROSETTE	8.5	40	13	40	14	0	1	1	6	5	3	2
S4 DEAD	0.7	2	0	1	2	0	2	0	1	0	0	1

Table 10a. Cover Data – Control Area, Trans. 1, Trodon Post–Spray Study, Bldr City OS, CO – Aug 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER–ALL (%)	RELATIVE VEGETATION COVER–ALL (%)	1
NATIVE ANNUAL & BIENNIAL FORBS						
Erigeron divergens	0.00	100.00	0.00	0.00	0.00	P
Grindelia squarrosa	0.00	100.00	0.00	0.00	0.00	P
Pterogonum alatum	0.00	100.00	0.00	0.00	0.00	P
Silene antirrhina	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE ANN. & BIEN. FORBS	0.0	100.0	0.0	0.0	0.0	P
INTRODUCED ANNUAL & BIENNIAL FORBS						
Acosta diffusa	44.00	100.00	64.23	44.00	61.97	44.0
Alyssum minus	1.00	100.00	1.46	1.50	2.11	1.0(0.5)
Carduus nutans ssp. macrolepis	0.00	100.00	0.00	0.00	0.00	P
Neolepia campestre	0.00	100.00	0.00	0.00	0.00	P
Plantago lanceolata	0.00	100.00	0.00	0.00	0.00	P
Verbascum blattaria	0.00	100.00	0.00	0.00	0.00	P
TOTAL INTRO. ANN. & BIEN. FORBS	45.0	100.0	65.7	45.5	64.1	45.0(0.5)
INTRODUCED ANNUAL GRASSES						
Bromus japonicus	1.00	100.00	1.46	1.00	1.41	1.0
TOTAL INTRO. ANN. GRASSES	1.0	100.0	1.5	1.0	1.4	1.0
NATIVE PERENNIAL FORBS						
Ambrosia psilostachya var. coronopifolia	0.00	100.00	0.00	0.00	0.00	P
Artemisia frigida	0.00	100.00	0.00	0.00	0.00	P
Astragalus shortianus	0.00	100.00	0.00	0.00	0.00	P
Gutierrezia sarothrae	0.00	100.00	0.00	0.00	0.00	P
Heterotheca villosa	0.00	100.00	0.00	0.00	0.00	P
Liatris punctata	0.00	100.00	0.00	0.00	0.00	P
Oligosporus dracunculus ssp. glaucus	0.00	100.00	0.00	0.00	0.00	P
Potentilla hippiana	0.00	100.00	0.00	0.00	0.00	P
Psoralidium tenuiflorum	1.00	100.00	1.46	1.00	1.41	1.0
Sphaeralcea coccinea	0.00	100.00	0.00	0.00	0.00	P
Virgulus falcatus	0.50	100.00	0.73	1.00	1.41	0.5(0.5)
TOTAL NATIVE PERENNIAL FORBS	1.5	100.0	2.2	2.0	2.8	1.5(0.5)
INTRODUCED PERENNIAL FORBS						
Convolvulus arvensis	0.00	100.00	0.00	0.00	0.00	P
Hypericum perforatum	0.00	100.00	0.00	0.00	0.00	P
Taraxacum officinale	2.00	100.00	2.92	2.00	2.82	2.0
TOTAL INTRO. PERENNIAL FORBS	2.0	100.0	2.9	2.0	2.8	2.0
NATIVE PERENNIAL GRASSES (cool)						
Pascopyrum smithii	0.00	100.00	0.00	0.50	0.70	(0.5)
Poa agassizensis	0.50	100.00	0.73	0.50	0.70	0.5
Poa compressa	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE PERENNIAL GRASSES (c)	0.5	100.0	0.7	1.0	1.4	0.5(0.5)
NATIVE PERENNIAL GRASSES (warm)						
Andropogon gerardii	1.00	100.00	1.46	1.00	1.41	1.0
Aristida purpurea	0.50	100.00	0.73	0.50	0.70	0.5
Buchloe dactyloides	17.00	100.00	24.82	18.00	25.35	17.0(1.0)
Chondrosum gracile	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE PERENNIAL GRASSES (w)	*18.5*	*100.0*	*27.0*	19.5	*27.5*	18.5(1.0)
SUCCULENT						
Echinocereus viridiflorus	0.00	100.00	0.00	0.00	0.00	P
Opuntia macrorhiza	0.00	100.00	0.00	0.00	0.00	P
TOTAL SUCCULENT	0.0	100.0	0.0	0.0	0.0	P
MUSHROOMS						
Fungus	0.00	100.00	0.00	0.00	0.00	P
TOTAL MUSHROOMS	0.0	100.0	0.0	0.0	0.0	P

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER–ALL (%)	RELATIVE VEGETATION COVER–ALL (%)	1
Litter	27.00	100.00		27.00		27.0
Bare soil	4.50	100.00		4.50		4.5
TOTALS	100.0			102.5		100
TOTAL VEGETATION COVER	68.5 (s=0.0)		100.0	71.0 (s=0.0)	100.0	68.5(2.5)
GROUND COVER (Litter+Rock+Veg+St.Dead)	95.5			98.0		96(3)
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 35.0 Std.Dev.= 0.0)						35

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

Table 10b. Cover Data – Control Area, Trans. 2, Tordon Post–Spray Study, Bldr City OS, CO – Aug 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER–ALL (%)	RELATIVE VEGETATION COVER–ALL (%)	2
NATIVE ANNUAL & BIENNIAL FORBS						
Grindelia squarrosa	0.00	100.00	0.00	0.00	0.00	P
Oligosporus pacificus	0.00	100.00	0.00	0.00	0.00	P
Plantago patagonica	0.00	100.00	0.00	0.00	0.00	P
Pterogonum alatum	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE ANN. & BIEN. FORBS	0.0	100.0	0.0	0.0	0.0	P
INTRODUCED ANNUAL & BIENNIAL FORBS						
Acosta diffusa	0.00	100.00	0.00	0.00	0.00	P
Alyssum minus	0.00	100.00	0.00	0.00	0.00	P
Carduus nutans ssp. macrolepis	0.00	100.00	0.00	0.00	0.00	P
Lepidium densiflorum	0.00	100.00	0.00	0.00	0.00	P
Plantago lanceolata	0.00	100.00	0.00	0.00	0.00	P
Tragopogon dubius ssp. major	0.00	100.00	0.00	0.00	0.00	P
TOTAL INTRO. ANN. & BIEN. FORBS	0.0	100.0	0.0	0.0	0.0	P
INTRODUCED ANNUAL GRASSES						
Bromus japonicus	0.00	100.00	0.00	0.00	0.00	P
TOTAL INTRO. ANN. GRASSES	0.0	100.0	0.0	0.0	0.0	P
NATIVE PERENNIAL FORBS						
Artemisia frigida	0.50	100.00	1.10	1.00	2.11	0.5(0.5)
Artemisia ludoviciana	1.00	100.00	2.20	1.00	2.11	1.0
Asclepias viridiflora	0.00	100.00	0.00	0.00	0.00	P
Aster porteri	0.00	100.00	0.00	0.00	0.00	P
Astragalus miser var. oblongifolius	0.00	100.00	0.00	0.00	0.00	P
Castilleja sessiliflora	0.00	100.00	0.00	0.00	0.00	P
Comandra umbellata ssp. pallida	0.00	100.00	0.00	0.00	0.00	P
Dalea purpurea	0.00	100.00	0.00	0.00	0.00	P
Eremogone fendleri	0.00	100.00	0.00	0.00	0.00	P
Erigeron flagellaris	0.00	100.00	0.00	0.00	0.00	P
Gaillardia aristata	0.00	100.00	0.00	0.00	0.00	P
Gaura coccinea	0.00	100.00	0.00	0.00	0.00	P
Gutierrezia sarothrae	6.00	100.00	13.19	6.00	12.63	6.0
Helianthus pumilus	0.00	100.00	0.00	0.00	0.00	P
Heterotheca villosa	3.50	100.00	7.69	3.50	7.37	3.5
Ipomopsis aggregata	0.00	100.00	0.00	0.00	0.00	P
Lesquerella montana	0.00	100.00	0.00	0.00	0.00	P
Liatris punctata	0.00	100.00	0.00	0.00	0.00	P
Nothocalais cuspidata	0.00	100.00	0.00	0.00	0.00	P
Oxytropis x sericea	0.00	100.00	0.00	0.00	0.00	P
Paronychia jamesii	0.00	100.00	0.00	0.00	0.00	P
Penstemon strictus	0.00	100.00	0.00	0.00	0.00	P
Psoralidium tenuiflorum	0.50	100.00	1.10	0.50	1.05	0.5
Ratibida columnifera	0.00	100.00	0.00	0.00	0.00	P
Senecio integerrimus	0.00	100.00	0.00	0.00	0.00	P
Sphaeralcea coccinea	0.00	100.00	0.00	0.00	0.00	P
Townsendia hookeri	0.00	100.00	0.00	0.00	0.00	P
Virgulus falcatus	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE PERENNIAL FORBS	11.5	100.0	25.3	12.0	25.3	11.5(0.5)
INTRODUCED PERENNIAL FORBS						
Hypericum perforatum	0.00	100.00	0.00	0.00	0.00	P
Linaria genistifolia ssp. dalmatica	0.00	100.00	0.00	0.00	0.00	P
Taraxacum officinale	0.00	100.00	0.00	0.00	0.00	P
Verbena bracteata	0.00	100.00	0.00	0.00	0.00	P
TOTAL INTRO. PERENNIAL FORBS	0.0	100.0	0.0	0.0	0.0	P
NATIVE PERENNIAL GRASSES (cool)						
Carex pensylvanica ssp. heliophila	8.00	100.00	17.58	8.50	17.89	8.0(0.5)
Hesperostipa comata	2.00	100.00	4.40	2.00	4.21	2.0
Koeleria macrantha	3.50	100.00	7.69	3.50	7.37	3.5
Pascopyrum smithii	2.50	100.00	5.49	2.50	5.26	2.5
Poa compressa	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE PERENNIAL GRASSES (c)	16.0	100.0	35.2	16.5	34.7	16.0(0.5)

