Eldorado Fire at Walker Ranch
Vegetation Reestablishment Monitoring
Boulder, County
Colorado

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Abstract

This study quantitatively monitors the recovery of vegetation at locations that were permanently marked and photographed to allow long-term repeated analysis. The purpose of this study was to provide a baseline data set that would quantitatively describe current conditions and could be used for monitoring change in coming years. No attempt was made to compare current vegetation with pre-fire vegetation since no quantitative data were collected prior to the fire. Evaluation of reclamation treatment effectiveness was also beyond the scope of this study since statistically adequate sampling would require a much larger sample size that would include the presence of controls. Controls would require that areas in needed of treatment, not be treated. A complete evaluation of the effectiveness of reclamation would also require a more exact assessment of the vegetation response to burn intensity as well as pre-fire vegetation conditions. Cost analysis would also be a critically important part of a complete analysis of the effectiveness of reclamation methods.

Sites were subjectively selected based primarily on post-burn treatments in addition to variation in topography and burn intensity. The vegetation cover data were collected with a point-intercept scope that allows the integration of forest canopy cover data with ground cover data by allowing a single sample point to be projected both upward and downward. This methodology allowed the incorporation of the cover currently provided by standing dead trees as well as the future incorporation of changes in forest canopy as the tree species become reestablished. The data were also recorded in a manner that allows tree understory to be distinguished from ground cover in areas between trees.

Species composition and species dominance were measured using a combination of a 100 square meter plot for species density, and point-intercept sampling (100 sample points) on a 50-meter transect to quantify species dominance. This same methodology is currently used by Boulder City Open Space to monitor tall grass prairie and prairie dog habitat, and by Boulder County at the Doniphan Property prairie dog town revegetation experiment.

The recovery of these burned areas needed to be monitored in order to answer the following questions:

1. How well did the erosion control and seeding work?,

The purpose of erosion control is to minimize rill and gully formation. This can best be accomplished by minimizing the amount of bare ground exposed to raindrop impacts and overland sheet flow. The average bare soil in the 16 burned samples was 36% (s.d.= 9%) with a range of 16% to 54%. The two unburned sites had 33% and 1% bare soil. The average vegetation cover for the burned samples was 30% (s.d.=6%) with a range of 21% to 39%. Past experience using the Revised Universal Soil Loss Equation RUSLE has indicated that when all other factors are held constant, a vegetation cover of about 30% results in the greatest proportional reduction in erosion.

The classification subgroup that most consistently received seeding had an average vegetation cover of 27%. Of this total vegetation cover, about 13% was primarily provided by the reclamation species

that provided a significant increase in ground cover. However, considering the predominant success of the introduced and non-local native species, the question should be asked whether or not it would be more reasonable to simply increase ground cover by 13% using persistent mulch and allow natives to recover.

2. Which reclamation species did best?,
Within the classification subgroup that most consistently received seeding (Group B), mountain brome (*Ceratochloa carinata*) provide an average of 5.4%, slender wheatgrass (*Elymus trachycaulus*) provided about 5.4%, regreen *(Triticum aestivum x Elytrigia elongata*) provided about 1%, and blue grama (*Chondrosum gracile*) provided about 0.8% cover.

3. Which reclamation species were not successful?,
Blue grama and regreen did not seem to provide significant cover over the two-year period since the fire (See question two above).

4. How well did the natives recover on their own?
Within the classification subgroup that was severely burned, was not reseeded, and received only contour log installation (Group A), the average vegetation cover was 37% (s.d. = 2%, n = 3)) with a range of 35% to 39%.

5. Are noxious weeds becoming a problem, and if so which species?
It is not possible to know if weeds are decreasing or increasing with only one field season of data. With the exception of the introduced species included in the seed mix, the predominant weedy species are mullein (*Verbascum thapsus*), Jim hill mustard (*Sisymbrium altissimum*), alyssum (*Alyssum minus*) and cheatgrass (*Anisantha tectorum*). Although introduced species have the potential to be aggressive or noxious weeds, they do not currently dominate the vegetation but do have cover values in the burn sites (sites 1-16) that average 10% (s.d. 7.4%) and range from 28% to 0.2%. When these cover values are compared to the total vegetation cover at the sample locations, the relative cover of the introduced species averages 28% (s.d. 20%) and range from 76% to 0.4%. One interesting weed that occurred here, but is not common elsewhere, is tobacco weed (*Nicotiana attenuata*).

6. What is the current risk of erosion due to bare soil?
Based on a subjective assessment that includes familiarity with the RUSLE annual erosion prediction model, the risk is relatively low. Vegetation cover averages 30% in the burn areas, and overall ground cover (includes vegetation, litter, rock and standing dead vegetation) averages 54% (s.d. = 10%, n = 16) with a range of 39% to 75%.

Introduction

The Eldorado fire at Walker Ranch produced areas with variable impacts related to vegetation damage and soil exposure. Intensive reclamation efforts of selected areas have helped to reduce the risk of severe erosion and the introduction of non-native noxious weedy species. At the same time there is a risk that disturbance activities related to reclamation, including the use of introduced species in the reclamation mix, may have negative effects on long-term native vegetation recovery. This baseline of the current (2002) conditions is an essential component of "adaptive management". The actual success or failure of these reclamation methods related to vegetation establishment and reduction of erodible bare soil was not previously monitored.

Adaptive management necessitates a critical review of management actions in order to refine and adjust management practices based on actual results. The purpose of this study was to establish vegetation monitoring sites that will provide long-term quantitative data on vegetation establishment and relate the results to environmental conditions such as slope, aspect, climate, severity of burn, and post-burn treatment. Results include sample specific summary of vegetation conditions, classification of all samples based on vegetation characteristics, and ordination of all samples in the environmental/treatment gradient to allow some assessment of results based on site conditions and treatment.

This study was not designed to provide statistical assessment of success or failure of the reclamation methods. The hypothesis testing that statistical assessment requires, mandates an intensive sampling methodology that must include sample adequacy determination, and untreated controls. The current study utilizes numerical analysis techniques to determine trends that point the way for future hypothesis testing if that is ultimately desired. As stated in the original proposal the following questions were addressed.

The recovery of these burned areas needs to be monitored to answer such questions as:
1. How well did the erosion control and seeding work?,
2. Which species did best?,
3. Which were not successful?,
4. How well did the natives recover on their own?,
5. Are weeds becoming a problem, and if so which species?,
6. What is the current risk of erosion due to bare soil?

Figures 1(aerial photography) & 2(USGS topography) provide maps of the burn area and the approximate treatment zones with eighteen sample locations. The perimeter of the burn area is identified with a red line. The burn severity areas are identified with black perimeter lines with a red hatch pattern for severely burned areas and a blue hatch pattern for moderately burned areas. The areas within the red perimeter line but outside of the hatch areas were typically unburned but were sometimes lightly burned or had received small spot burns. The treatment areas are identified by magenta perimeter lines and the treatment associated with each area is described in the Methods section of this report. The actual reclamation treatments are described below.

The following details regarding the burn were provided by Boulder Area Sustainability Information Network (BASIN) and can be found at the following web site: http://bcn.boulder.co.us/basin/news/Eldorado.html
The Walker Ranch Fire, also referred to as the Eldorado Fire, began about 2 p.m. Friday, Sept. 15, 2000 and consumed some 1100 acres before it was completely contained on Wednesday, September 20th. There was no loss of life and no structures were burned. The Boulder Daily Camera reports that more than 500 people, 74 fire-fighting engines, 273,000 gallons of water and 133,000 gallons of fire retardant were used to bring the fire under control.

The burn occurred along and near South Boulder Creek west and north of Eldorado Springs State Park primarily on Boulder County Open Space land, but potentially impacts the drinking water supplies of the cities of Denver, Louisville and Lafayette which all draw source water for their treatment facilities from South Boulder Creek (see Boulder County Open Space map of burn region).

The Colorado State Forest Service has provided a more detailed graphic presentation of the burn chronology at http://lamar.colostate.edu/~csfsbo/fire.htm#

Boulder County provided the following details on the burn impacts and reclamation efforts at the following web site. http://www.co.boulder.co.us/openspace/resources/ecology/walker_fire.htm
Of the 1,062 acres that were burned in the Eldorado Fire, 450 acres were moderately or severely burned.
275 acres were severely burned.

- 50% to 100% of the canopy was burned
- Needles are gone
- Ground cover was partially consumed
- Weak areas of hydrophobic or water resistant soils may be present

175 acres were moderately burned.

- Up to 50% of the canopy was burned
- Needles are gone from many trees, but not all
- Ground cover was partially consumed
- There may be weak areas of hydrophobic soils may be present.

Seeding

Minimal seeding will be used since this fire was relatively small and there are ample native seed sources surrounding the burned areas. Seed will only be hand broadcast onto areas that are at high risk for severe erosion or noxious weed invasion. The following seed mix is being used:

- 28% of the mix will be Blue grama (*Bouteloua gracili*s), a dominant native grass, (Authors Note: the actual value included 30% and 32% in site specific mixes Claire Deleo – Eldorado Area Rehabilitation Plan Revisions and Summary, undated BCPOS).
- 25% will be Mountain brome (*Bromus marginatus*), a pioneer native grass, (Authors Note: the actual value included 27% in site specific mixes Claire Deleo – Eldorado Area Rehabilitation Plan Revisions and Summary, undated BCPOS).
- 32% will be Slender wheatgrass (*Elymus trachycaulus*), a short-lived native perennial, and,
  (Authors Note: the actual value included 35% and 37% in site specific mixes Claire Deleo – Eldorado Area Rehabilitation Plan Revisions and Summary, undated BCPOS).

- 15% will be "Regreen", a sterile hybrid of Cereal wheat (*Triticum aestivum*) and Tall wheatgrass (*Elytrigia elongata*), short-lived perennials.
  (Authors Note: the actual value included 4% and 10% in site specific mixes Claire Deleo – Eldorado Area Rehabilitation Plan Revisions and Summary, undated BCPOS).

(Current Author's Comment: Although blue grama grass is a local native, it is not typically the dominant in the upper foothill areas of this burn. Mountain brome (a.k.a. *Ceratochloa carinata* is an introduced species in Colorado although native in some states of the U.S. This species did not naturally occur in the burn areas prior to planting. Slender wheatgrass is also a local native species, but was probably not abundant in the burn area prior to seeding.)

The reasons why introduced or non-local species are used are based on the facts that native species, especially local native species, are either unavailable or expensive. Not all areas were seeded. The areas that were seeded were selected because they were the greatest concern with regard to erosion or noxious weed invasion. The non-native species were chosen based on their ability to produce quick ground cover and yet be short-lived and allow the reestablishment of native species.

(Current Author's Comments: This study allowed some evaluation of whether these species were successful at providing quick cover, and will permit future evaluation of whether of not they are short-lived.)

Mulching

Mulching reduces the erosive action of raindrops hitting bare soil and overland sheet flow. Certified weed-free winter wheat straw is applied at 1 ton (about 50 bales) per acre. Seeds remaining in the straw will germinate and provide a temporary ground cover until native plants can reestablish.

Mulching is also used in conjunction with seeding to provide a protective cover for seeds by reducing soil moisture evaporation.

Contour Straw Wattles (a.k.a. straw logs – authors note)

Straw wattles are used on severe to moderately burned slopes with less than 30 percent of the original ground cover remaining. They increase infiltration, add roughness, reduce erosion, and help retain eroded soil on slopes. They are also used to supplement erosion control in areas that do not have enough large trees for contour log felling and in rocky areas where contour log felling is difficult to implement.

Straw wattles are cylinders of compressed weed-free straw. They are made of either wheat or rice straw, and are 8 to 12 inches in diameter and 20 to 25 feet long. They are encased in jute, nylon, or other bio/photo-degradable materials. When installed on the contour of a slope they form a continuous barrier that intercepts water and sediment running down the slope. Straw wattles are effective for about 3 years.

Contour Log Felling

When the original ground cover is lost during a fire, the soil is at risk for erosion. Drainage ways may flood more frequently from increased runoff on the burned slopes. Contour log felling can reduce erosion from rainwater that runs down a slope by cutting dead trees so they fall perpendicular to the main direction of the slope. This technique is used on burned slopes where about 50% or more of the tree canopy is destroyed.

Sawyers cut trees, dropping the trunks along the contour of the slope leaving stumps about 12 inches high to brace the tree from sliding downhill. Tree limbs are removed so that the log lies flat on the ground. Soil is then packed under the log to slow the flow of water and facilitate the deposition of sediment on the upslope side of the log.

A discussion of potential water quality impact was also provided by the following BASIN web site: http://bcn.boulder.co.us/basin/forum/walkerWQ.html
By: Donna Scott, City of Boulder, Water Quality and Environmental Services Potential water quality impacts involve a major tributary to Boulder Creek and a drinking water supply reservoir. It is estimated that 500,000 people receive their drinking water from water resources affected by this fire. These include South Boulder Creek, which is a drinking water source for the cities of Louisville, Lafayette and the town of Superior and Gross Reservoir, a water supply for Denver Water as well as serving Arvada. In addition, several small drainage ways cross the area. Tom Davis Gulch is an intermittent stream which runs west to east right through the most heavily burned areas and is a tributary to South Boulder Creek, just upstream of the city of Lafayette's and the town of Louisville's diversion structures. Gross Reservoir's northern corner is within a few hundred feet of the fire area, and South Boulder Creek forms most of the eastern boundary of the fire.