Table 10b. Cover Data – Control Area, Trans. 2, Tordon Post–Spray Study, Bldr City OS, CO – Aug 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER–ALL (%)	RELATIVE VEGETATION COVER–ALL (%)	2
NATIVE PERENNIAL GRASSES (warm)						
Andropogon gerardii	1.00	100.00	2.20	1.00	2.11	1.0
Aristida purpurea	1.00	100.00	2.20	1.00	2.11	1.0
Bouteloua curtipendula	3.00	100.00	6.59	3.00	6.32	3.0
Buchloe dactyloides	0.00	100.00	0.00	0.00	0.00	P
Chondrosum gracile	13.00	100.00	28.57	14.00	29.47	13.0(1.0)
Chondrosum hirsutum	0.00	100.00	0.00	0.00	0.00	P
Schizachyrium scoparium	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE PERENNIAL GRASSES (w)	18.0	100.0	39.6	19.0	40.0	18.0(1.0)
LICHEN						
Lichen	0.00	100.00	0.00	0.00	0.00	P
TOTAL LICHEN	0.0	100.0	0.0	0.0	0.0	P
SUCCULENT						
Coryphantha vivipara var. vivipara	0.00	100.00	0.00	0.00	0.00	P
Opuntia macrorhiza	0.00	100.00	0.00	0.00	0.00	P
TOTAL SUCCULENT	0.0	100.0	0.0	0.0	0.0	P
MUSHROOMS						
Fungus	0.00	100.00	0.00	0.00	0.00	P
TOTAL MUSHROOMS	0.0	100.0	0.0	0.0	0.0	P
Standing dead	1.00	100.00		1.00		1.0
Litter	30.50	100.00		30.50		30.5
Bare soil	17.50	100.00		17.50		17.5
Rock	5.50	100.00		5.50		5.5
TOTALS	100.0			102.0		100
TOTAL VEGETATION COVER	45.5 (s=0.0)		100.0	47.5 (s=0.0)	100.0	45.5(2.0)
GROUND COVER (Litter+Rock+Veg+St.Dead)	82.5			84.5		83(2)
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 59.0 Std.Dev.= 0.0)						59

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

Table 11. Cover Data – Spray Area, Tordon Post–Spray Study, Bldr City OS, CO – Aug 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER–ALL (%)	RELATIVE VEGETATION COVER–ALL (%)
NATIVE ANNUAL & BIENNIAL FORBS					
Cirsium undulatum	0.00	25.00	0.00	0.00	0.00
Erigeron divergens	0.38	100.00	0.86	0.38	0.77
Erysimum asperum	0.00	25.00	0.00	0.00	0.00
Grindelia squarrosa	0.13	75.00	0.29	0.13	0.26
Hedeoma hispidum	0.00	25.00	0.00	0.00	0.00
Oligosporus pacificus	0.00	50.00	0.00	0.00	0.00
Plantago patagonica	0.00	100.00	0.00	0.00	0.00
Pterogonum alatum	0.00	50.00	0.00	0.00	0.00
Silene antirrhina	0.00	75.00	0.00	0.00	0.00
TOTAL NATIVE ANN. & BIEN. FORBS	0.5	100.0	1.1	0.5	1.0
INTRODUCED ANNUAL & BIENNIAL FORBS					
Acosta diffusa	2.00	100.00	4.58	2.25	4.63
Alyssum minus	0.88	100.00	2.01	0.88	1.80
Camelina microcarpa	0.00	25.00	0.00	0.00	0.00
Conyza canadensis	0.00	25.00	0.00	0.00	0.00
Lactuca serriola	0.00	75.00	0.00	0.00	0.00
Lepidium densiflorum	0.00	50.00	0.00	0.00	0.00
Neolepia campestre	0.00	25.00	0.00	0.00	0.00
Noccaea montana	0.00	50.00	0.00	0.00	0.00
Plantago lanceolata	0.00	50.00	0.00	0.00	0.00
Podospermum laciniatum	0.00	25.00	0.00	0.00	0.00
Tragopogon dubius ssp. major	0.13	100.00	0.29	0.13	0.26
Verbascum blattaria	0.38	75.00	0.86	0.38	0.77
TOTAL INTRO. ANN. & BIEN. FORBS	3.4	100.0	7.7	3.6	7.5
NATIVE ANNUAL GRASSES					
Vulpia octoflora	0.00	25.00	0.00	0.00	0.00
TOTAL NATIVE ANN. GRASSES	0.0	25.0	0.0	0.0	0.0
INTRODUCED ANNUAL GRASSES					
Bromus japonicus	1.25	100.00	2.87	1.50	3.08
TOTAL INTRO. ANN. GRASSES	1.3	100.0	2.9	1.5	3.1
NATIVE PERENNIAL FORBS					
Achillea lanulosa	0.00	50.00	0.00	0.13	0.26
Ambrosia psilostachya var. coronopifolia	0.00	25.00	0.00	0.00	0.00
Antennaria rosea	0.13	75.00	0.29	0.13	0.26
Artemisia frigida	0.13	75.00	0.29	0.13	0.26
Artemisia ludoviciana	0.13	50.00	0.29	0.13	0.26
Aster porteri	0.00	50.00	0.00	0.00	0.00
Astragalus tridactylicus	0.00	25.00	0.00	0.00	0.00
Castilleja sessiliflora	0.00	50.00	0.00	0.00	0.00
Comandra umbellata ssp. pallida	0.00	25.00	0.00	0.00	0.00
Dalea candida var. oligophylla	0.13	25.00	0.29	0.13	0.26
Dalea purpurea	0.13	50.00	0.29	0.13	0.26
Erigeron flagellaris	0.00	50.00	0.00	0.00	0.00
Evolvulus nuttalianus	0.00	25.00	0.00	0.00	0.00
Gaura coccinea	0.00	75.00	0.00	0.00	0.00
Gutierrezia sarothrae	1.38	100.00	3.15	1.50	3.08
Heterotheca villosa	0.25	100.00	0.57	0.38	0.77
Hymenopappus filifolius	0.00	25.00	0.00	0.00	0.00
Ipomopsis spicata	0.00	25.00	0.00	0.00	0.00
Lesquerella montana	0.00	75.00	0.00	0.00	0.00
Liatris punctata	0.00	75.00	0.00	0.00	0.00
Mertensia lanceolata	0.00	25.00	0.00	0.00	0.00
Nothocalais cuspidata	0.00	25.00	0.00	0.00	0.00
Oligosporus dracunculus ssp. glaucus	0.00	25.00	0.00	0.00	0.00
Oxybaphus linearis	0.00	50.00	0.00	0.00	0.00
Oxytropis x sericea	0.00	25.00	0.00	0.00	0.00
Paronychia jamesii	0.00	25.00	0.00	0.00	0.00
Penstemon virens	0.13	25.00	0.29	0.13	0.26
Psoralidium tenuiflorum	2.25	100.00	5.16	2.25	4.63
Ratibida columnifera	0.00	75.00	0.00	0.00	0.00

Table 11. Cover Data – Spray Area, Tordon Post–Spray Study, Bldr City OS, CO – Aug 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER–ALL (%)	RELATIVE VEGETATION COVER–ALL (%)
NATIVE PERENNIAL FORBS (concluded)					
Rumex triangulivalvis	0.00	25.00	0.00	0.00	0.00
Senecio integerrimus	0.00	25.00	0.00	0.00	0.00
Solidago mollis	0.00	25.00	0.00	0.00	0.00
Solidago simplex var. nana	0.00	25.00	0.00	0.00	0.00
Sphaeralcea coccinea	0.00	50.00	0.00	0.00	0.00
Thelesperma megapotamicum	0.00	25.00	0.00	0.00	0.00
Tithymalus brachyceras	0.00	25.00	0.00	0.00	0.00
Townsendia exscapa	0.00	25.00	0.00	0.00	0.00
Townsendia hookeri	0.00	25.00	0.00	0.00	0.00
Virgulus falcatus	0.13	100.00	0.29	0.13	0.26
TOTAL NATIVE PERENNIAL FORBS	4.8	100.0	10.9	5.1	10.5
INTRODUCED PERENNIAL FORBS					
Cichorium intybus	0.00	25.00	0.00	0.00	0.00
Convolvulus arvensis	0.00	50.00	0.00	0.00	0.00
Hypericum perforatum	0.00	25.00	0.00	0.00	0.00
Taraxacum officinale	0.75	100.00	1.72	0.75	1.54
TOTAL INTRO. PERENNIAL FORBS	0.8	100.0	1.7	0.8	1.5
NATIVE PERENNIAL GRASSES (cool)					
Bromopsis porteri	0.00	25.00	0.00	0.13	0.26
Carex pensylvanica ssp. heliophila	1.63	100.00	3.72	1.75	3.60
Elymus elymoides	0.00	25.00	0.00	0.00	0.00
Hesperostipa comata	0.00	25.00	0.00	0.00	0.00
Juncus arcticus ssp. ater	0.00	25.00	0.00	0.00	0.00
Koeleria macrantha	1.88	100.00	4.30	2.00	4.11
Nassella viridula	0.13	25.00	0.29	0.13	0.26
Pascopyrum smithii	7.50	100.00	17.19	8.38	17.22
Poa agassizensis	1.88	50.00	4.30	2.13	4.37
Poa compressa	0.13	75.00	0.29	0.13	0.26
TOTAL NATIVE PERENNIAL GRASSES (c)	13.1	100.0	30.1	14.6	30.1
NATIVE PERENNIAL GRASSES (warm)					
Andropogon gerardii	0.13	50.00	0.29	0.13	0.26
Aristida purpurea	0.25	75.00	0.57	0.25	0.51
Bouteloua curtipendula	2.13	75.00	4.87	2.13	4.37
Buchloe dactyloides	4.63	100.00	10.60	5.00	10.28
Chondrosum gracile	11.75	100.00	26.93	13.88	28.53
Chondrosum hirsutum	0.00	25.00	0.00	0.00	0.00
Muhlenbergia wrightii	0.00	25.00	0.00	0.00	0.00
Schizachyrium scoparium	0.50	25.00	1.15	0.50	1.03
TOTAL NATIVE PERENNIAL GRASSES (w)	19.4	100.0	44.4	21.9	45.0
NATIVE SHRUBS					
Yucca glauca	0.00	25.00	0.00	0.00	0.00
TOTAL NATIVE SHRUBS	0.0	25.0	0.0	0.0	0.0
BRYOPHYTES					
Moss	0.13	25.00	0.29	0.13	0.26
TOTAL BRYOPHYTES	0.1	25.0	0.3	0.1	0.3
LICHEN					
Lichen	0.00	50.00	0.00	0.00	0.00
Xanthoparmelia chlorochloa	0.00	50.00	0.00	0.00	0.00
TOTAL LICHEN	0.0	100.0	0.0	0.0	0.0
SUCCULENT					
Coryphantha vivipara var. vivipara	0.00	25.00	0.00	0.00	0.00
Opuntia macrorhiza	0.25	100.00	0.57	0.38	0.77
TOTAL SUCCULENT	0.3	100.0	0.6	0.4	0.8
MUSHROOMS					
Fungus	0.13	75.00	0.29	0.13	0.26
TOTAL MUSHROOMS	0.1	75.0	0.3	0.1	0.3

Table 11. Cover Data – Spray Area, Tordon Post–Spray Study, Bldr City OS, CO – Aug 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER–ALL (%)	RELATIVE VEGETATION COVER–ALL (%)
Standing dead	1.63	75.00		1.63	
Litter	34.13	100.00		34.13	
Bare soil	18.00	100.00		18.00	
Rock	2.63	100.00		2.63	
TOTALS	100.0			105.0	
TOTAL VEGETATION COVER	43.6 (s=8.9)		100.0	48.6 (s=13.5)	100.0
GROUND COVER (Litter+Rock+Veg+St.Dead)	82.0			87.0	
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 47.0 Std.Dev.= 7.9)					

Table 11. Cover Data – Spray Area, Tordon Post–Spray Study, Bldr City OS, CO – Aug 1997

PLANT SPECIES	Percent Foliar Cover*			
	SAMPLE NUMBER			
	1	2	3	4
NATIVE ANNUAL & BIENNIAL FORBS				
Cirsium undulatum	P			
Erigeron divergens	1.5	P	P	P
Erysimum asperum		P		
Grindelia squarrosa		P	P	0.5
Hedeoma hispidum			P	
Oligosporus pacificus		P		P
Plantago patagonica	P	P	P	P
Pterogonum alatum	P	P		
Silene antirrhina		P	P	P
TOTAL NATIVE ANN. & BIEN. FORBS	1.5	P	P	0.5
INTRODUCED ANNUAL & BIENNIAL FORBS				
Acosta diffusa	3.0	1.0(0.5)	1.5	2.5(0.5)
Alyssum minus	P	0.5	0.5	2.5
Camelina microcarpa		P		
Conyza canadensis				P
Lactuca serriola		P	P	P
Lepidium densiflorum		P		P
Neolepia campestre			P	
Noccaea montana		P		P
Plantago lanceolata		P		P
Podospermum laciniatum				P
Tragopogon dubius ssp. major	P	0.5	P	P
Verbascum blattaria		0.5	P	1.0
TOTAL INTRO. ANN. & BIEN. FORBS	3.0	2.5(0.5)	2.0	6.0(0.5)
NATIVE ANNUAL GRASSES				
Vulpia octoflora		P		
TOTAL NATIVE ANN. GRASSES	---	P	---	---
INTRODUCED ANNUAL GRASSES				
Bromus japonicus	P	1.5(0.5)	2.0	1.5(0.5)
TOTAL INTRO. ANN. GRASSES	P	1.5(0.5)	2.0	1.5(0.5)
NATIVE PERENNIAL FORBS				
Achillea lanulosa			P	(0.5)
Ambrosia psilostachya var. coronopifolia		P		
Antennaria rosea	0.5	P		P
Artemisia frigida	0.5	P		P
Artemisia ludoviciana	P		0.5	
Aster porteri	P	P		
Astragalus tridactylicus	P			
Castilleja sessiliflora	P	P		
Comandra umbellata ssp. pallida	P			
Dalea candida var. oligophylla	0.5			
Dalea purpurea	P	0.5		
Erigeron flagellaris	P	P		
Evolvulus nuttalianus	P			
Gaura coccinea	P	P	P	
Gutierrezia sarothrae	P	5.0	P	0.5(0.5)
Heterotheca villosa	1.0	P	(0.5)	P
Hymenopappus filifolius	P			
Ipomopsis spicata	P			
Lesquerella montana	P	P	P	
Liatris punctata	P	P	P	
Mertensia lanceolata		P		
Nothocalais cuspidata	P			
Oligosporus dracunculus ssp. glaucus	P			
Oxybaphus linearis		P		P
Oxytropis x sericea	P			
Paronychia jamesii	P			
Penstemon virens	0.5			
Psoralidium tenuiflorum	3.5	2.0	1.5	2.0
Ratibida columnifera	P	P	P	

Table 11. Cover Data – Spray Area, Tordon Post–Spray Study, Bldr City OS, CO – Aug 1997

PLANT SPECIES	Percent Foliar Cover* SAMPLE NUMBER 1	2	3	4
NATIVE PERENNIAL FORBS (concluded)				
Rumex triangulivalvis				P
Senecio integerrimus	P			
Solidago mollis	P			
Solidago simplex var. nana			P	
Sphaeralcea coccinea			P	P
Thelesperma megapotamicum			P	
Tithymalus brachyceras	P			
Townsendia exscapa	P			
Townsendia hookeri		P		
Virgulus falcatus	P	P	0.5	P
TOTAL NATIVE PERENNIAL FORBS	6.5	7.5	2.5(0.5)	2.5(1.0)
INTRODUCED PERENNIAL FORBS				
Cichorium intybus				P
Convolvulus arvensis	P		P	
Hypericum perforatum			P	
Taraxacum officinale	P	P	3.0	P
TOTAL INTRO. PERENNIAL FORBS	P	P	3.0	P
NATIVE PERENNIAL GRASSES (cool)				
Bromopsis porteri		(0.5)		
Carex pensylvanica ssp. heliophila	0.5	2.5	1.0	2.5(0.5)
Elymus elymoides	P			
Hesperostipa comata	P			
Juncus arcticus ssp. ater				P
Koeleria macrantha	4.5	2.5(0.5)	P	0.5
Nassella viridula	0.5			
Pascopyrum smithii	2.5	7.5	9.5(0.5)	10.5(3.0)
Poa agassizensis			2.0	5.5(1.0)
Poa compressa		P	P	0.5
TOTAL NATIVE PERENNIAL GRASSES (c)	8.0	12.5(1.0)	12.5(0.5)	19.5(4.5)
NATIVE PERENNIAL GRASSES (warm)				
Andropogon gerardii	0.5		P	
Aristida purpurea	1.0	P	P	
Bouteloua curtipendula	3.5	4.5	0.5	
Buchloe dactyloides	6.0(0.5)	P	12.0(1.0)	0.5
Chondrosum gracile	3.0	14.0(2.5)	5.5(1.5)	24.5(4.5)
Chondrosum hirsutum	P			
Muhlenbergia wrightii		P		
Schizachyrium scoparium	2.0			
TOTAL NATIVE PERENNIAL GRASSES (w)	16.0(0.5)	18.5(2.5)	18.0(2.5)	25.0(4.5)
NATIVE SHRUBS				
Yucca glauca	P			
TOTAL NATIVE SHRUBS	P	---	---	---
BRYOPHYTES				
Moss			0.5	
TOTAL BRYOPHYTES	---	---	0.5	---
LICHEN				
Lichen		P		P
Xanthoparmelia chlorochloa	P		P	
TOTAL LICHEN	P	P	P	P
SUCCULENT				
Coryphantha vivipara var. vivipara		P		
Opuntia macrorhiza	P	P	0.5	0.5(0.5)
TOTAL SUCCULENT	P	P	0.5	0.5(0.5)
MUSHROOMS				
Fungus		P	P	0.5
TOTAL MUSHROOMS	---	P	P	0.5