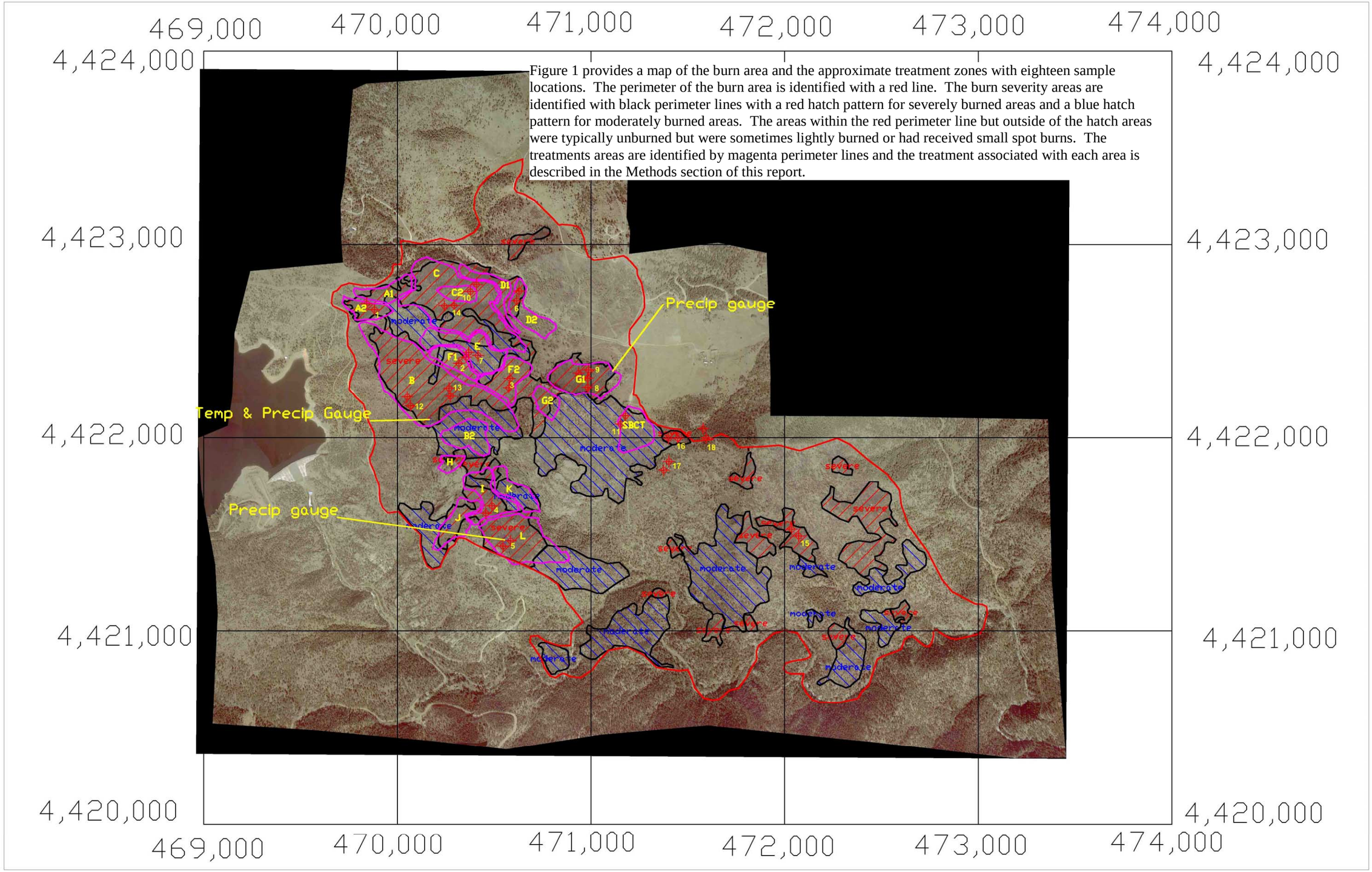


Figure 1. Eldorado Fire at Walker Ranch aerial photography with; burn perimeter, burn severity mapping, treatment areas, and sample locations. Coordinate grid is UTM NAD 27 meter.

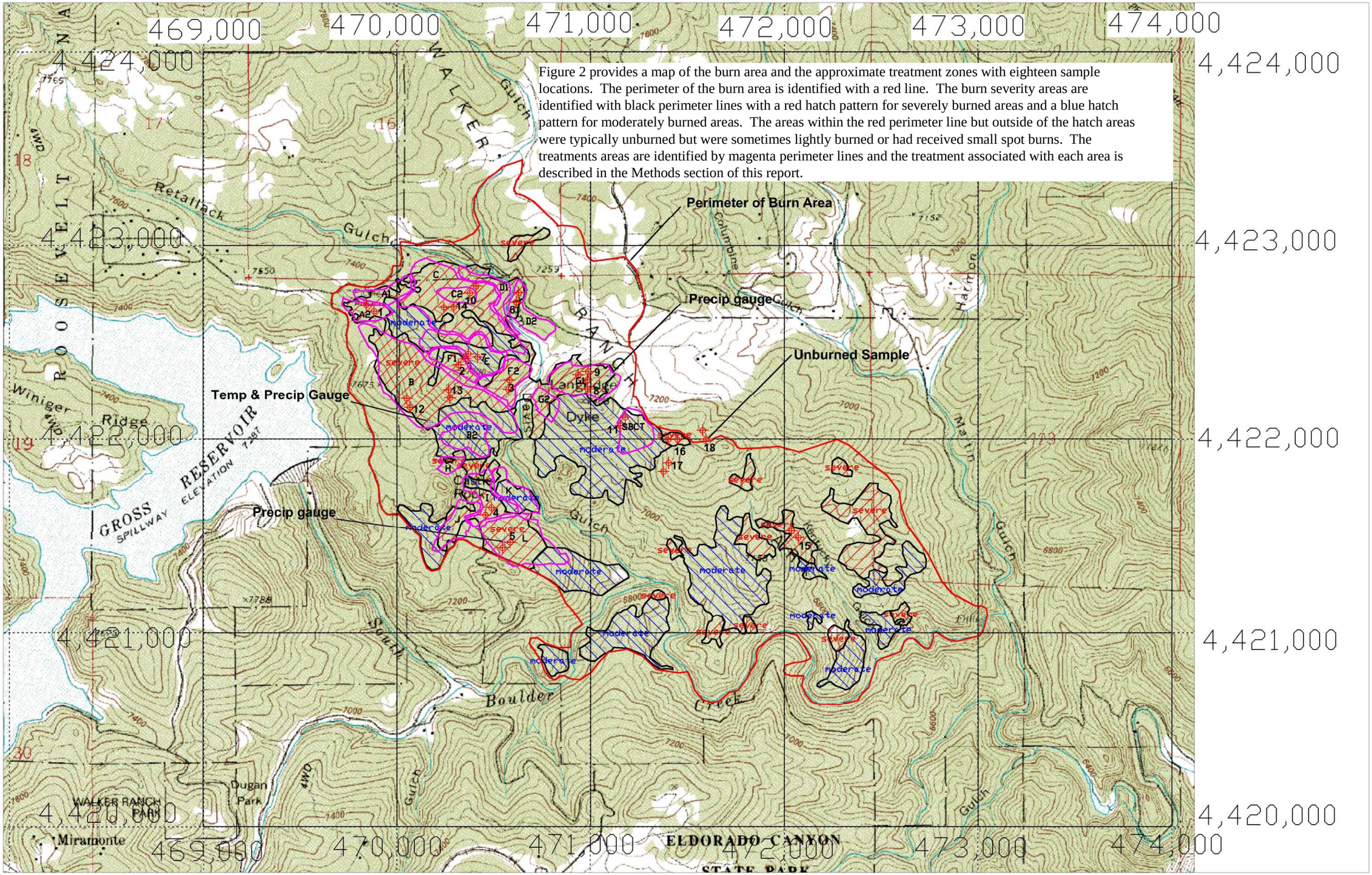


Figure 2. Eldorado Fire at Walker Ranch USGS topographic map with; burn perimeter, burn severity mapping, treatment areas, and sample locations. Coordinate grid is UTM NAD 27 meter.

Methods

Sample Site Selection and Documentation

Eighteen samples were subjectively selected from the study area (Figures 1 & 2) and stratified as much as possible to include the range of burn severity, reclamation treatments and topographic position. Sample 18 was selected from a site that was outside of the burn perimeter in a densely forested site. The mapping of the treatment areas was not precise and required on-site adjustment of plot location and orientation to best fulfill the targeted combination of treatments that each sample was intended to represent. Table 1 summarizes the results of sample selection. The sample transects were marked by a large survey cap and brown carsonite post at the start point, and a white fiberglass pole and small aluminum caps at the end point (Figure 3). The start and end points were recorded with a Trimble Geoexplorer 3 GPS unit that was accurate to approximately +/- 1.5 meters.

Table 1. Summary of sample locations, treatments, burn severity, and topographic characteristics.

Data collection

Sample ID	Treatment Unit	Contour	Straw logs (acres)	Seed (acres)	Mulch (acres)	Treatment Summary	Burn Class	Slope-Aspect	
	A1	X	3.1	6	6	Everything	Severe	M - NE	M = moderate
1	A2	X	2	3	5	Everything	Severe	M - NE	
2	F1	X	10.1		2.5	C& S-Logs & Mulch	Severe	M - SE	
3	F2	X	10.1		4.5	C& S-Logs & Mulch	Severe	S - SE	S = Steep
4	I	X	5.8		4	C& S-Logs & Mulch	Severe	M - SE	
5	L	X	5.7		8	C& S-Logs & Mulch	Severe	M - NE	
6	D2	X		5	4	C& Seed & Mulch	Severe	S- W	
7	E	X	2.9			C& Straw Logs	Moderate	Ridge - SE	
	J	X	1.9			C& Straw Logs	Severe		
8 & 9	G1	X		8		C& Seed only	Severe	S - NW	Top & bottom of slope
10	C2	X		some		C& some seed	Severe	Ridge - ENE	Seeded top
11	SBCTrail			1.5 some		Seed only	Moderate	S - SW	
12 & 13	B	X				Contour only	Severe	S - ENE	Top & bottom of slope
	B2	X				Contour only	Moderate		
14	C	X				Contour only	Severe	Drain - ENE	
	D1	X				Contour only	Severe		
	G2	X				Contour only	Severe+Mod		
	H	X				Contour only	Light+Severe		
	K	X				Contour only	Moderate + Sev.		
15	Other Burn					None	Severe	S - NE	
16	Other Burn					None	Severe	S - NW	
17	No burn interior					None	None	M - W	
18	No burn dense exterior					None	None	S - NNE	
18	**TOTAL Samples**								

Vegetation Cover Sampling

Vegetation cover was sampled at the 18 transects (Figures 1 & 2) on July 16-19, 2002. Each 50 meter transect was sampled with 100 points using a point-intercept optical device (Figure 4). . Two points were sampled at each meter, one on either side of the transect at 0.5 meter from the transect centerline (Figure 4). The point-intercept optical device uses high quality optics and cross-hairs to project a point in an upward as well as downward direction, allowing the canopy of living or dead trees to be recorded. Whenever an upward point recorded a hit on tree canopy (either alive or dead), the additional downward hits were recorded separately to allow the discrimination of points that occurred under a tree canopy.

Sample Transect Start Point

Sample Transect End Point

Aluminum Cap with Transect Number

Figure 3. Sample location markers

Each sample point recorded first-hit (top canopy) and additional hits for vegetation by species, as well as litter, bare soil, rock, and standing-dead vegetation.

Species within one meter (3.28 ft.) of the transect centerline were also recorded as "present". This allowed species with low cover to be represented in the data and provided a species density per 100 square meters (i.e., 50 meters long by 2 meters wide plot). The transect was subjectively oriented to best represent the community/treatment target. This cover sampling methodology is identical to the vegetation monitoring used by Boulder City Open Space and Mountain Parks in their prairie dog studies, and the

Boulder County study at the Doniphan Property prairie dog revegetation site. Each transect was documented with a vertical and horizontally oriented photograph immediately prior to each sample.

Climate Data

Three precipitation gauges and one air and soil temperature gauge was established within the burn perimeter. The primary purpose of these stations was to allow some accurate measurement of local large precipitation events in order to evaluate large-scale erosion events that might occur. Figures 1 & 2 show the location of these stations. The northeastern precipitation gauge was a data logging tipping-bucket gauge accurate to .01 inch. Data were summarized and logged every 15 minutes. The south-central precipitation gauge was a drip gauge that was also accurate to .01 inch and simply provided a single cumulative precipitation value. The northwestern collocated precipitation and temperature gauges were also data logging gauges. Precipitation was measured with a drip gauge that was accurate to .01 inch and logged the time of each .01 inch. The temperature for the air at 1 meter above ground and 3cm below the soil surface were logged each 15 minutes.

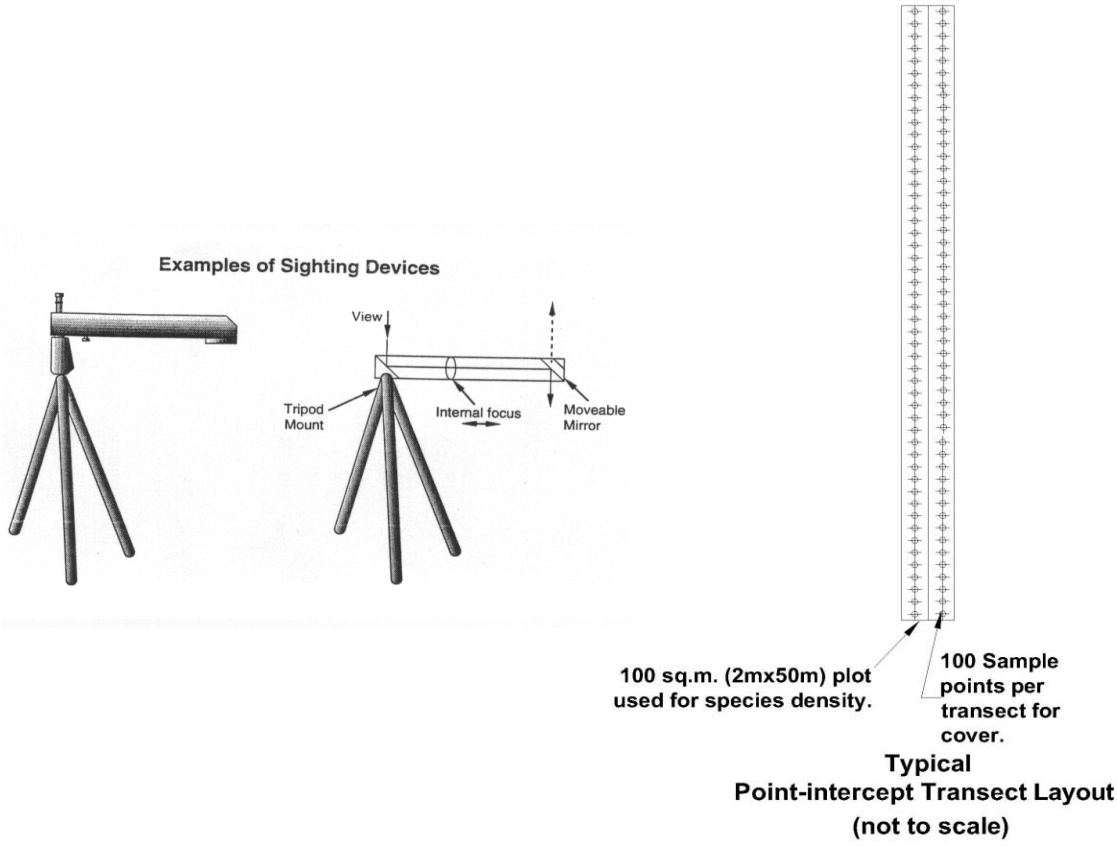


Figure 4. Point-intercept optical sampling device and the point-intercept transect layout

Classification

The vegetation cover data were classified using the TWINSPAN (Hill, 1979) divisive classification program with the strict convergence criteria of Oksanen & Minchin (1997). This program defines groups of samples based on the similarity of their species composition, and simultaneously groups the species that tend to occur together within each classification group.

Certain settings must be entered for TWINSPAN to perform the classification. These settings are described in the following section.

Cover classes and pseudospecies

Because TWINSPAN was originally designed to be used for Presence-Absence (i.e. frequency) data rather than quantitative (i.e. abundance) data, the use of "Pseudospecies" was incorporated into the computer program. The concept of pseudospecies allows greater weight to be given to higher quantitative values. The first setting of TWINSPAN for pseudospecies requires that the cover classes (i.e. cut levels) be defined. TWINSPAN allows a maximum of nine cut levels.

In this study the cut levels were defined as 0.0, 0.2, 1.1, 3.1, 5.1, 7.1, 9.1, 11.1, >11.1. The first cut level included all species cover values that were greater than zero, cut level two included all values that were greater than or equal to 0.2%, cut level three included all values greater than or equal to 1.1%, etc. The 0.2 cut level was used to distinguish those species that were present, but were not tallied as a hit by the cover sample. All of these "present" species were given a value of 0.1. Almost all species had cover values less than 19%. Figure 5 shows the frequency distribution of cover values at the targeted cut levels. A species that was present (SPEX) in the plot but not "hit" was assigned a value of 0.1 and was assigned one pseudospecies (i.e. SPEX1). A species with a cover value of 10% would be assigned eight pseudospecies (i.e. SPEX1, SPEX2, SPEX3, SPEX4, SPEX5, SPE6, SPE7, SPE8) because it could be found to occur within eight of the nine possible cover classes. If the cover classes are not equal in size to each other, there is a *de facto* weighting of the data. For example the species with 10% cover would occur in eight out of nine possible classes, so its weighted cover would be 89% (i.e. 8/9). The net effect is to positively weight the lower cover values and negatively weight the higher cover values. This can be compensated by the weighting option of the TWINSPAN program. For this study the weights given to each class were respectively; 9,000, 45,000, 60,000, 67,500, 90,000, 105,000, 115,714, 123,750, 190,000. For example, the species with 10% cover would be given a weight of 123,750 and would be multiplied by 89 (i.e., the 8/9 = 89% value) = 11,013,750. The maximum weighted value for a species with 100% cover would be 100 x 1,000,000 = 100,000,000. The net weighting for the 10% species is 11,013,750/100,000,000= 11%. The final result is that the cover classes are "unweighted", and more representative of the true cover values.

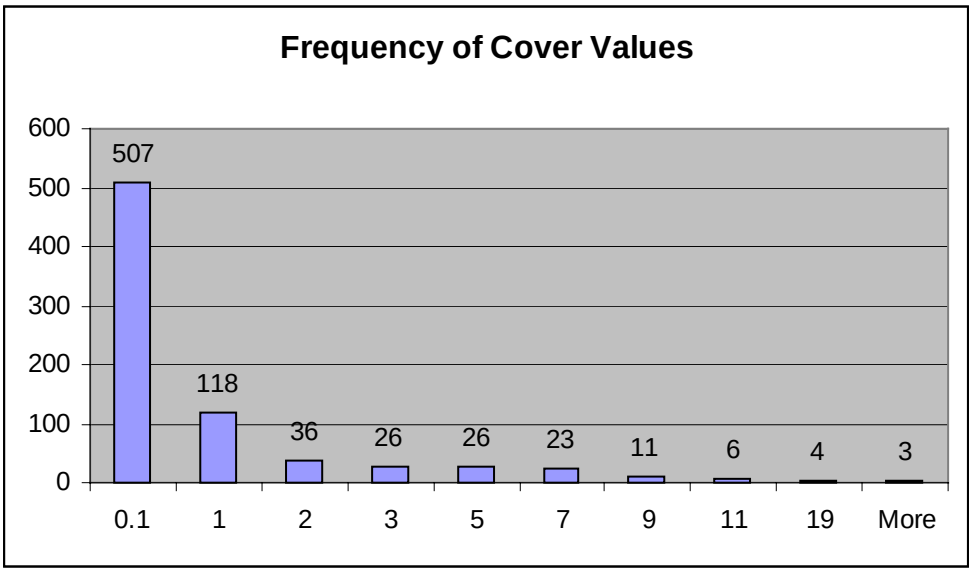


Figure 5. Frequency distribution of cover values.

The TWINSPAN results were used to define the sample and species associations that have resulted from the fire disturbance and reclamation efforts. This is presented in a dendrogram that includes those species, growth forms (i.e., introduced annual forbs, native perennial grasses, etc.), and selected environmental factors that were most closely associated with each division. The determination of these associated growth forms and environmental factors was accomplished using DISCRIM variant of the TWINSPAN program (ter Braak 1982).

Ordination

The samples were ordinated using CANOCO Version 4.0 (ter Braak 1999) which incorporates the strict convergence criteria of Oksanen & Minchin (1997). The ordinations of samples, species, and environmental vectors were produced separately for different combinations of two axes, as well as a simulated three-dimensional scatter plot. The "environmental factors" included reclamation treatments, independent site factors, vegetation related site factors, and growth forms. Table 2 summarizes the environmental factors used in the ordination. Slope was measured in percent, and aspect was composed of the combination of "easterliness" (sine of aspect) and "northerliness" (cosine of aspect). Aspect was recorded with respect to true north. Abbreviations used throughout this report are as follows:

Treatments

- Contour = Contour log felling
- Strwlogs = Straw logs (wattles)
- Seed = Application of seed
- Mulch = Application of Mulch

Burn Intensity

- Burn = Burn Intensity

Independent Site Factors

- Sloppcnt = Slope in percent
- AspETN = Easterly component of aspect relative to true north
- AspNTN = Northerly component of aspect relative to true north

Vegetation Related Site Factors

- StndDead = Standing Dead vegetation that has been dead for at least one full year, and that is not in contact with mineral soil, litter, or the ground surface.
- Litter = Non-living organic matter, that is in contact with the mineral soil, other litter or the ground surface.
- Baresoil = Soil with no vegetation or litter cover.
- Rock = Rock that is greater than 1cm in size in at least one dimension.
- TotVeg = Total vegetation cover
- SpeDen = Species density (i.e., number of species found within the 100sq.m. [2m x 50m] transect)
- Grndcov = Ground cover that will help reduce erosion. Includes total vegetation cover, rock, litter, and standing dead.

Growth Forms

- IAF = Introduced Annual & Biennial Forbs
- IAG = Introduced Annual Grasses
- IPF = Introduced Perennial Forbs
- IPGC = Introduced Perennial Grasses (cool season)
- NAF = Native Annual & Biennial Forbs
- NPF = Native Perennial Forbs
- NPGC = Native Perennial Grasses (cool season)
- NPGW = Native Perennial Grasses (warm season)
- S = Native Shrubs
- T = Native Trees
- F = Native Ferns
- M = Moss

The associations as defined by the TWINSPAN classification were also represented within the ordination using connecting lines or distinct symbols to show the distribution of the classification groups within the ordination. The species that were found to distinguish the classification groups were also presented in separate attribute plots. The attribute plots show the actual cover values of the selected species for each sample. The cover values are represented by circles with a diameter that is proportional to the cover value, and the circles are centered on the location of the sample in the ordination. It is then possible to get a realistic idea of the distribution of cover values for each species with respect to the plant associations and the environmental factors.

Table 2. Summary of Site Factors used in Ordination.

											Samples								
	Ordination Site Factors	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Treatments																			
	Contour	1	1	1	1	1	1	1	1	1	1		1	1	1				
	Strwlogs	1	1	1	1	1		1											
	Seed	1					1		1	1	1	1							
	Mulch	1	1	1	1	1	1												
Burn Intensity																			
	Burn	4	4	4	4	4	4	3	4	4	4	3	4	4	4	4	4	0	0
Independent Site Factors																			
	Sloppcnt	18%	29%	29%	27%	29%	40%	18%	32%	32%	11%	32%	36%	45%	25%	40%	25%	36%	32%
	AspETN	0.2924	0.2250	0.3907	0.7986	0.8746	-0.9563	-0.1908	-0.2924	-0.4540	0.9986	0.6820	0.9962	0.9063	0.9925	0.9205	-0.7547	-0.9563	0.6820
	AspNTN	0.9563	-0.9744	-0.9205	-0.6018	0.4848	0.2924	-0.9816	0.9563	0.8910	-0.0523	-0.7314	0.0872	0.4226	0.1219	0.3907	0.6561	0.2924	0.7314
Vegetation Related Site Factors																			
	StndDead	2	1	4	2	3	0	0	0	1	3	0	1	0	0	3	0	2	0
	Litter	43	19	30	26	30	19	20	16	17	15	19	13	9	15	16	20	29	79
	Baresoil	18	49	37	29	31	49	43	44	51	57	55	37	42	41	31	54	33	2
	Rock	0	1	1	5	1	7	3	9	6	0	0	10	7	1	8	1	10	0
	TotVeg	41	31	32	40	37	24	36	31	26	26	31	51	46	53	45	30	28	73
	SpeDen	49	43	47	46	36	36	39	46	39	35	44	32	31	48	57	40	39	25
	Grndcov	86	52	67	73	71	50	59	56	50	44	50	75	62	69	72	51	69	152
Growth Forms																			
	NAF	0.1	2.0	1.0	2.0	0.1	1.0	3.0	1.0	1.0	3.0	5.0	11.0	4.0	18.0	1.1	6.0	2.0	0.1
	IAF	4.0	1.0	10.0	10.0	20.0	1.0	0.1	0.1	0.1	0.1	5.0	6.0	0.1	4.0	11.0	1.0	1.0	0.0
	IAG	1.0	1.0	0.1	7.0	7.0	1.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	6.0	0.1	0.1	0.1	0.0
	NPF	1.0	20.0	3.0	9.0	7.0	10.0	18.0	5.0	13.0	5.0	3.0	14.0	21.0	14.0	13.0	23.0	7.0	0.1
	IPF	1.1	0.1	6.0	1.0	0.1	1.0	1.0	0.1	0.0	0.1	1.0	4.0	0.1	0.1	0.1	0.1	0.1	0.1
	NPGC	18	6	7	10	2	7	11	10	3	5	11	1	4	2	15	0.1	6	12
	IPGC	12	0.1	0.1	0.1	1	3	1	11	7	10	2	0	0	0	0	0	0	0
	NPGW	3.0	0.0	0.0	0.1	0.1	0.1	0.0	3.0	0.1	1.0	1.0	0.0	0.0	0.0	1.0	0.0	3.0	0.0
	Shrub	1.0	1.0	5.0	1.0	0.1	0.1	2.0	1.0	1.0	2.0	3.0	12.0	13.0	2.0	4.0	0.1	9.0	0.1
	Tree	9.0	12.0	5.0	1.0	7.1	11.0	6.0	10.0	11.0	4.0	29.0	13.0	13.0	18.0	16.0	9.0	1.0	64.0
	Fern	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Moss	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0

Results & Discussion:

Data Tables

The vegetation cover data are presented in Appendix 1 as summary tables that include the original cover data, average and relative cover for each species and growth form, total cover for each sample, and the number of species that occurred within the 100 sq.m. plot for each sample. The individual site data are also presented.

Table 3 presents the 31 most important species, based on a combination of constancy (a term that is equivalent to frequency when comparing samples) and total cover. This list includes those species that were non-preferentials as well as some species that TWINSPAN determined were indicator species for some of the groups. The complete list of species sorted by relative importance is presented in Appendix 2. Photographs of samples are presented in Appendix 3.

Classification

The TWINSPAN 2-way classification table is presented in Appendix 4. This table presents both the sample and species divisions produced by the TWINSPAN program. The TWINSPAN classification summary is presented in Figure 6 and defined five groups (A-E) based on species composition. The species listed at the top of Figure 6 were common in all groups, and were non-discriminatory. Because samples were selected primarily from fire disturbance sites, no attempt has been made to classify the communities based on typical undisturbed plant community structure.

This classification integrates the results of burn intensity, site conditions, reclamation treatment, and natural revegetation. Figure 6 demonstrates that much of the grouping based on species composition correlates well with reclamation treatments. NO simplistic or definitive conclusion can be made, however, regarding the cause and effect of the treatments, since the treatments were applied subjectively in areas of greatest need. For example, Group A (Samples 12, 13, 14) was severely burned with no treatment and was found to be typified by the presence of quaking aspen (*Populus tremuloides*). The relative absence of aspen in all of the other "treatment" groups does not mean that "treatment" excluded regeneration of aspen. It is more likely that aspen occurred in areas that were more likely to regenerate on their own, or were less of an erosion risk, and were therefore not selected to receive reclamation treatment. On the other hand, when the treatment included seeding, especially with non-native species, the change in community composition due to these species can be assumed to be caused by reclamation efforts.

Table 3. The 31 most important species based on cover and frequency in all 18 samples.

Scientific Name	Relative Importance (%)	Constancy (%)	Average Cover All-Hits (%)
Pinus ponderosa ssp. scopulorum (dead)	100.00	66.67	5.61
Carex pensylvanica ssp. heliophila	65.92	77.78	3.17
Ceanothus fendleri	53.28	94.44	2.11
Phacelia heterophylla	53.24	77.78	2.56
Pseudotsuga menziesii (dead)	42.93	55.56	2.89
Verbascum thapsus	36.36	94.44	1.44
Sisymbrium altissimum	28.10	61.11	1.72
Chenopodium simplex	27.66	77.78	1.33
Anisantha tectorum	24.72	72.22	1.28
Elymus trachycaulus	19.34	33.33	2.17
Ceratochloa carinata	18.36	33.33	2.06
Penstemon virens	15.92	88.89	0.67

Artemisia ludoviciana	12.94	72.22	0.67
Geranium caespitosum ssp. caespitosum	12.69	77.78	0.61
Carex spp.	11.10	50.00	0.83
Corydalis aurea	9.95	55.56	0.67
Artemisia frigida	8.96	50.00	0.67
⦸Campanula rotundifolia	8.11	77.78	0.39
⦸Chenopodium leptophyllum	8.11	77.78	0.39
Grindelia squarrosa	7.25	44.44	0.61
Triticum aestivum x Elytrigia elongata	7.19	61.11	0.44
Helianthus pumilus	6.95	66.67	0.39
Breea arvensis	6.34	38.89	0.61
Apocynum androsaemifolium	6.30	22.22	1.06
Chondrosum gracile	5.94	44.44	0.50
Epilobium brachycarpum	5.88	66.67	0.33
Leucopoa kingii	5.88	66.67	0.33
⦸Astragalus miser var. oblongifolius	5.41	72.22	0.28
☛Populus tremuloides	4.93	22.22	0.83
Pseudotsuga menziesii	4.88	5.56	3.28
Physocarpus monogynus	4.63	44.44	0.39

⦸ = Nonpreferential species. This symbol marks those species that are evenly distributed among all of the classification groups. The other species showed some degree of preference for specific groups.
☛ = Indicator species determined by TWINSPAN. These species were closely associated (high fidelity) with specific groups and little or no association with other groups. Although some indicator species were also relatively dominant in the groups, an indicator species may also be present with low cover values. Since the indicator typically occurs only in a specific group and not in the others it is a good indicator for group affiliation when it is observed in a sample.