Table 11. Cover Data – Spray Area, Tordon Post–Spray Study, Bldr City OS, CO – Aug 1997

PLANT SPECIES	Percent Foliar Cover*			
	SAMPLE NUMBER			
	1	2	3	4
Standing dead		2.0	1.0	3.5
Litter	41.0	27.5	46.0	22.0
Bare soil	17.5	26.0	10.5	18.0
Rock	6.5	2.0	1.5	0.5
TOTALS	100	100	100	100
TOTAL VEGETATION COVER	35.0(0.5)	42.5(4.5)	41.0(3.5)	56.0(11.5)
GROUND COVER (Litter+Rock+Veg+St.Dead)	83(1)	74(5)	90(4)	82(12)
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 47.0 Std.Dev.= 7.9)	56	51	42	39

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

Table 12. Freq. Data – Control Area, Trans. 1, Tordon Post–Spray Study, Bldr City OS, CO – Aug 1997

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS											
Erigeron divergens	50.00			P				P	P	P	P
Grindelia squarrosa	60.00		P	P		P			P	P	P
Pterogonum alatum	10.00										P
Silene antirrhina	10.00									P	
TOTAL NATIVE ANN. & BIEN. FORBS	70.0	---	P	P	---	P	---	P	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS											
Acosta diffusa	100.00	P	P	P	P	P	P	P	P	P	P
Alyssum minus	70.00	P		P	P	P			P	P	P
Carduus nutans ssp. macrolepis	20.00					P			P		
Neolepia campestre	10.00					P					
TOTAL INTRO. ANN. & BIEN. FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED ANNUAL GRASSES											
Bromus japonicus	60.00				P	P		P	P	P	P
TOTAL INTRO. ANN. GRASSES	60.0	---	---	---	P	P	---	P	P	P	P
NATIVE PERENNIAL FORBS											
Ambrosia psilostachya var. coronopifolia	20.00									P	P
Artemisia frigida	70.00		P	P	P	P		P		P	P
Astragalus shortianus	10.00		P								
Gutierrezia sarothrae	50.00	P		P				P	P		P
Heterotheca villosa	30.00	P	P								P
Liatris punctata	20.00		P					P			
Oligosporus dracunculus ssp. glaucus	30.00	P					P	P			
Potentilla hippiana	30.00				P		P		P		
Psoralidium tenuiflorum	40.00	P	P							P	P
Sphaeralcea coccinea	40.00			P			P	P	P		
Virgulus falcatus	40.00		P	P		P				P	
TOTAL NATIVE PERENNIAL FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED PERENNIAL FORBS											
Convolvulus arvensis	20.00									P	P
Hypericum perforatum	50.00				P	P	P			P	P
Taraxacum officinale	50.00					P	P	P		P	P
TOTAL INTRO. PERENNIAL FORBS	60.0	---	---	---	P	P	P	P	---	P	P
NATIVE PERENNIAL GRASSES (cool)											
Pascopyrum smithii	100.00	P	P	P	P	P	P	P	P	P	P
Poa agassizensis	20.00			P		P					
Poa compressa	40.00			P				P	P	P	
TOTAL NATIVE PERENNIAL GRASSES (c)	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE PERENNIAL GRASSES (warm)											
Andropogon gerardii	20.00	P	P								
Aristida purpurea	20.00						P	P			
Buchloe dactyloides	100.00	P	P	P	P	P	P	P	P	P	P
Chondrosum gracile	60.00	P	P					P	P	P	P
TOTAL NATIVE PERENNIAL GRASSES (w)	100.0	P	P	P	P	P	P	P	P	P	P
SUCCULENT											
Echinocereus viridiflorus	50.00		P	P					P	P	P
Opuntia macrorhiza	70.00		P		P	P	P		P	P	P
TOTAL SUCCULENT	80.0	---	P	P	P	P	P	---	P	P	P
MUSHROOMS											
Fungus	10.00										P
TOTAL MUSHROOMS	10.0	---	---	---	---	---	---	---	---	---	P
SPECIES DENSITY (# of species/5 sq.m.) (AVERAGE= 13.8 Std.Dev.= 3.6)		10	14	13	9	14	10	14	15	19	20

*P=Present within 1m X 5m plot on right side (when standing at origin and facing the endpoint) of the cover transect.

Table 13. Freq. Data – Control Area, Trans. 2, Tordon Post–Spray Study, Bldr City OS, CO – Aug 1997

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS											
Grindelia squarrosa	20.00		P			P					
Oligosporus pacificus	10.00					P					
Plantago patagonica	20.00		P			P					
Pterogonum alatum	80.00	P		P	P	P	P	P	P		P
TOTAL NATIVE ANN. & BIEN. FORBS	90.0	P	P	P	P	P	P	P	P	---	P
INTRODUCED ANNUAL & BIENNIAL FORBS											
Acosta diffusa	80.00	P	P	P	P	P	P		P	P	
Alyssum minus	40.00	P	P	P		P					
Carduus nutans ssp. macrolepis	20.00		P			P					
Lepidium densiflorum	10.00		P								
Plantago lanceolata	10.00			P							
Tragopogon dubius ssp. major	10.00						P				
TOTAL INTRO. ANN. & BIEN. FORBS	80.0	P	P	P	P	P	P	---	P	P	---
INTRODUCED ANNUAL GRASSES											
Bromus japonicus	60.00	P	P		P	P	P	P			
TOTAL INTRO. ANN. GRASSES	60.0	P	P	---	P	P	P	P	---	---	---
NATIVE PERENNIAL FORBS											
Artemisia frigida	90.00	P	P	P	P		P	P	P	P	P
Artemisia ludoviciana	20.00				P	P					
Asclepias viridiflora	10.00										P
Aster porteri	70.00	P	P		P	P		P	P		P
Astragalus miser var. oblongifolius	30.00			P	P	P					
Castilleja sessiliflora	10.00			P							
Comandra umbellata ssp. pallida	30.00			P						P	P
Dalea purpurea	30.00				P					P	P
Eremogone fendleri	50.00					P		P	P	P	P
Erigeron flagellaris	60.00	P	P	P	P		P			P	
Gaillardia aristata	20.00								P		P
Gaura coccinea	40.00			P	P		P			P	
Gutierrezia sarothrae	60.00	P	P	P		P	P	P			
Helianthus pumilus	10.00										P
Heterotheca villosa	90.00	P	P	P		P	P	P	P	P	P
Ipomopsis aggregata	40.00			P					P	P	P
Lesquerella montana	80.00		P		P	P	P	P	P	P	P
Liatris punctata	100.00	P	P	P	P	P	P	P	P	P	P
Nothocalais cuspidata	20.00					P	P				
Oxytropis x sericea	20.00									P	P
Paronychia jamesii	60.00		P			P		P	P	P	P
Penstemon strictus	60.00				P	P		P	P	P	P
Psoralidium tenuiflorum	70.00	P			P		P	P	P	P	P
Ratibida columnifera	60.00	P		P	P	P	P			P	
Senecio integerrimus	10.00								P		
Sphaeralcea coccinea	20.00		P		P						
Townsendia hookeri	40.00			P	P		P		P		
Virgulus falcatus	20.00			P	P						
TOTAL NATIVE PERENNIAL FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED PERENNIAL FORBS											
Hypericum perforatum	10.00			P							
Linaria genistifolia ssp. dalmatica	10.00					P					
Taraxacum officinale	30.00	P		P				P			
TOTAL INTRO. PERENNIAL FORBS	40.0	P	---	P	---	P	---	P	---	---	---
NATIVE PERENNIAL GRASSES (cool)											
Carex pensylvanica ssp. heliophila	70.00				P	P	P	P	P	P	P
Hesperostipa comata	70.00				P	P	P	P	P	P	P
Koeleria macrantha	100.00	P	P	P	P	P	P	P	P	P	P
Pascopyrum smithii	70.00	P	P	P	P	P	P	P			
Poa compressa	10.00	P									
TOTAL NATIVE PERENNIAL GRASSES (c)	100.0	P	P	P	P	P	P	P	P	P	P

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
NATIVE PERENNIAL GRASSES (warm)											
Andropogon gerardii	30.00			P			P				P
Aristida purpurea	60.00	P			P			P	P	P	P
Bouteloua curtipendula	80.00			P	P	P	P	P	P	P	P
Buchloe dactyloides	20.00					P	P				
Chondrosum gracile	100.00	P	P	P	P	P	P	P	P	P	P
Chondrosum hirsutum	20.00									P	P
Schizachyrium scoparium	20.00									P	P
TOTAL NATIVE PERENNIAL GRASSES (w)	100.0	P	P	P	P	P	P	P	P	P	P
LICHEN											
Lichen	50.00					P	P		P	P	P
TOTAL LICHEN	50.0	---	---	---	---	P	P	---	P	P	P
SUCCULENT											
Coryphantha vivipara var. vivipara	20.00					P			P		
Opuntia macrorhiza	40.00	P	P	P			P				
TOTAL SUCCULENT	60.0	P	P	P	---	P	P	---	P	---	---
MUSHROOMS											
Fungus	10.00						P				
TOTAL MUSHROOMS	10.0	---	---	---	---	---	P	---	---	---	---
SPECIES DENSITY (# of species/5 sq.m.) (AVERAGE= 24.0 Std.Dev.= 3.5)		19	20	25	25	30	26	20	23	25	27

*P=Present within 1m X 5m plot on right side (when standing at origin and facing the endpoint) of the cover transect.