Although five groups were defined by the classification, only four occur within the burn area. A description of the groups follows the next section, which describes the Ordination results.

Ordination

The purpose of the ordination graphic is to reduce an extremely complex system to a fewer number of manageable factors. No presumption is made that all of the most important factors are represented. This is a first approximation that should be refined in an iterative process. The cross-tabulated correlation matrix of the ordination axes and environmental factors is presented in Table 4. Significant correlations are highlighted in blue ($P < .05$) or red ($P < .01$).

CANOCO provides ordinations with four axes that are typically represented two axes at a time. The fourth axis was found to be well represented by the other three axes and is not presented here. These axes do not represent a specific environmental/treatment factor, but rather a two step process that maximizes the dispersion of the samples on each axis. The first step of the ordination "arranges" the samples based on vegetation similarities. The second step then further refines the "arrangement" by creating axes that are linear combinations of all of the environmental/treatment factors. The vectors associated with the environmental/treatment factors are "best fit" axes for these specific factors. The direction of the vector from the origin indicates the direction of increasing values for the factor, and the length of the vector indicates the relative importance of the factor (when compared to the other measured factors) for explaining the variability found in the data.

The ordination graphics are presented in four two-dimensional figures using axes 1 & 2 (i.e., the x- and y-axes respectively) from the CANOCO results, and two simulated 3-dimensional figures. Most of the variability in the data were represented by the first two axes but Samples 17 and 18, the unburned samples, were found to be separated from the cluster of other samples along the 3rd axis. Sample 18, the

dense forest sample that was outside of the burn area, was excluded from the ordination because it was so distinctive that it forced all of the other samples into a tight cluster. Sample 17 although distinctive, had similar species composition and allowed a reasonable ordination result.

Figure 7 presents the sample sites with respect to the "environmental" vectors. The treatment vectors are in red, the environmental site vectors are in black, and the growth form vectors are in green. The direction of the vectors indicates the direction of increasing value for that factor. The length of the vector indicates the relative importance of that vector in the ordination. The position and magnitude of the environmental vector is determined by its ability to maximize its contribution to an explanation of the species and site ordinations. The position of a sample site in the ordination is determined both by its species composition, and its environmental site factors.

Figure 8 presents the samples with respect to the environmental vectors and the zones that are occupied by the groups defined by the TWINSPAN classification results.

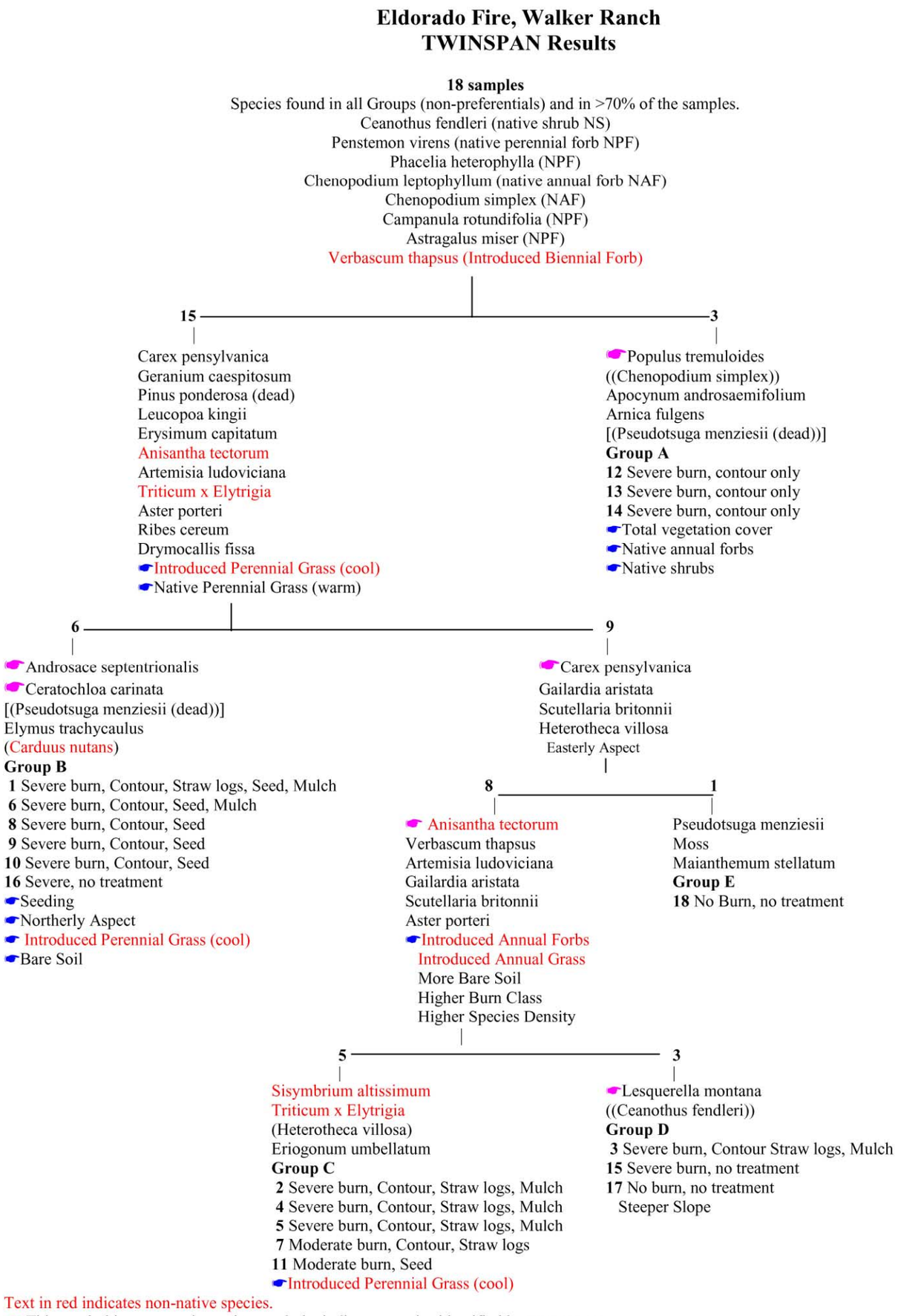
Figure 9 presents those species that had the greatest effect on the ordination results. Those species with red font were indicators of the classification groups. The position of a species in the ordination represents its center of distribution and is determined by its cover distribution among the sample sites.

Figure 10 combines the three previous figures and allows simultaneous comparison of samples, species, and environmental factors.

Figure 11 is the 3-dimensional representation of Figure 7 with the samples and treatment vectors projected to permit some visualization of different paired combinations of the three axes. The floor of the simulated cube is a representation of axes 1 & 2, the right wall represents axes 2 & 3, and the left back wall represents axes 1 & 3. The most significant item to notice is that although sample 17 appears to be close to the other samples when only axes 1 & 2 are used, it can be seen to be separated from the other samples along the 3rd axis.

Figure 12 is similar to Figure 11 but includes the environmental factors.

The graphics following Figure 12 will plot the actual cover values for species at the sample locations in order to allow a more accurate representation of the distribution of species within this same ordination.



Text in red indicates non-native species.

This symbol in magenta is used to mark the indicator species identified by TWINSPAN

This symbol in blue is used to mark the indicator environmental/treatment/growth form factors that are associated with the classification levels. The program DISCRIM was used to identify these indicators. Additional factors that were "preferentials" are sometimes listed below the indicators.

The number of samples in each division is at the top of each column.

Single parenthesis = (xxxxx) = center in a moderately wide distribution

Double parenthesis = ((xxxxx)) = center in a broad distribution

Bracketed parenthesis = [(xxxxx)] = secondary center in moderate distribution

This classification dendrogram presents the species, samples and environmental/treatment/growth form factors that are associated with the groups defined by the TWINSPAN program based on the vegetation composition of the samples.
The program DESCRIM was used to determine the environmental/treatment/growth form factors that are associated with the classification groups that were originally determined by TWINSPAN based on vegetation composition.

TWINSPAN Classification results using total hit (i.e., first and additional hits) data.

Figure 6. TWINSPAN classification of samples based on vegetation cover data

Table 4. CANOCO Correlation Matrix.

**** Weighted correlation matrix (weight = sample total) ****

	SPEC AX1	SPEC AX2	SPEC AX3	SPEC AX4	ENVI AX1	ENVI AX2	ENVI AX3	ENVI AX4	Contour	Strawlog	Seed	Mulch	BurnClas	Slopepct	AspectE	AspectN	StndDead	Litter
SPEC AX1	1.0000																	
SPEC AX2	-.0001	1.0000																
SPEC AX3	.0000	.0000	1.0000															
SPEC AX4	.0000	.0000	.0000	1.0000														
ENVI AX1	1.0000	.0000	.0000	.0000	1.0000													
ENVI AX2	-.0001	1.0000	.0000	.0000	.0000	1.0000												
ENVI AX3	.0000	.0000	1.0000	.0000	.0000	.0000	1.0000											
ENVI AX4	.0000	.0000	.0000	1.0000	.0000	.0000	.0000	1.0000										
Contour	.2054	-.1131	**-.5113**	-.1515	.2055	-.1131	**-.5113**	-.1515	1.0000									
Straw lo	**-.5579**	-.1933	-.1500	-.1429	**-.5579**	-.1934	-.1500	-.1429	.4070	1.0000								
Seed	-.0730	**.8204**	-.3454	-.0491	-.0730	**.8204**	-.3454	-.0491	.0151	-.2037	1.0000							
Mulch	-.4631	-.0929	-.3260	-.0439	-.4631	-.0929	-.3260	-.0439	.3988	**.7734**	.0159	1.0000						
Burn Cla	.1977	-.0942	**-.6886**	**-.5324**	.1977	-.0942	**-.6886**	**-.5324**	.4563	.1065	.0407	.2443	1.0000					
Slope pe	.2944	-.1959	.2712	.0379	.2944	-.1959	.2712	.0380	-.2617	**-.4874**	-.1786	-.1995	-.0621	1.0000				
AspectET	.2531	**-.5646**	-.3660	-.2520	.2530	**-.5646**	-.3660	-.2519	.1356	.0314	-.2894	-.0647	.3840	.0249	1.0000			
AspectNT	.3638	.3865	-.3871	**.4970**	.3639	.3865	-.3870	**.4970**	.0003	-.3936	.2800	-.1729	.1675	.1825	-.1890	1.0000		
StndDead	-.2344	-.1032	-.0205	.1457	-.2343	-.1032	-.0205	.1457	-.0262	.4101	-.1722	.4309	.0406	-.1329	.2730	-.0269	1.0000	
Litter	-.4596	.2131	-.1455	.2897	-.4595	.2130	-.1455	.2897	.0455	**.6878**	.1764	**.6817**	-.1738	-.4689	-.2089	.0684	**.4833**	1.0000
Baresoil	.0296	.2359	.1699	-.2528	.0296	.2359	.1699	-.2528	-.1649	-.4625	.2722	-.4132	-.0093	.0156	-.2571	-.2679	**-.5161**	**-.6019**
Rock	.3727	-.0465	.3000	.2217	.3727	-.0464	.3000	.2217	-.0351	-.4478	-.1520	-.3397	-.1714	**.6971**	-.1350	.3291	-.0641	-.4157
TotVeg	**.5071**	**-.6118**	-.1826	-.1089	**.5070**	**-.6118**	-.1827	-.1089	.1655	-.0854	**-.5270**	-.2134	.2771	.1601	**.7038**	.1019	-.0439	-.2181
SpeDen	-.3957	.0947	.0215	-.3036	-.3957	.0947	.0215	-.3036	-.3641	.1303	.0346	.0984	.0833	-.1318	.1095	-.0115	.3106	.2968
Grndcov	.1620	-.3579	-.1558	.2152	.1620	-.3579	-.1558	.2152	.1505	.3364	-.3598	.2680	.0416	-.0028	.3942	.2362	.4135	.4786
NAF	**.5010**	-.4380	-.0483	-.0707	**.5009**	-.4380	-.0483	-.0706	.0813	-.4064	-.3050	-.4434	.0826	-.0554	.3688	-.0730	-.4435	-.4381
IAF	-.3529	-.5261	-.2904	.1569	-.3529	**-.5261**	-.2904	.1569	-.0852	.3651	-.3377	.4009	.1848	.0798	**.4931**	-.0494	**.6533**	.3401
IAG	-.3371	**-.6205**	**-.5513**	.2448	-.3371	**-.6205**	**-.5513**	.2448	.3144	.3421	-.3041	.3935	.1926	-.2300	.3501	-.0381	.1160	.2174
NPF	.2882	-.3906	.2585	-.1917	.2882	-.3906	.2585	-.1917	.0188	-.1780	**-.5978**	-.3175	.1690	.2492	-.0614	-.0452	-.4316	**-.5940**
IPF	.2598	-.1479	.2061	-.2391	.2598	-.1479	.2061	-.2391	.2115	.2222	-.1509	.2232	.0989	.0281	.1510	-.3610	.3121	.1642
NPGC	-.3772	.3965	.0306	-.2786	-.3772	.3964	.0306	-.2786	-.2398	.2946	.3670	.2063	-.0830	-.1207	-.0045	-.0393	.2469	.4570
IPGC	.0059	**.8169**	-.4594	.0675	.0060	**.8169**	-.4594	.0674	.2645	.0346	**.8144**	.0898	.1527	-.4187	-.2233	**.4871**	.0413	.3560
NPGW	-.1002	**.6596**	.0245	.3582	-.1002	**.6596**	.0245	.3582	-.2214	-.0476	**.5128**	-.0264	-.3898	-.1263	-.2585	.4347	.1237	.4619
S	**.7298**	-.2923	.3770	.1083	**.7298**	-.2923	.3770	.1083	-.0016	-.3512	-.3660	-.3908	-.2006	**.5672**	.3282	.0056	-.0555	-.4098
T	.1545	.0138	-.0298	-.4055	.1544	.0138	-.0298	-.4054	-.4064	-.4796	.2445	-.3968	.0930	.3125	.3245	-.0917	-.4387	-.3874
F	-.3622	-.4119	-.2054	.0506	-.3623	-.4119	-.2054	.0506	.1362	.3348	-.1667	.3416	.0835	-.0964	.1545	-.2491	.1434	.1605