PLANT SPECIES	FREQUENCY (%)	PRESENCE* – SAMPLE NUMBER – 1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS											
Plantago patagonica	10.00	P									
Pterogonum alatum	80.00	P		P	P	P	P		P	P	P
TOTAL NATIVE ANN. & BIEN. FORBS	80.0	P	---	P	P	P	P	---	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS											
Acosta diffusa	80.00		P		P	P	P	P	P	P	P
Alyssum minus	40.00	P	P						P		P
Tragopogon dubius ssp. major	10.00				P						
TOTAL INTRO. ANN. & BIEN. FORBS	90.0	P	P	---	P	P	P	P	P	P	P
INTRODUCED ANNUAL GRASSES											
Bromus japonicus	10.00	P									
TOTAL INTRO. ANN. GRASSES	10.0	P	---	---	---	---	---	---	---	---	---
NATIVE PERENNIAL FORBS											
Antennaria rosea	20.00	P	P								
Artemisia frigida	50.00				P	P		P	P	P	
Aster porteri	10.00				P						
Astragalus tridactylicus	10.00										P
Castilleja sessiliflora	20.00				P						P
Comandra umbellata ssp. pallida	30.00				P					P	P
Dalea candida var. oligophylla	10.00						P				
Dalea purpurea	70.00		P		P		P	P	P	P	P
Erigeron flagellaris	20.00							P			P
Evolvulus nuttalianus	10.00										P
Gaura coccinea	30.00	P	P								P
Gutierrezia sarothrae	50.00			P			P		P	P	P
Heterotheca villosa	70.00	P	P	P	P	P		P	P		
Ipomopsis spicata	60.00			P	P	P		P		P	P
Lesquerella montana	30.00								P	P	P
Liatris punctata	90.00	P	P	P		P	P	P	P	P	P
Nothocalais cuspidata	20.00						P				P
Oxytropis x sericea	30.00					P				P	P
Paronychia jamesii	70.00		P	P	P		P	P		P	P
Psoralidium tenuiflorum	80.00		P	P	P	P	P	P	P		P
Ratibida columnifera	30.00			P	P					P	
Senecio integerrimus	30.00				P			P	P		
Solidago mollis	20.00			P	P						
Townsendia exscapa	80.00		P	P	P	P	P		P	P	P
Virgulus falcatus	30.00							P	P	P	
TOTAL NATIVE PERENNIAL FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED PERENNIAL FORBS											
Convolvulus arvensis	10.00										P
Taraxacum officinale	30.00						P			P	P
TOTAL INTRO. PERENNIAL FORBS	30.0	---	---	---	---	---	P	---	---	P	P
NATIVE PERENNIAL GRASSES (cool)											
Carex pensylvanica ssp. heliophila	60.00		P		P			P	P	P	P
Elymus elymoides	10.00		P								
Hesperostipa comata	10.00	P									
Koeleria macrantha	100.00	P	P	P	P	P	P	P	P	P	P
Nassella viridula	30.00						P	P			P
Pascopyrum smithii	50.00					P	P		P	P	P
TOTAL NATIVE PERENNIAL GRASSES (c)	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE PERENNIAL GRASSES (warm)											
Andropogon gerardii	30.00			P	P		P				
Aristida purpurea	90.00	P	P	P	P	P	P	P	P	P	
Bouteloua curtipendula	100.00	P	P	P	P	P	P	P	P	P	P
Buchloe dactyloides	60.00	P	P		P			P	P	P	
Chondrosum gracile	70.00		P			P	P	P	P	P	P
Chondrosum hirsutum	70.00	P	P	P	P		P	P	P		
Schizachyrium scoparium	60.00	P		P	P		P			P	P
TOTAL NATIVE PERENNIAL GRASSES (w)	100.0	P	P	P	P	P	P	P	P	P	P

Table 14. Freq. Data – Spray Area, Trans. 1, Tordon Post–Spray Study, Bldr City OS, CO – Aug 1997

PLANT SPECIES	FREQUENCY (%)	PRESENCE* – SAMPLE NUMBER – 1	2	3	4	5	6	7	8	9	10
NATIVE SHRUBS											
Yucca glauca	30.00					P		P		P	
TOTAL NATIVE SHRUBS	30.0	---	---	---	---	P	---	P	---	P	---
LICHEN											
Xanthoparmelia chlorochloa	40.00			P				P	P		P
TOTAL LICHEN	40.0	---	---	P	---	---	---	P	P	---	P
SPECIES DENSITY (# of species/5 sq.m.) (AVERAGE= 20.5 Std.Dev.= 4.5)		15	18	17	24	15	20	21	22	24	29

*P=Present within 1m X 5m plot on right side (when standing at origin and facing the endpoint) of the cover transect.

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS											
Erysimum asperum	10.00			P							
Grindelia squarrosa	30.00	P			P						P
Oligosporus pacificus	40.00			P			P		P	P	
Plantago patagonica	50.00		P	P			P		P		P
Pterogonum alatum	20.00			P					P		
Silene antirrhina	20.00		P				P				
TOTAL NATIVE ANN. & BIEN. FORBS	80.0	P	P	P	P	---	P	---	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS											
Acosta diffusa	90.00	P	P	P	P	P	P		P	P	P
Alyssum minus	50.00						P	P	P	P	P
Camelina microcarpa	20.00		P				P				
Lactuca serriola	10.00		P								
Lepidium densiflorum	10.00						P				
Noccaea montana	50.00		P	P		P			P		P
Plantago lanceolata	10.00	P									
Tragopogon dubius ssp. major	10.00					P					
Verbascum blattaria	20.00		P	P							
TOTAL INTRO. ANN. & BIEN. FORBS	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE ANNUAL GRASSES											
Vulpia octoflora	10.00			P							
TOTAL NATIVE ANN. GRASSES	10.0	---	---	P	---	---	---	---	---	---	---
INTRODUCED ANNUAL GRASSES											
Bromus japonicus	100.00	P	P	P	P	P	P	P	P	P	P
TOTAL INTRO. ANN. GRASSES	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE PERENNIAL FORBS											
Antennaria rosea	10.00					P					
Artemisia frigida	80.00	P	P		P	P	P	P	P	P	
Aster porteri	80.00	P	P	P	P	P	P			P	P
Castilleja sessiliflora	20.00					P			P		
Dalea purpurea	40.00	P		P	P	P					
Erigeron flagellaris	70.00	P	P	P	P	P		P		P	
Gaura coccinea	30.00		P	P			P				
Gutierrezia sarothrae	100.00	P	P	P	P	P	P	P	P	P	P
Heterotheca villosa	10.00				P						
Lesquerella montana	40.00	P	P						P	P	
Liatris punctata	60.00	P		P			P		P	P	P
Mertensia lanceolata	10.00		P								
Oxybaphus linearis	30.00			P					P		P
Psoralidium tenuiflorum	80.00	P		P	P	P	P	P	P		P
Ratibida columnifera	10.00										P
Townsendia hookeri	20.00				P						P
Virgulus falcatus	60.00	P			P		P	P		P	P
TOTAL NATIVE PERENNIAL FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED PERENNIAL FORBS											
Taraxacum officinale	80.00	P	P		P	P	P	P	P	P	
TOTAL INTRO. PERENNIAL FORBS	80.0	P	P	---	P	P	P	P	P	P	---
NATIVE PERENNIAL GRASSES (cool)											
Carex pensylvanica ssp. heliophila	80.00	P	P	P	P		P	P		P	P
Koeleria macrantha	100.00	P	P	P	P	P	P	P	P	P	P
Pascopyrum smithii	100.00	P	P	P	P	P	P	P	P	P	P
Poa compressa	10.00			P							
TOTAL NATIVE PERENNIAL GRASSES (c)	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE PERENNIAL GRASSES (warm)											
Aristida purpurea	30.00							P		P	P
Bouteloua curtipendula	90.00	P		P	P	P	P	P	P	P	P
Buchloe dactyloides	20.00				P			P			
Chondrosum gracile	100.00	P	P	P	P	P	P	P	P	P	P
TOTAL NATIVE PERENNIAL GRASSES (w)	100.0	P	P	P	P	P	P	P	P	P	P

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
LICHEN											
Lichen	60.00		P	P	P	P	P		P		
TOTAL LICHEN	60.0	---	P	P	P	P	P	---	P	---	---
SUCCULENT											
Coryphantha vivipara var. vivipara	20.00	P					P				
Opuntia macrorhiza	40.00	P				P	P				P
TOTAL SUCCULENT	40.0	P	---	---	---	P	P	---	---	---	P
MUSHROOMS											
Fungus	20.00	P						P			
TOTAL MUSHROOMS	20.0	P	---	---	---	---	---	P	---	---	---
SPECIES DENSITY (# of species/5 sq.m.) (AVERAGE= 20.5 Std.Dev.= 2.5)		22	21	24	20	19	24	16	20	18	21

*P=Present within 1m X 5m plot on right side (when standing at origin and facing the endpoint) of the cover transect.

Table 16. Freq. Data – Spray Area, Trans. 3, Tordon Post–Spray Study, Bldr City OS, CO – Aug 1997

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS											
Erigeron divergens	60.00			P	P	P			P	P	P
Hedeoma hispidum	10.00										P
Plantago patagonica	80.00	P	P			P	P	P	P	P	P
Silene antirrhina	100.00	P	P	P	P	P	P	P	P	P	P
TOTAL NATIVE ANN. & BIEN. FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS											
Acosta diffusa	100.00	P	P	P	P	P	P	P	P	P	P
Alyssum minus	100.00	P	P	P	P	P	P	P	P	P	P
Neolepia campestre	40.00				P	P			P		P
Tragopogon dubius ssp. major	30.00	P			P						P
TOTAL INTRO. ANN. & BIEN. FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED ANNUAL GRASSES											
Bromus japonicus	100.00	P	P	P	P	P	P	P	P	P	P
TOTAL INTRO. ANN. GRASSES	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE PERENNIAL FORBS											
Artemisia ludoviciana	20.00	P	P								
Gaura coccinea	10.00	P									
Gutierrezia sarothrae	70.00		P	P	P		P		P	P	P
Heterotheca villosa	30.00							P	P		P
Lesquerella montana	30.00			P	P					P	
Liatris punctata	10.00		P								
Psoralidium tenuiflorum	90.00	P	P	P		P	P	P	P	P	P
Ratibida columnifera	20.00			P	P						
Solidago simplex var. nana	20.00						P	P			
Sphaeralcea coccinea	50.00			P	P	P	P				P
Virgulus falcatus	100.00	P	P	P	P	P	P	P	P	P	P
TOTAL NATIVE PERENNIAL FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED PERENNIAL FORBS											
Hypericum perforatum	20.00				P				P		
Taraxacum officinale	40.00	P		P					P	P	
TOTAL INTRO. PERENNIAL FORBS	50.0	P	---	P	P	---	---	---	P	P	---
NATIVE PERENNIAL GRASSES (cool)											
Carex pensylvanica ssp. heliophila	10.00	P									
Koeleria macrantha	80.00	P	P		P		P	P	P	P	P
Pascopyrum smithii	100.00	P	P	P	P	P	P	P	P	P	P
Poa agassizensis	40.00		P	P		P				P	
Poa compressa	40.00		P	P	P			P			
TOTAL NATIVE PERENNIAL GRASSES (c)	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE PERENNIAL GRASSES (warm)											
Andropogon gerardii	10.00	P									
Aristida purpurea	10.00				P						
Bouteloua curtipendula	40.00	P		P	P				P		
Buchloe dactyloides	80.00		P	P	P	P	P	P		P	P
Chondrosum gracile	100.00	P	P	P	P	P	P	P	P	P	P
TOTAL NATIVE PERENNIAL GRASSES (w)	100.0	P	P	P	P	P	P	P	P	P	P
BRYOPHYTES											
Moss	20.00					P	P				
TOTAL BRYOPHYTES	20.0	---	---	---	---	P	P	---	---	---	---
LICHEN											
Xanthoparmelia chlorochloa	20.00					P		P			
TOTAL LICHEN	20.0	---	---	---	---	P	---	P	---	---	---
SUCCULENT											
Opuntia macrorhiza	10.00		P								
TOTAL SUCCULENT	10.0	---	P	---	---	---	---	---	---	---	---

PLANT SPECIES	FREQUENCY (%)	PRESENCE* ----- SAMPLE NUMBER ----- 1	2	3	4	5	6	7	8	9	10
MUSHROOMS											
Fungus	10.00					P					
TOTAL MUSHROOMS	10.0	---	---	---	---	P	---	---	---	---	---
SPECIES DENSITY (# of species/5 sq.m.) (AVERAGE= 17.0 Std.Dev.= 1.5)		17	17	18	20	17	15	15	17	16	18

*P=Present within 1m X 5m plot on right side (when standing at origin and facing the endpoint) of the cover transect.

Table 17. Freq. Data – Spray Area, Trans. 4, Tordon Post–Spray Study, Bldr City OS, CO – Aug 1997

PLANT SPECIES	FREQUENCY (%)	PRESENCE* – SAMPLE NUMBER – 1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS											
Erigeron divergens	40.00		P	P			P				P
Grindelia squarrosa	40.00				P	P	P		P		
Plantago patagonica	30.00							P	P		P
Silene antirrhina	20.00				P				P		
TOTAL NATIVE ANN. & BIEN. FORBS	80.0	---	P	P	P	P	P	P	P	---	P
INTRODUCED ANNUAL & BIENNIAL FORBS											
Acosta diffusa	100.00	P	P	P	P	P	P	P	P	P	P
Alyssum minus	90.00	P	P	P	P	P		P	P	P	P
Lactuca serriola	30.00				P	P	P				
Lepidium densiflorum	10.00		P								
Podospermum laciniatum	40.00	P	P				P		P		
Tragopogon dubius ssp. major	20.00	P					P				
Verbascum blattaria	60.00		P		P	P		P	P		P
TOTAL INTRO. ANN. & BIEN. FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED ANNUAL GRASSES											
Bromus japonicus	80.00	P		P	P	P	P		P	P	P
TOTAL INTRO. ANN. GRASSES	80.0	P	---	P	P	P	P	---	P	P	P
NATIVE PERENNIAL FORBS											
Achillea lanulosa	30.00		P		P					P	
Artemisia frigida	10.00	P									
Gutierrezia sarothrae	50.00	P	P	P	P						P
Heterotheca villosa	30.00	P	P								P
Oxybaphus linearis	10.00									P	
Psoralidium tenuiflorum	60.00	P	P	P			P	P			P
Rumex triangulivalvis	10.00					P					
Sphaeralcea coccinea	30.00	P		P						P	
Virgulus falcatus	70.00	P		P	P		P		P	P	P
TOTAL NATIVE PERENNIAL FORBS	100.0	P	P	P	P	P	P	P	P	P	P
INTRODUCED PERENNIAL FORBS											
Cichorium intybus	10.00							P			
Taraxacum officinale	60.00	P	P	P	P	P				P	
TOTAL INTRO. PERENNIAL FORBS	70.0	P	P	P	P	P	---	P	---	P	---
NATIVE PERENNIAL GRASSES (cool)											
Carex pensylvanica ssp. heliophila	80.00	P	P	P	P			P	P	P	P
Juncus arcticus ssp. ater	20.00				P			P			
Koeleria macrantha	50.00		P	P		P			P	P	
Pascopyrum smithii	100.00	P	P	P	P	P	P	P	P	P	P
Poa agassizensis	30.00			P	P	P					
TOTAL NATIVE PERENNIAL GRASSES (c)	100.0	P	P	P	P	P	P	P	P	P	P
NATIVE PERENNIAL GRASSES (warm)											
Buchloe dactyloides	80.00	P	P	P	P		P	P	P		P
Chondrosum gracile	90.00	P	P	P	P		P	P	P	P	P
TOTAL NATIVE PERENNIAL GRASSES (w)	90.0	P	P	P	P	---	P	P	P	P	P
LICHEN											
Lichen	20.00								P		P
TOTAL LICHEN	20.0	---	---	---	---	---	---	---	P	---	P
SUCCULENT											
Opuntia macrorhiza	60.00	P	P			P	P		P	P	
TOTAL SUCCULENT	60.0	P	P	---	---	P	P	---	P	P	---
MUSHROOMS											
Fungus	40.00					P		P	P		P
TOTAL MUSHROOMS	40.0	---	---	---	---	P	---	P	P	---	P
SPECIES DENSITY (# of species/5 sq.m.) (AVERAGE= 15.0 Std.Dev.= 2.1)		17	17	15	17	13	13	12	17	13	16

*P=Present within 1m X 5m plot on right side (when standing at origin and facing the endpoint) of the cover transect.