	Baresoil	Rock	TotVeg	SpeDen	Grndcov	NAF	IAF	IAG	NPF	IPF	NPGC	IPGC	NPGW	S	T	F
Baresoil	1.0000															
Rock	-.1684	1.0000														
TotVeg	**-.4970**	.1804	1.0000													
SpeDen	-.3499	-.1874	.1321	1.0000												
Grndcov	**-.9514**	.1597	**.6901**	.2970	1.0000											
NAF	.1656	-.0660	**.6341**	-.0650	.1107	1.0000										
IAF	**-.5181**	-.1072	.2719	.2644	**.5057**	-.1313	1.0000									
IAG	-.3311	-.2933	.3360	.1299	.3438	.3001	**.5481**	1.0000								
NPF	.2868	.2050	.2601	-.3016	-.2109	.3016	-.3179	-.0825	1.0000							
IPF	-.1757	.0741	.1324	-.1100	.2859	.0806	.2172	-.2011	-.2532	1.0000						
NPGC	-.4311	-.0632	-.0788	**.6518**	.2799	**-.5100**	.0690	-.2156	**-.4812**	-.0675	1.0000					
IPGC	-.0744	-.1202	-.3360	.1024	-.0412	-.3550	-.2974	-.2219	**-.5505**	-.1677	.4084	1.0000				
NPGW	-.3488	.1256	-.1957	.3484	.2383	-.3477	-.1566	-.2606	**-.6038**	-.1907	**.5988**	**.6877**	1.0000			
S	-.1119	**.5645**	.4668	-.4532	.2501	.2378	-.1088	-.3567	.2627	.3655	-.2542	-.3566	-.1080	1.0000		
T	.3563	-.1566	.2274	.2018	-.2050	.4006	-.0362	-.1453	-.0101	-.1054	.0815	-.1377	-.0769	.0801	1.0000	
F	-.2699	.0579	.0678	.1312	.2071	-.1041	.2382	**.5181**	-.0792	.0070	.1334	-.1411	-.1313	-.1512	-.3621	1.0000

Critical values for correlation coefficients

Degrees of freedom = 17-2 = 15 (sample 18 was excluded because it was unburned and off-site)

$P_{.05}$ = .482

$P_{.01}$ = .606

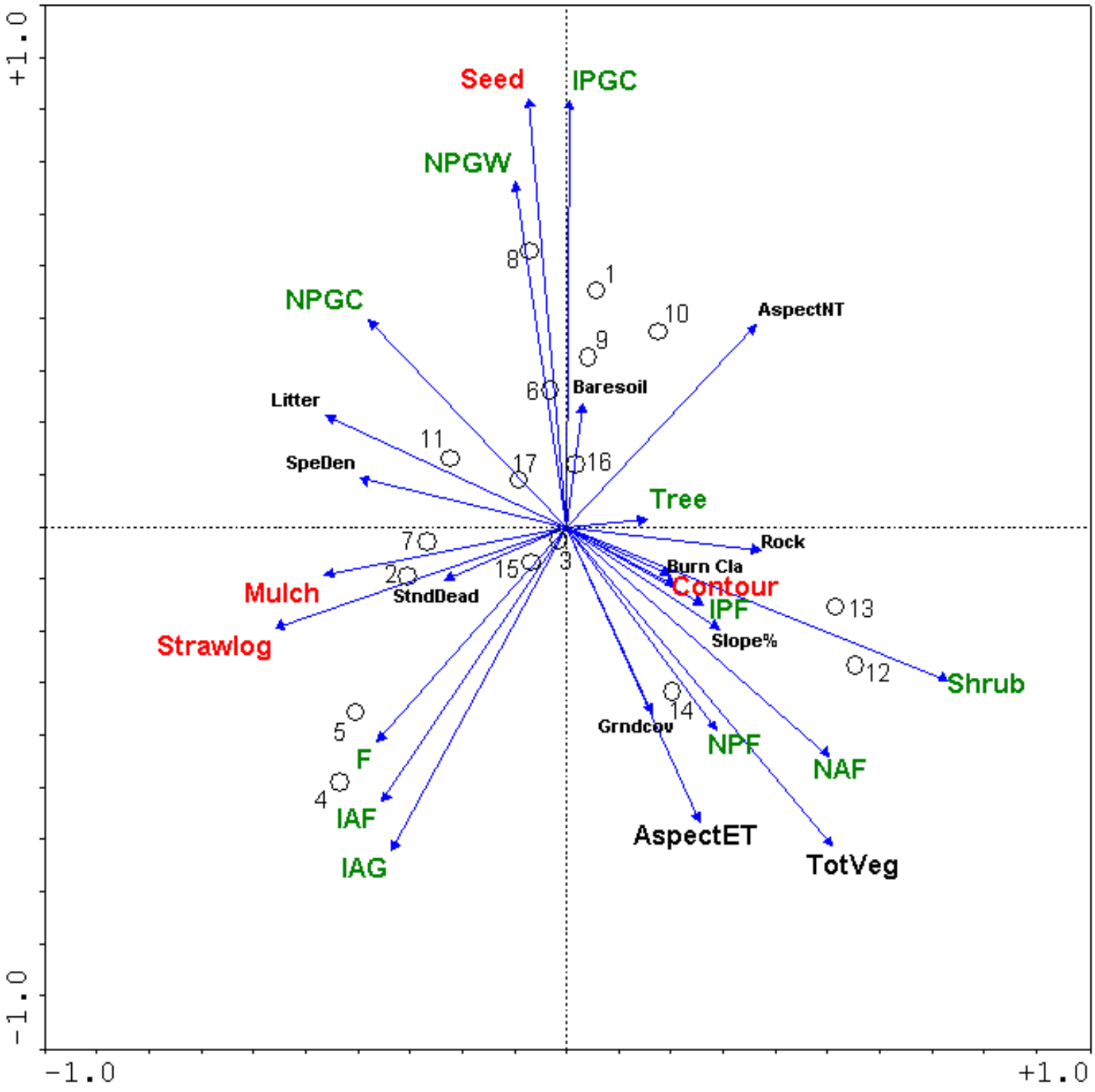


Figure 7. **Axes 1-2 – Environmental/treatment/growth form vectors with sample sites.**

The treatment vectors are in red, the "environmental" site vectors are in black, and the growth form vectors are in green. The direction of the vectors indicates the direction of increasing value for that factor. The length of the vector indicates the relative importance of that vector in the ordination.

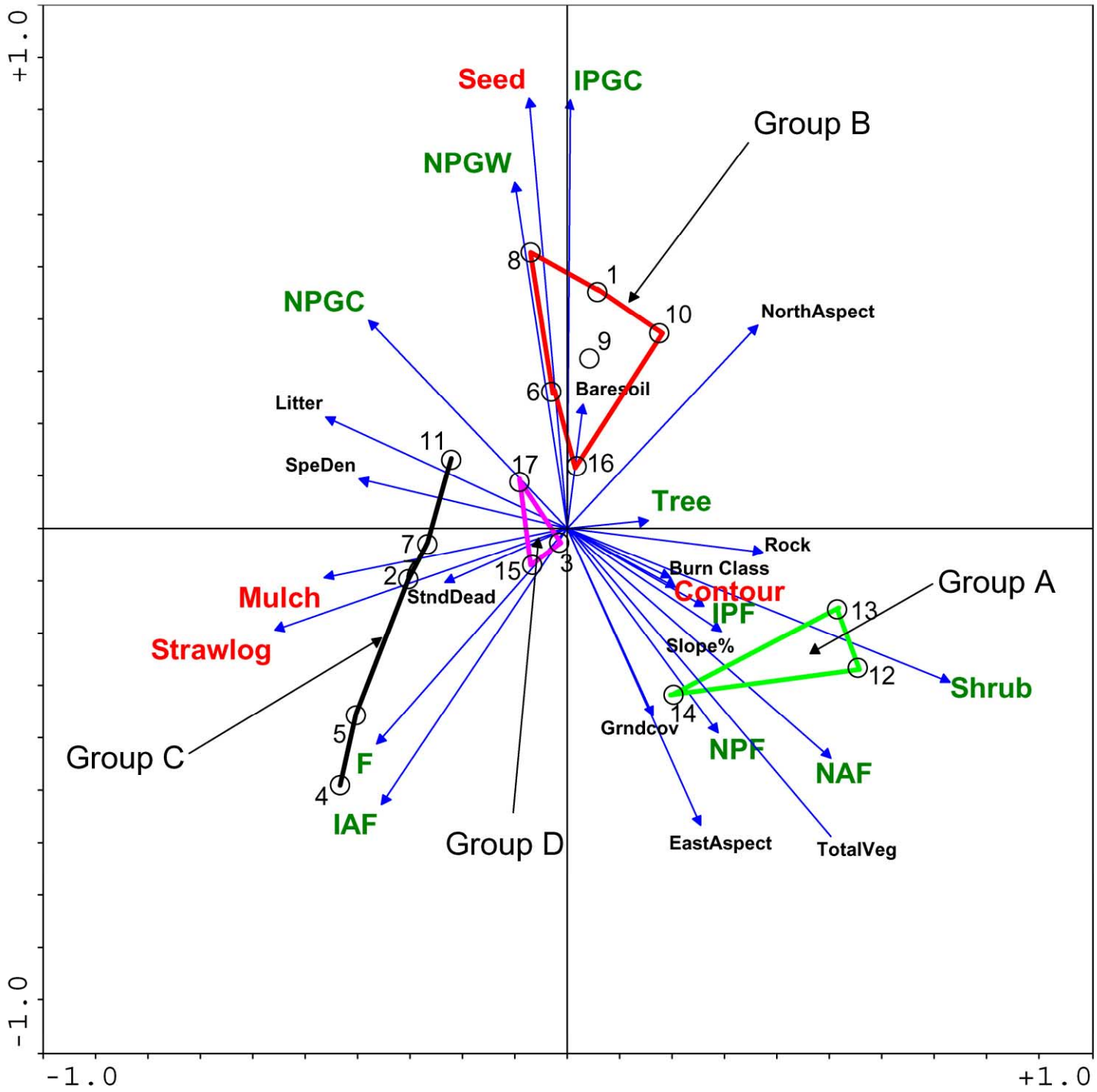


Figure 8. Axes 1-2 Sites, classification groups and vectors.

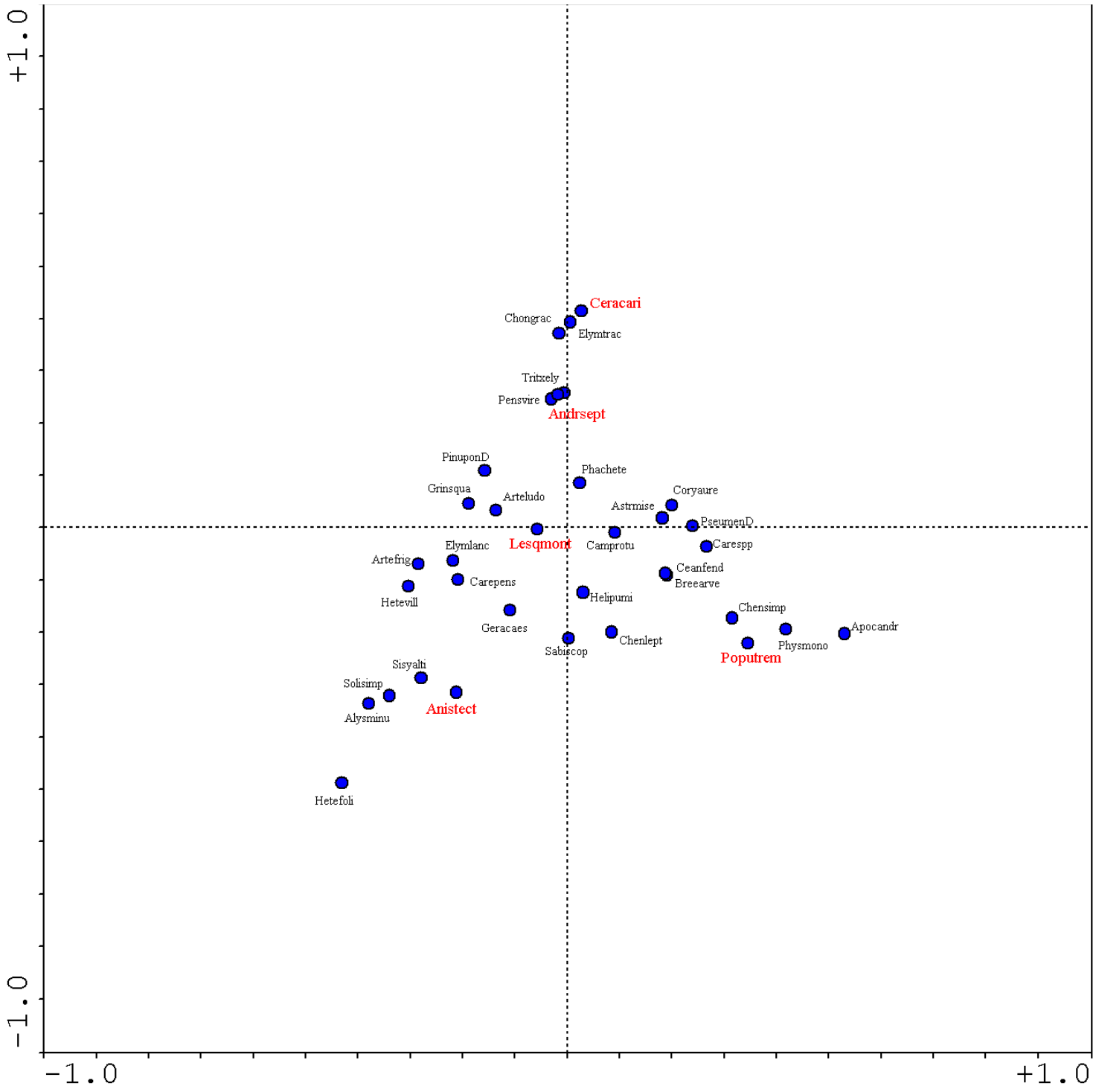


Figure 9. Axes 1-2 Selected Species.

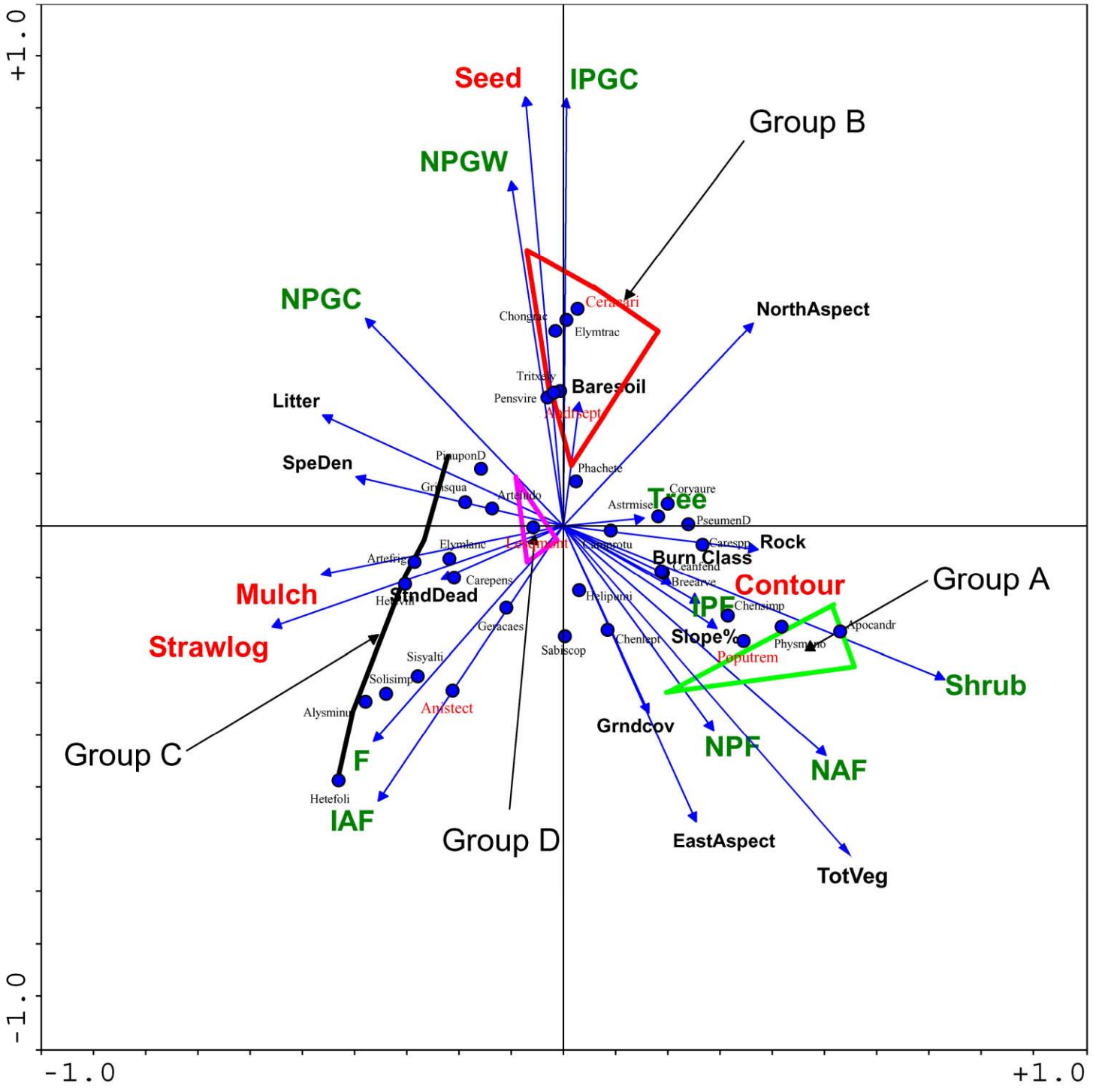


Figure 10. Axes 1-2 Species, groups and environmental vectors.

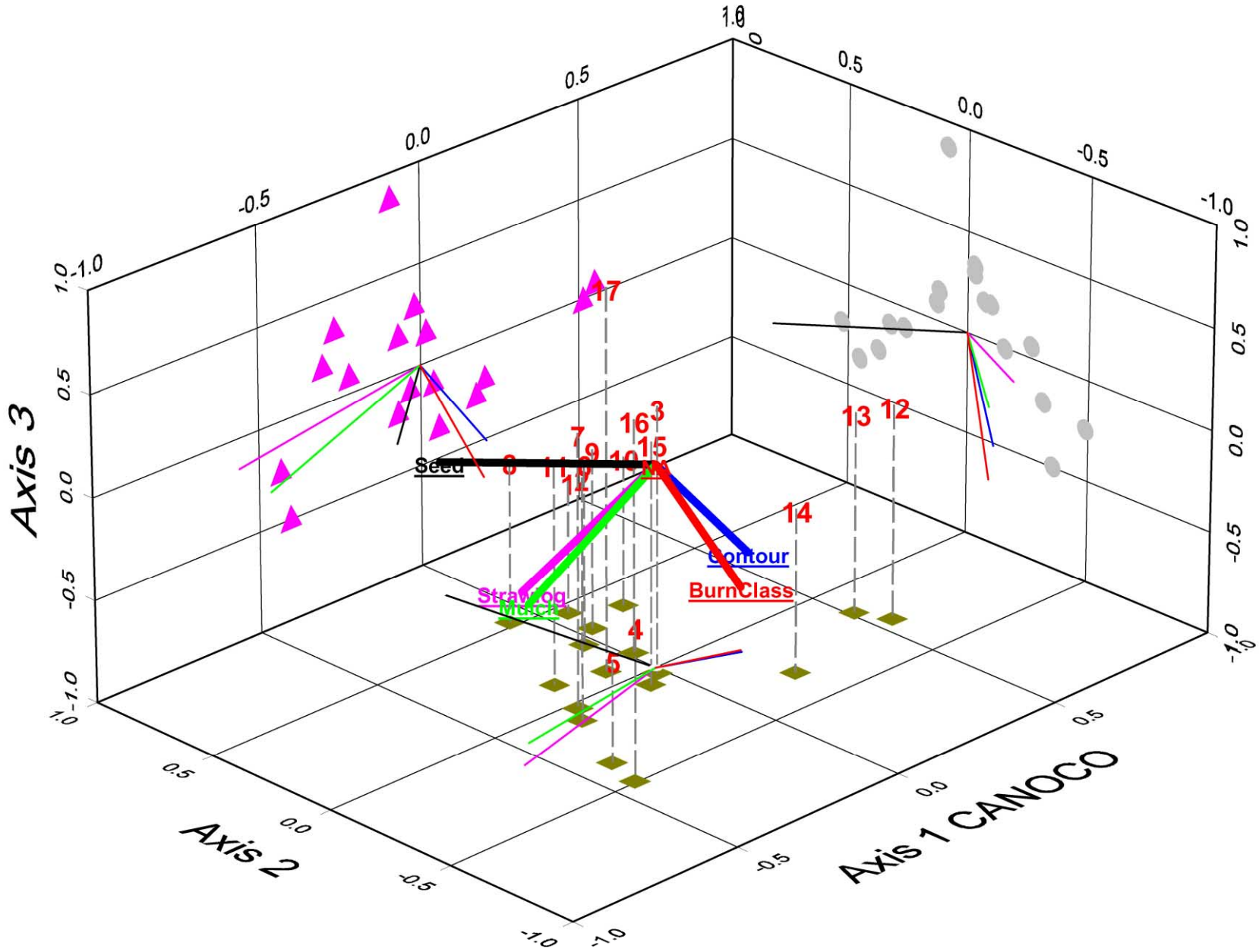


Figure 11. Axes 1-2-3, Sites, and Treatments.

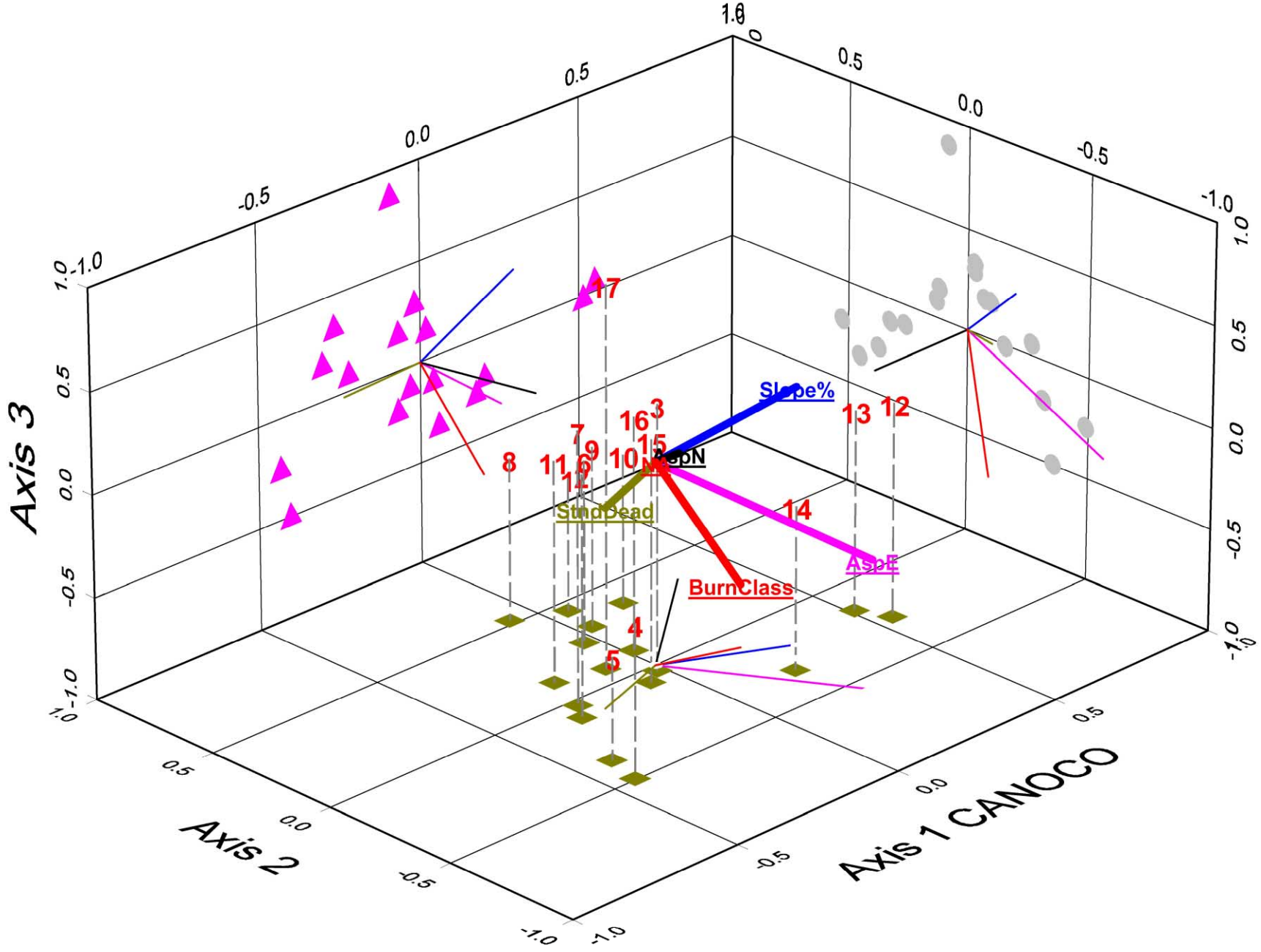


Figure 12. Axes 1-2-3, Sites, and Environmental Factors.

Attribute Figures

The attribute figures present the cover values for selected species at each sample site. This has been superimposed on the environmental vectors to represent the environmental centers of species distributions. The position of the circles indicates the sample site location in the ordination, and the size of the symbol is proportional to the actual cover value for the selected species. The species that were selected were the 31 most important species based on cover and frequency. Species that were identified as indicator species are noted as such in the Figure title. The species are presented in the same order as found in the Table 3. Douglas fir (Pseudotsuga menziesii) was included in the Table 3 list, but occurred only in Sample 18 with a cover value of 59%. Sample 18 was the unburned site outside of the burn perimeter and was so different from all of the other samples that it had to be excluded from the ordination, and is not presented below.