Table 18. Knapweed (*Acosta diffusa*) Density, Tordon Post-Spray Study, Bldr City OS - August 1997

			Subplot Number # individuals/sq. m.									
	AVERAGE	MAXIMUM	1	2	3	4	5	6	7	8	9	10
C1 BOLT	17.7	39	26	33	19	39	13	14	14	10	6	3
C1 ROSETTE	22.4	92	27	32	92	46	8	5	3	3	5	3
C1 DEAD	0.0	0	0	0	0	0	0	0	0	0	0	0
C2 BOLT	1.6	11	11	5	0	0	0	0	0	0	0	0
C2 ROSETTE	2.4	9	9	8	5	1	0	0	0	0	0	1
C2 DEAD	0.0	0	0	0	0	0	0	0	0	0	0	0
S1 BOLT	2.4	16	0	0	0	4	1	0	0	2	16	1
S1 ROSETTE	7.3	52	0	0	0	2	0	0	1	6	52	12
S1 DEAD	0.0	0	0	0	0	0	0	0	0	0	0	0
S2 BOLT	1.2	9	1	1	1	0	9	0	0	0	0	0
S2 ROSETTE	7.1	21	3	2	3	21	16		6	4	2	
S2 DEAD	0.0	0	0	0	0	0	0	0	0	0	0	0
S3 BOLT	1.5	11	1	1	11	2	0	0	0	0	0	0
S3 ROSETTE	24.9	55	17	12	44	48	19	0	36	13	5	55
S3 DEAD	0.0	0	0	0	0	0	0	0	0	0	0	0
S4 BOLT	3.9	22	3	22	6	0	0	0	4	0	1	3
S4 ROSETTE	11.7	70	10	70	20	0	2	3	4	4	1	3
S4 DEAD	0.1	1	0	0	0	0	0	0	1	0	0	0

Table 19. Relative Cover by Lifeform, Tordon Post-Spray Study, Blouder City Open Space - June and August 1997

	Sample Number												
LIFEFORM	C1Jun	C1Aug	C2Jun	C2Aug	S1Jun	S1Aug	S2Jun	S2Aug	S3Jun	S3Aug	S4Jun	S4Aug	% Relative Cover (All Hits)
Nat. Ann. & Bien. Forbs	2					4.2	1		4		1	0.7	
Int. Ann. & Bien. Forbs	64.7	64.1	4.8		4	8.5	4	6.4	9	4.5	18	9.6	
Int. Ann. Grass	4.9	1.4					5	4.3	14	4.5	12	3	
Nat. Per. Forb	7.8	2.8	24.8	25.3	27	18.3	27	16	9	6.7	1	5.2	
Int. Per. Forb	2	2.8					1		1	6.7			
Nat. Per. Grass (c)	2.9	1.4	44.8	34.7	37	22.5	30	28.7	27	29.2	55	35.6	
Int. Per. Grass (c)													
Nat. Per. Grass (w)	15.7	27.5	24.8	40	30	46.5	32	44.7	36	46.1	13	43.7	
Native Subshrubs													
Native Shrubs													
Other			1		1					2.2		2.2	

Table 20. Species Density by Lifeform, Tordon Post-Spray Study, Boulder City Open Space - June and August 1997

	Sample Number											
LIFEFORM	C1Jun	C1Aug	C2Jun	C2Aug	S1Jun	S1Aug	S2Jun	S2Aug	S3Jun	S3Aug	S4Jun	S4Aug
Nat. Ann. & Bien. Forbs	4	4	5	4	5	4	5	7	6	5	8	5
Int. Ann. & Bien. Forbs	8	6	7	6	4	3	8	9	9	6	10	10
Native Ann. Grass	1						1	1	2		2	
Int. Ann. Grass	2	1	1	1	1	1	1	1	1	1	2	1
Nat. Per. Forb	14	11	35	28	32	30	24	18	19	13	18	10
Int. Per. Forb	3	3	2	4	1	2	1	1	3	3	1	
Nat. Per. Grass (c)	4	3	7	5	6	6	5	5	5	5	6	6
Int. Per. Grass (c)											1	
Nat. Per. Grass (w)	4	4	7	7	7	7	4	5	7	5	2	2
Native Subshrubs												
Int. Subshrubs												
Native Shrubs					1	1						
Other	2	3	1	4	2	2	1	4	1	4	3	3

#of Species/100 sq. m.

Table 21. Species Present – Tordon Post–Spray Study, Boulder City Open Space, CO – June and August 1997

LATIN NAME	COMMON NAME	Sample Number C1Jun	C1Aug	C2Jun	C2Aug	S1Jun	S1Aug	S2Jun	S2Aug	S3Jun	S3Aug	S4Jun	S4Aug
NATIVE ANNUAL & BIENNIAL FORBS													
Androsace occidentalis	WESTERN ROCKJASMINE									X		X	
Cirsium undulatum	WAVYLEAF THISTLE					X	X						
Collomia linearis	LINEARLEAF COLLOMIA									X		X	
Descurainia pinnata	PINNATE TANSYMUSTARD											X	
Draba reptans	WHITLOWWORT			X				X		X		X	
Erigeron divergens	SPREADING FLEABANE	X	X			X	X		X		X	X	X
Erysimum asperum	WALLFLOWER			X		X		X	X				
Grindelia squarrosa	GUMWEED	X	X	X	X			X	X		X		X
Hedeoma hispidum	ROUGH FALSEPENNYROYAL									X	X	X	
Oligosporus pacificus	SAGEWORT				X				X				X
Plantago patagonica	WOOLLY PLANTAIN	X		X	X	X	X	X	X	X	X	X	X
Pterogonum alatum	WINGED BUCKWHEAT		X	X	X	X	X		X				
Silene antirrhina	SLEEPY CATCHFLY	X	X					X	X	X	X	X	X
INTRODUCED ANNUAL & BIENNIAL FORBS													
Acosta diffusa	TUMBLE KNAPWEED	X	X	X	X	X	X	X	X	X	X	X	X
Alyssum minus	ALYSSUM	X	X	X	X	X	X	X	X	X	X	X	X
Camelina microcarpa	LITTLEPOD FALSEFLAX			X		X		X	X	X		X	
Carduus nutans ssp. macrolepis	MUSK THISTLE	X	X	X	X								
Conyza canadensis	HORSEWEED												X
Erodium cicutarium	FILAREE	X										X	
Lactuca serriola	PRICKLY LETTUCE					X		X	X	X	X	X	X
Lepidium densiflorum	DENSEFLOWER PEPPERWEED			X	X			X	X	X		X	X
Neolepia campestre	FIELD PEPPERWEED	X	X								X	X	
Noccaea montana	MOUNTAIN CANDYTUFT							X	X	X			X
Plantago lanceolata	BUCKHORN PLAINTAIN	X	X		X			X	X			X	X
Podospermum laciniatum	FALSE SALSIFY	X		X				X		X			X
Tragopogon dubius ssp. major	SALSIFY	X		X	X		X		X	X	X	X	X
Verbascum blattaria	MOTH MULLEIN		X						X	X	X	X	X
NATIVE ANNUAL GRASSES													
Critesion pusillum	LITTLE BARLEY									X		X	
Vulpia octoflora	SIX–WEEKS FESCUE	X						X	X	X		X	
INTRODUCED ANNUAL GRASSES													
Anisantha tectorum	CHEATGRASS	X										X	
Bromus japonicus	JAPANESE BROME	X	X	X	X	X	X	X	X	X	X	X	X
NATIVE PERENNIAL FORBS													
Achillea lanulosa	WESTERN YARROW	X						X		X	X	X	X
Agoseris glauca	FALSE DANDELION	X										X	
Allium textile	PRAIRIE ONION					X		X					
Ambrosia psilostachya var. coronopifolia	RAGWEED	X	X						X				
Antennaria rosea	ROSE PUSSYTOES					X	X	X	X				X

Table 21. Species Present – Tordon Post–Spray Study, Boulder City Open Space, CO – June and August 1997

LATIN NAME	COMMON NAME	Sample Number C1Jun	C1Aug	C2Jun	C2Aug	S1Jun	S1Aug	S2Jun	S2Aug	S3Jun	S3Aug	S4Jun	S4Aug
NATIVE PERENNIAL FORBS (continued)													
Aphyllon fasciculatum	PURPLE BROOMRAPE	X											
Arnica fulgens	ARNICA											X	
Artemisia frigida	FRINGED SAGE	X	X	X	X	X	X	X	X			X	X
Artemisia ludoviciana	PASTURE SAGE			X	X	X	X			X	X		
Asclepias viridiflora	MILKWEED				X								
Aster porteri	PORTER ASTER			X	X		X	X	X	X			
Astragalus agrestis	FIELD MILKVETCH			X		X				X			
Astragalus miser var. oblongifolius	WEEDY MILKVETCH				X								
Astragalus shortianus	MILK VETCH		X										
Astragalus tridactylicus	MILK VETCH					X	X						
Castilleja sessiliflora	LARGEFLOWERED PAINTBRUSH			X	X	X	X	X	X	X			
Comandra umbellata ssp. pallida	BASTARD TOADFLAX			X	X	X	X			X			
Dalea candida var. oligophylla	WHITE DALEA					X	X	X					
Dalea purpurea	DALEA			X	X	X	X	X	X	X			
Drymocallis fissa	BIGFLOWER CINQUEFOIL	X											
Eremogone fendleri	DESERT SANDWORT			X	X								
Erigeron flagellaris	WHIPLASH FLEABANE			X	X	X	X	X	X	X			
Evolvulus nuttalianus	NUTTALL'S EVOLVULUS						X						
Gaillardia aristata	BLANKET–FLOWER			X	X								
Gastrolychnis drummondii	DRUMMOND CAMPION									X			
Gaura coccinea	GAURA			X	X	X	X	X	X	X	X	X	
Gutierrezia sarothrae	SNAKEWEED	X	X	X	X	X	X	X	X	X	X	X	X
Helianthus pumilus	SUNFLOWER			X	X								
Heterotheca fulcrata	GOLDEN ASTER			X		X							
Heterotheca villosa	GOLDEN ASTER	X	X	X	X	X	X	X	X	X	X	X	X
Hymenopappus filifolius	HYMENOPAPPUS			X		X	X						
Ipomopsis aggregata	SCARLET GILIA				X								
Ipomopsis spicata	SPIKE GILIA			X			X						
Lesquerella montana	BLADDERPOD			X	X	X	X	X	X		X		
Leucocrinum montanum	SAND LILY					X				X			
Liatris punctata	GAYFEATHER	X	X	X	X	X	X	X	X		X		
Lithospermum ruderale	WAYSIDE GROMWELL			X									
Lomatium orientale	BISCUITROOT					X							
Mertensia lanceolata	BLUEBELLS			X					X				
Musineon divaricatum	MUSINEOM			X				X		X			
Nothocalais cuspidata	FALSE DANDELION			X	X	X	X						
Oenothera villosa	EVENING–PRIMROSE							X					
Oligosporus dracunculus ssp. glaucus	WILD TARRAGON	X	X				X	X				X	
Oxybaphus linearis	UMBRELLAWORT			X				X	X			X	X
Oxytropis x sericea	LOCO HYBRID			X	X	X	X						
Paronychia jamesii	NAILWORT			X	X	X	X						
Penstemon spp.	BEARD–TONGUE					X							
Penstemon strictus	ROCKY MOUNTAIN PENSTEMON			X	X								
Penstemon virens	GREEN BEARD–TONGUE						X						

Table 21. Species Present – Tordon Post–Spray Study, Boulder City Open Space, CO – June and August 1997

LATIN NAME	COMMON NAME	Sample Number C1Jun	C1Aug	C2Jun	C2Aug	S1Jun	S1Aug	S2Jun	S2Aug	S3Jun	S3Aug	S4Jun	S4Aug
NATIVE PERENNIAL FORBS (cocluded)													
Potentilla hippiana	HORSE CINQUEFOIL		X										
Psoralidium tenuiflorum	SCURFPEA	X	X	X	X	X	X	X	X	X	X	X	X
Ratibida columnifera	PRAIRIE CONEFLOWER			X	X	X	X		X	X	X		
Rumex triangulivalvis	WILLOW DOCK												X
Senecio integerrimus	LAMBSTONGUE GROUNDSEL			X	X	X	X	X				X	
Solidago mollis	VELVETY GOLDENROD						X						
Solidago nana	DWARF GOLDENROD											X	
Solidago simplex var. nana	DWARF GOLDENROD					X					X		
Sphaeralcea coccinea	COPPER MALLOW	X	X	X	X			X		X	X	X	X
Stachys palustris ssp. pilosa	HEDGE–NETTLE											X	
Thelesperma megapotamicum	THELESPERMA										X		
Tithymalus brachyceras	SPURGE			X		X	X			X			
Townsendia exscapa	STEMLESS TOWNSENDIA			X		X	X						
Townsendia hookeri	HOOKER'S EASTER DAISY				X			X	X				
Tradescantia occidentalis	SPIDERWORT											X	
Vicia americana	AMERICAN VETCH											X	
Viola nuttallii	YELLOW PRAIRIE VIOLET			X		X		X				X	
Virgulaster ascendens	PACIFIC ASTER	X											
Virgulus falcatus	FALCATE ASTER	X	X	X	X	X	X	X	X	X	X	X	X
INTRODUCED PERENNIAL FORBS													
Cichorium intybus	CHICORY												X
Convolvulus arvensis	BINDWEED	X	X				X			X	X		
Hypericum perforatum	KLAMATH WEED	X	X	X	X					X	X		
Linaria genistifolia ssp. dalmatica	DALMATION TOADFLAX				X								
Taraxacum officinale	DANDELION	X	X	X	X	X	X	X	X	X	X	X	X
Verbena bracteata	VERVAIN				X								
NATIVE PERENNIAL GRASSES (cool)													
Bromopsis porteri	NODDING BROME								X				
Carex pensylvanica ssp. heliophila	SUN SEDGE			X	X	X	X	X	X	X	X	X	X
Elymus elymoides	BOTTLEBRUSH SQUIRRELTAIL						X						
Elymus longifolius	BOTTLEBRUSH SQUIRRELTAIL	X		X		X							
Hesperostipa comata	NEEDLE–AND–THREAD			X	X	X	X						
Juncus arcticus ssp. ater	BALTIC RUSH												X
Juncus interior	RUSH											X	
Koeleria macrantha	JUNEGRASS			X	X	X	X	X	X	X	X	X	X
Nassella viridula	GREEN NEEDLEGRASS					X	X						
Pascopyrum smithii	WESTERN WHEATGRASS	X	X	X	X	X	X	X	X	X	X	X	X
Poa agassizensis	AGASSIZ BLUEGRASS	X	X							X	X	X	X
Poa compressa	CANADA BLUEGRASS	X	X	X	X			X	X	X	X	X	X
Poa secunda	SANDBERG BLUEGRASS			X				X					

Table 21. Species Present – Tordon Post–Spray Study, Boulder City Open Space, CO – June and August 1997

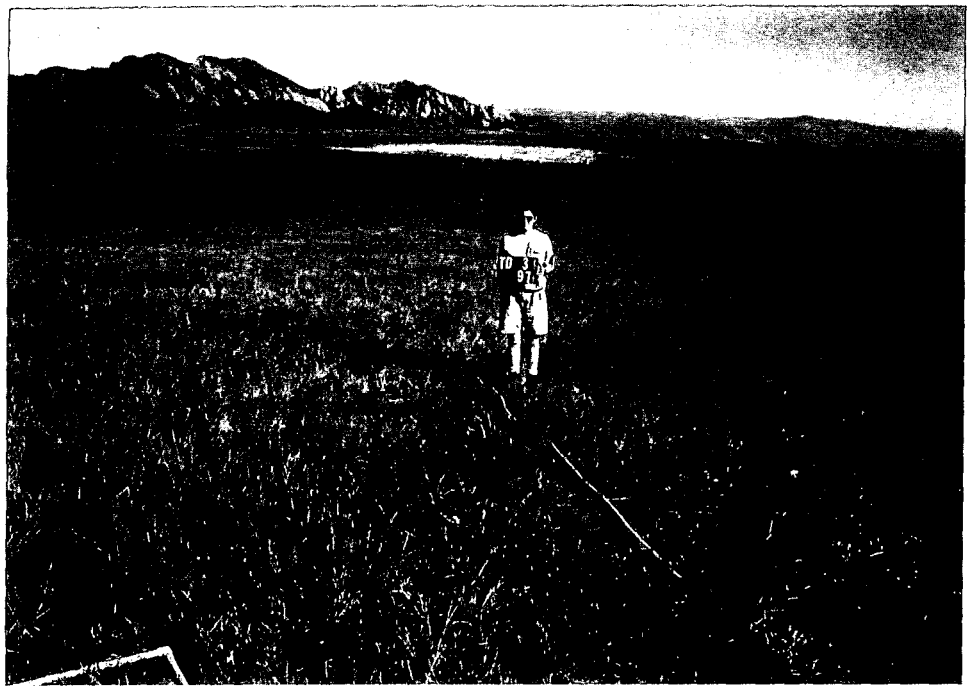
LATIN NAME	COMMON NAME	Sample Number C1Jun	C1Aug	C2Jun	C2Aug	S1Jun	S1Aug	S2Jun	S2Aug	S3Jun	S3Aug	S4Jun	S4Aug
INTRODUCED PERENNIAL GRASSES (cool)													
Dactylis glomerata	ORCHARD GRASS											X	
NATIVE PERENNIAL GRASSES (warm)													
Andropogon gerardii	BIG BLUESTEM, TURKEYFOOT	X	X	X	X	X	X			X	X		
Aristida purpurea	THREE–AWN	X	X	X	X	X	X	X	X	X	X		
Bouteloua curtipendula	SIDEOATS GRAMA			X	X	X	X	X	X	X	X		
Buchloe dactyloides	BUFFALOGRASS	X	X	X	X	X	X	X	X	X	X	X	X
Chondrosum gracile	BLUE GRAMA GRASS	X	X	X	X	X	X	X	X	X	X	X	X
Chondrosum hirsutum	HAIRY GRAMA			X	X	X	X						
Muhlenbergia wrightii	SPIKE MUHLY								X				
Schizachyrium scoparium	LITTLE BLUESTEM			X	X	X	X			X			
Sporobolus asper	DROPSEED									X			
NATIVE SHRUBS													
Yucca glauca	SPANISH BAYONET					X	X						
BRYOPHYTES													
Moss	MOSS										X		
LICHEN													
Lichen	LICHEN				X				X				X
Xanthoparmelia chlorochloa	LICHEN					X	X				X	X	
SUCCULENT													
Coryphantha vivipara var. vivipara	NIPPLE CACTUS				X				X				
Echinocereus viridiflorus	HEN–AND–CHICKENS	X	X										
Opuntia fragilis	BRITTLE CACTUS											X	
Opuntia macrorhiza	PRICKLEY–PEAR CACTUS	X	X	X	X	X	X	X	X	X	X	X	X
MUSHROOMS													
Fungus	MUSHROOM		X		X				X		X		X

Photograph 1. Tordon Control, Transect 1, June 1997

Photograph 2. Tordon Control, Transect 2, June 1997

Photograph 3. Tordon Spray, Transect 1, June 1997

Photograph 4. Tordon Spray, Transect 2, June 1997



Photograph 5. Tordon Spray, Transect 3, June 1997

Photograph 6. Tordon Spray, Transect 4, June 1997

Photograph 1. Tordon Spray, Transect 1, August 1997

Photograph 2. Tordon Spray, Transect 2, August 1997

Photograph 3. Tordon Spray, Transect 3, August 1997

Photograph 4. Tordon Spray, Transect 4, August 1997

Photograph 5. Tordon Control, Transect 1, August 1997

Photograph 6. Tordon Control, Transect 2, August 1997