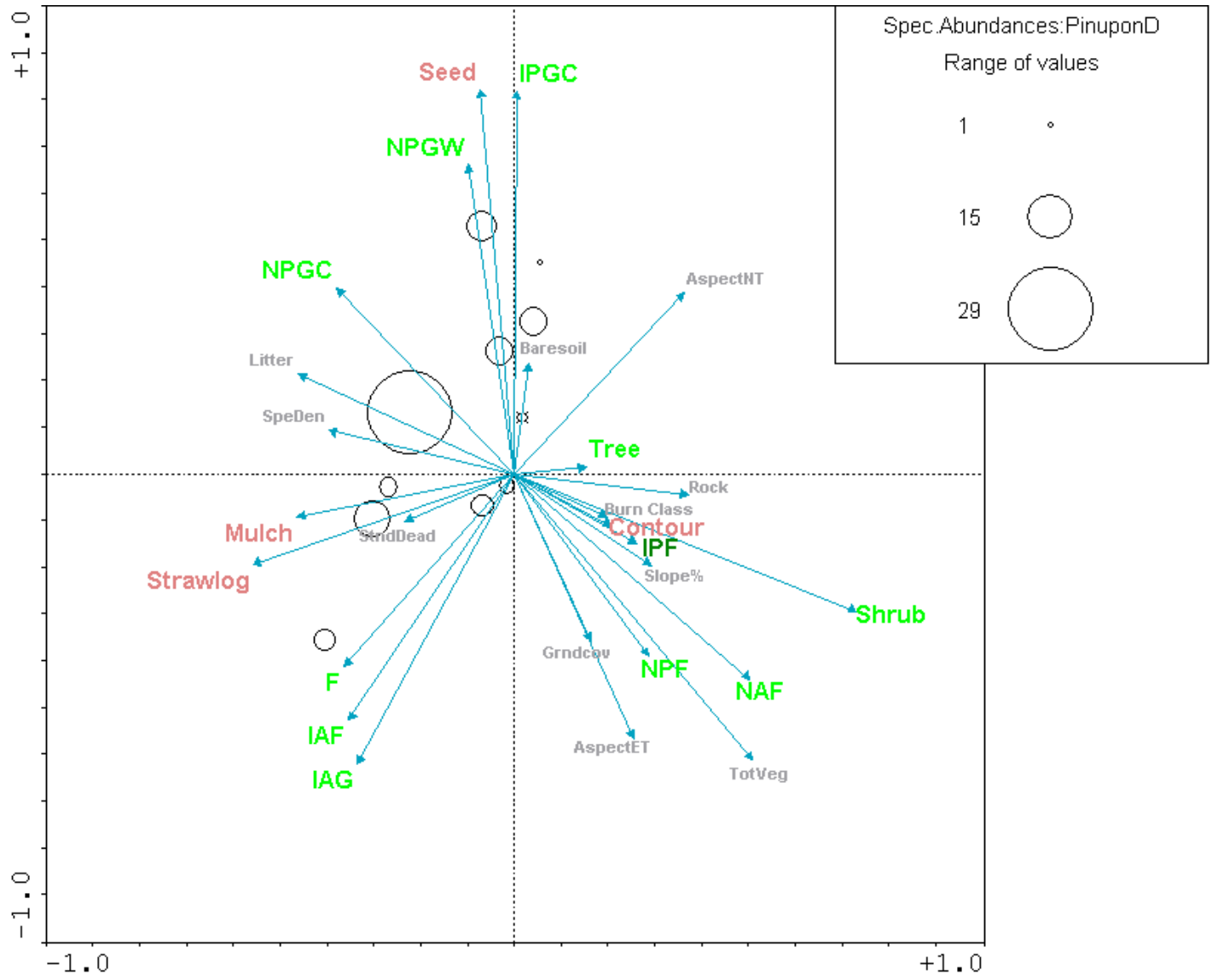


Figure 13. *Pinus ponderosa ssp. scopulorum* (dead) **Cover Distribution.**

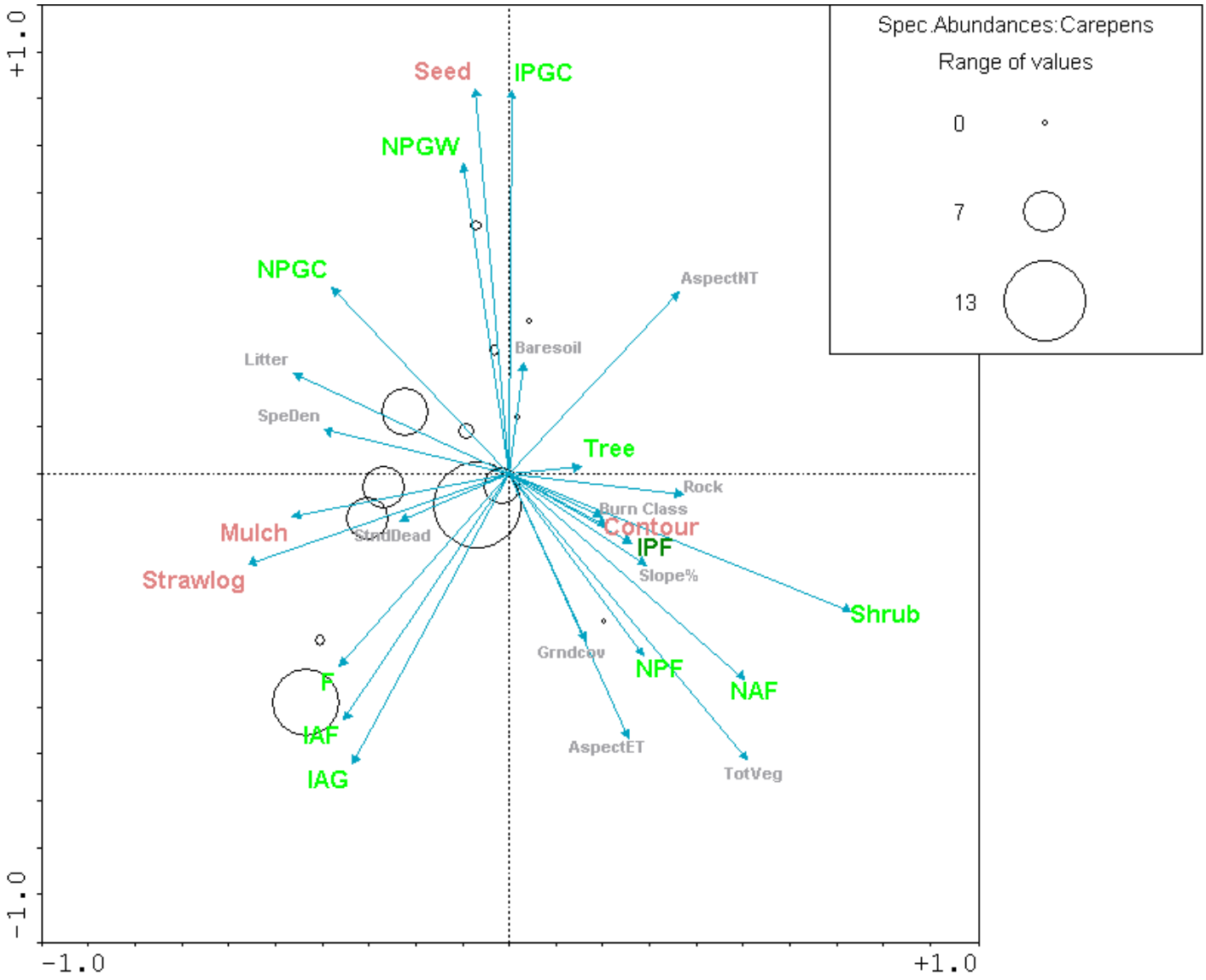


Figure 14. *Carex pensylvanica ssp. heliophila* Cover Distribution (Indicator for Groups C, D, & E.

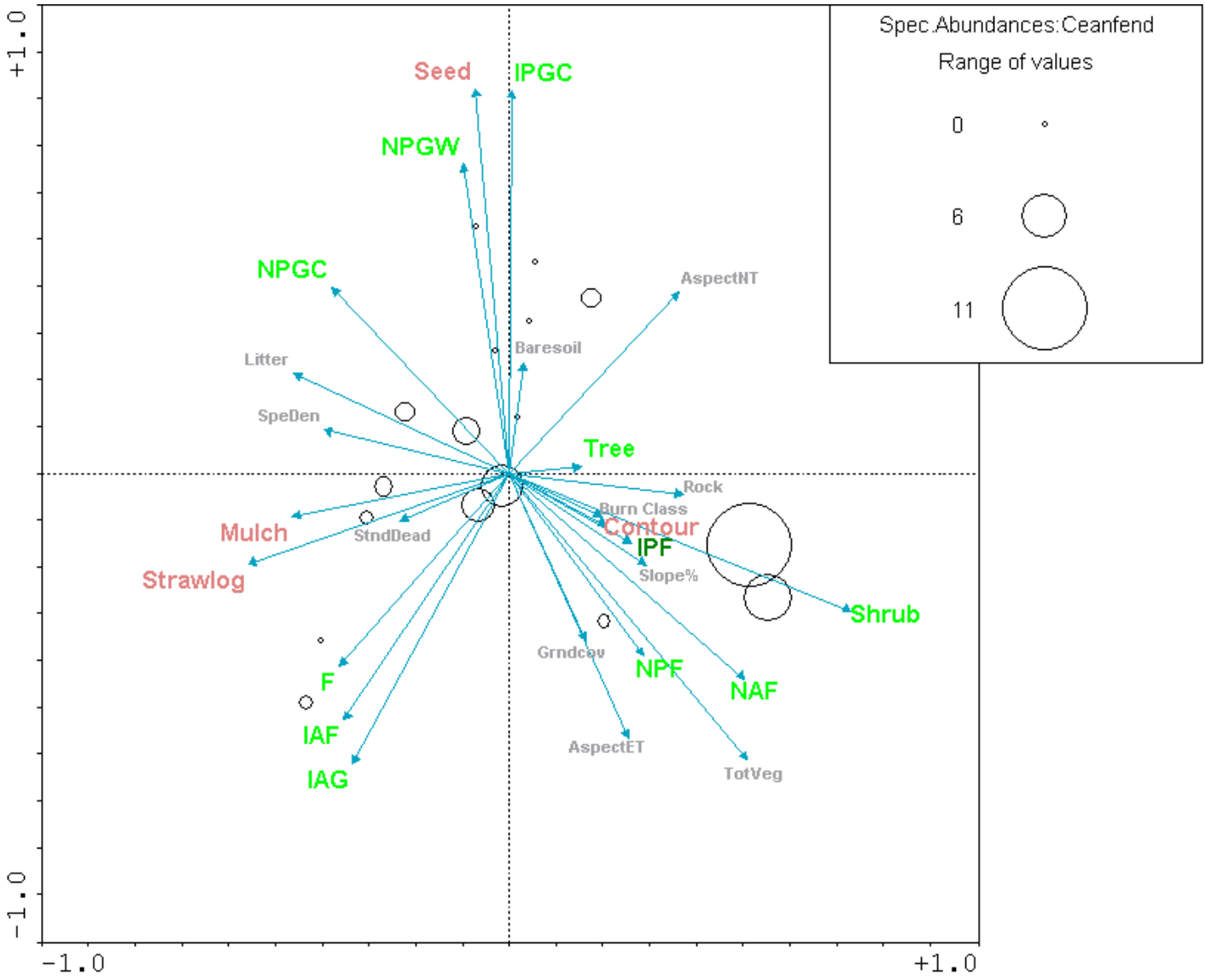


Figure 15. *Ceanothus fendleri* Cover Distribution – a non-preferential species.

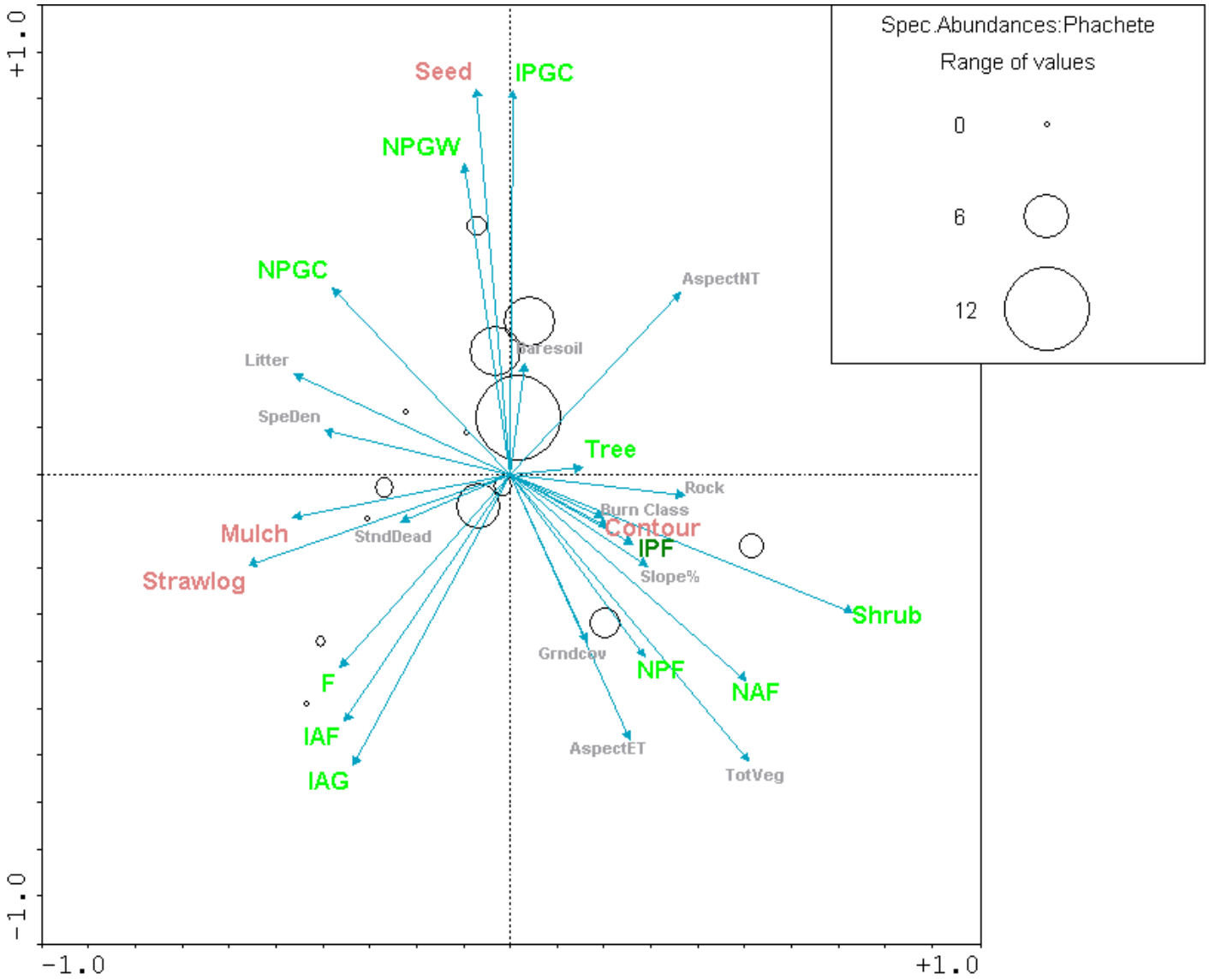


Figure 16. *Phacelia heterophylla* Cover Distribution – a non-preferential species.

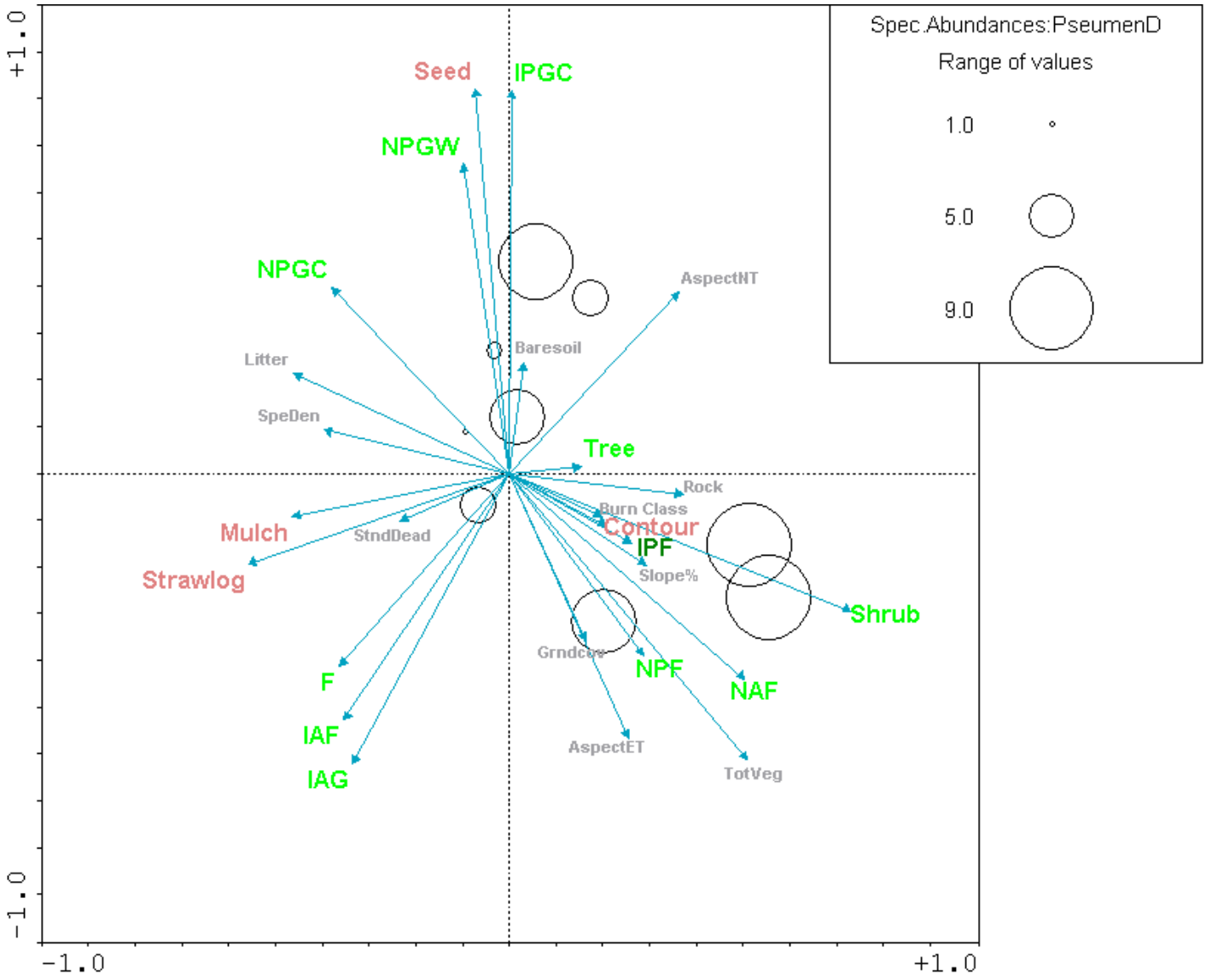


Figure 17. *Pseudotsuga menziesii* (dead) **Cover Distribution.**

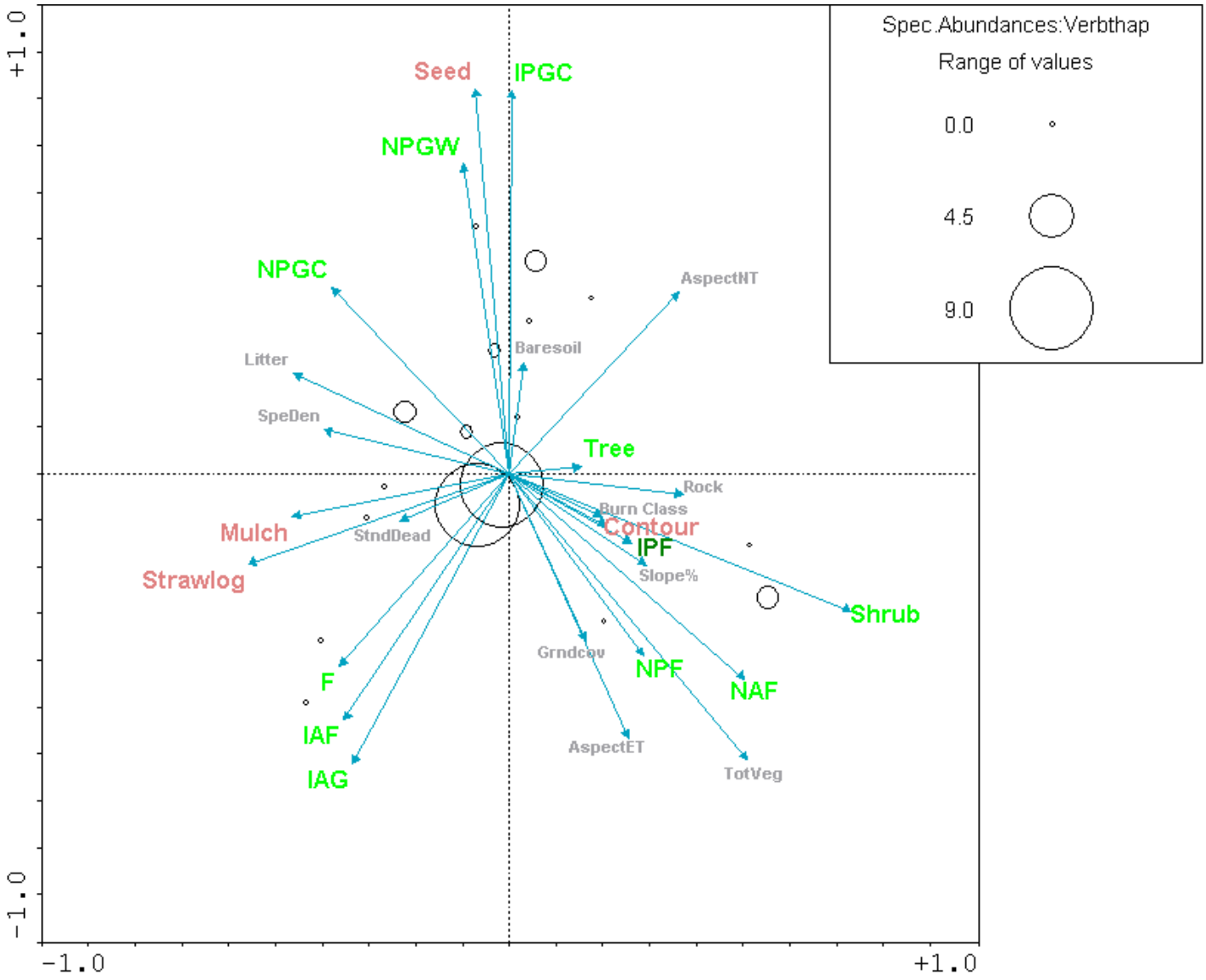


Figure 18. *Verbascum thapsus* Cover Distribution – non-preferential species.

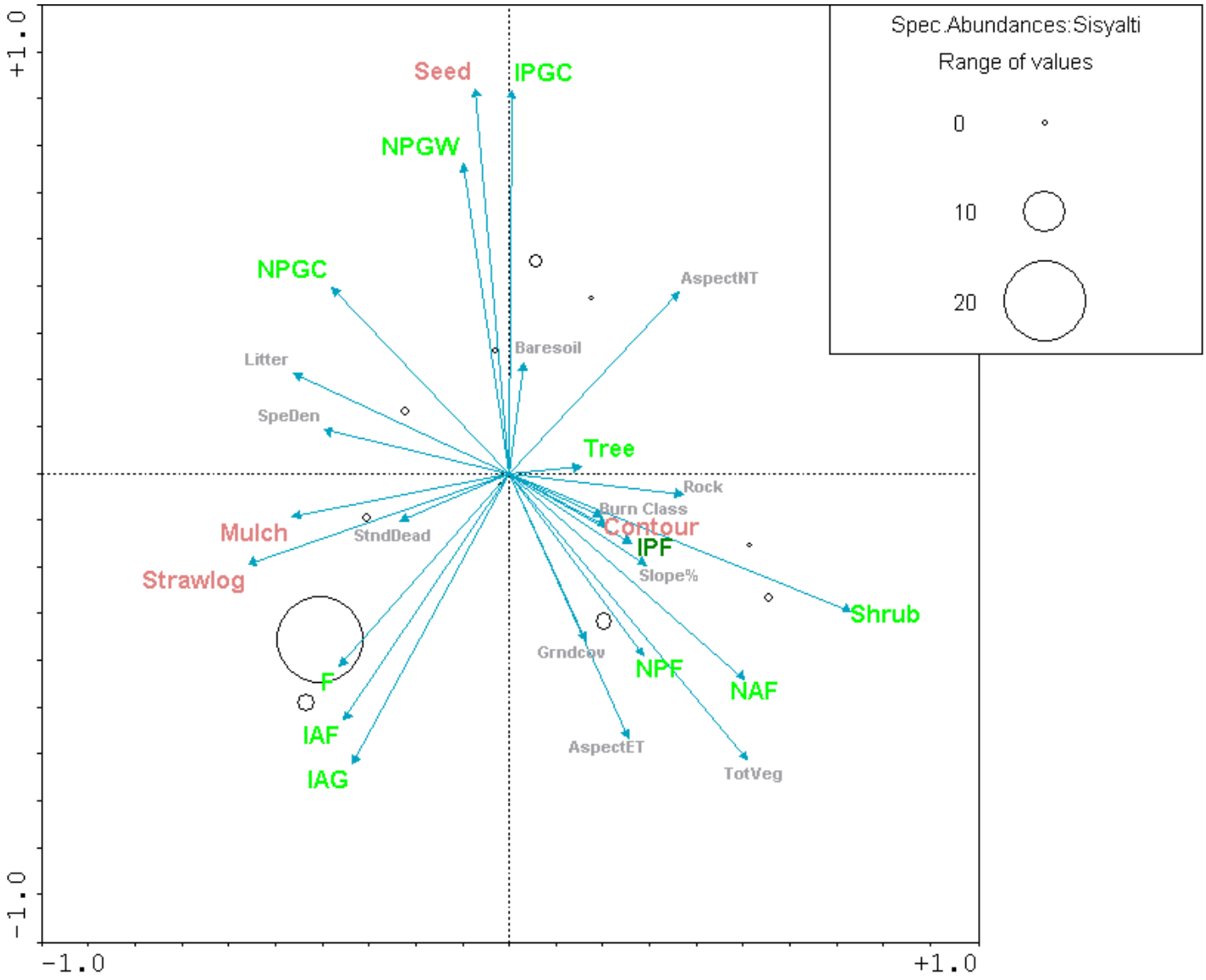


Figure 19. *Sisymbrium altissimum* Cover Distribution.

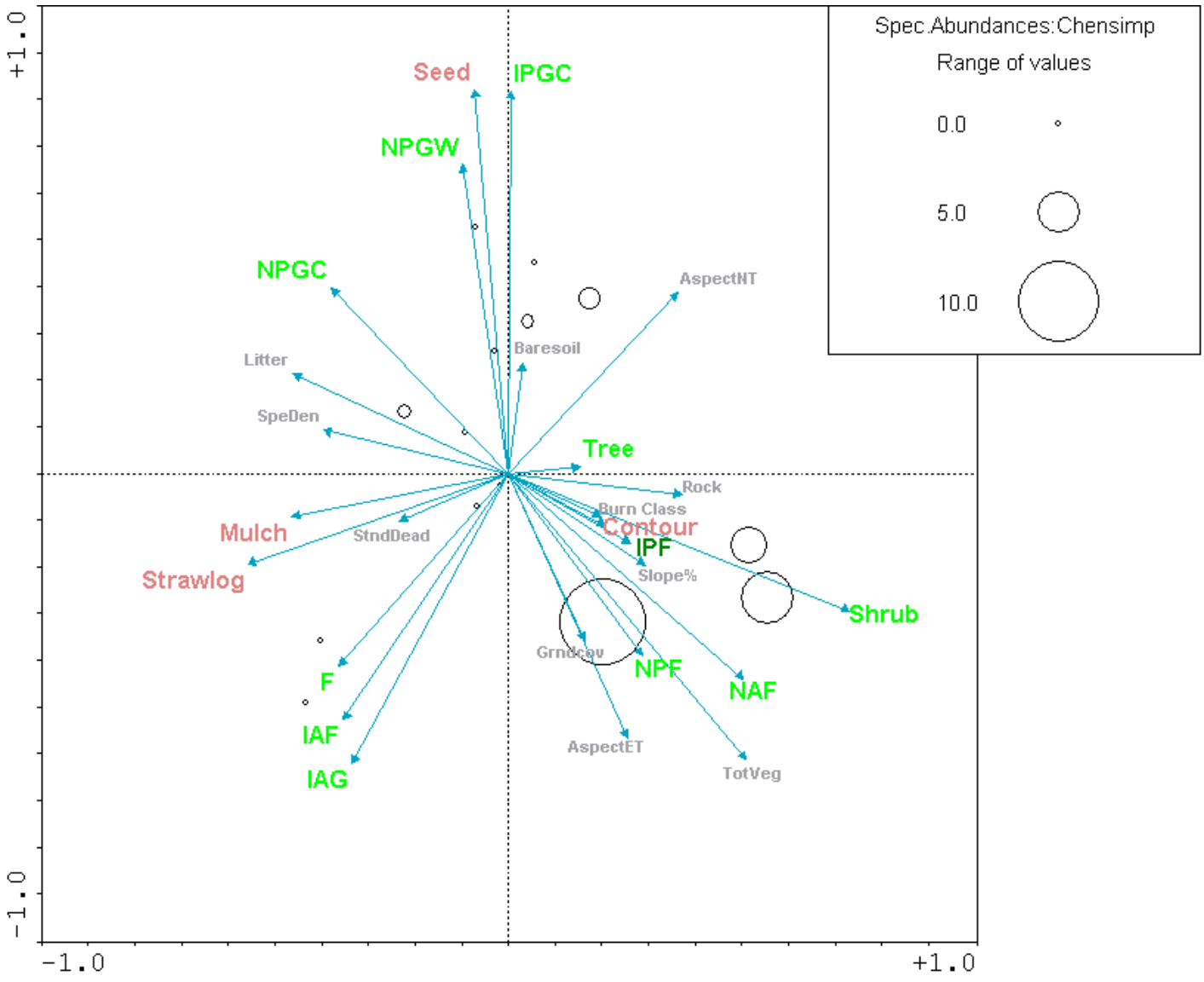


Figure 20. *Chenopodium simplex* Cover Distribution – non-preferential species.

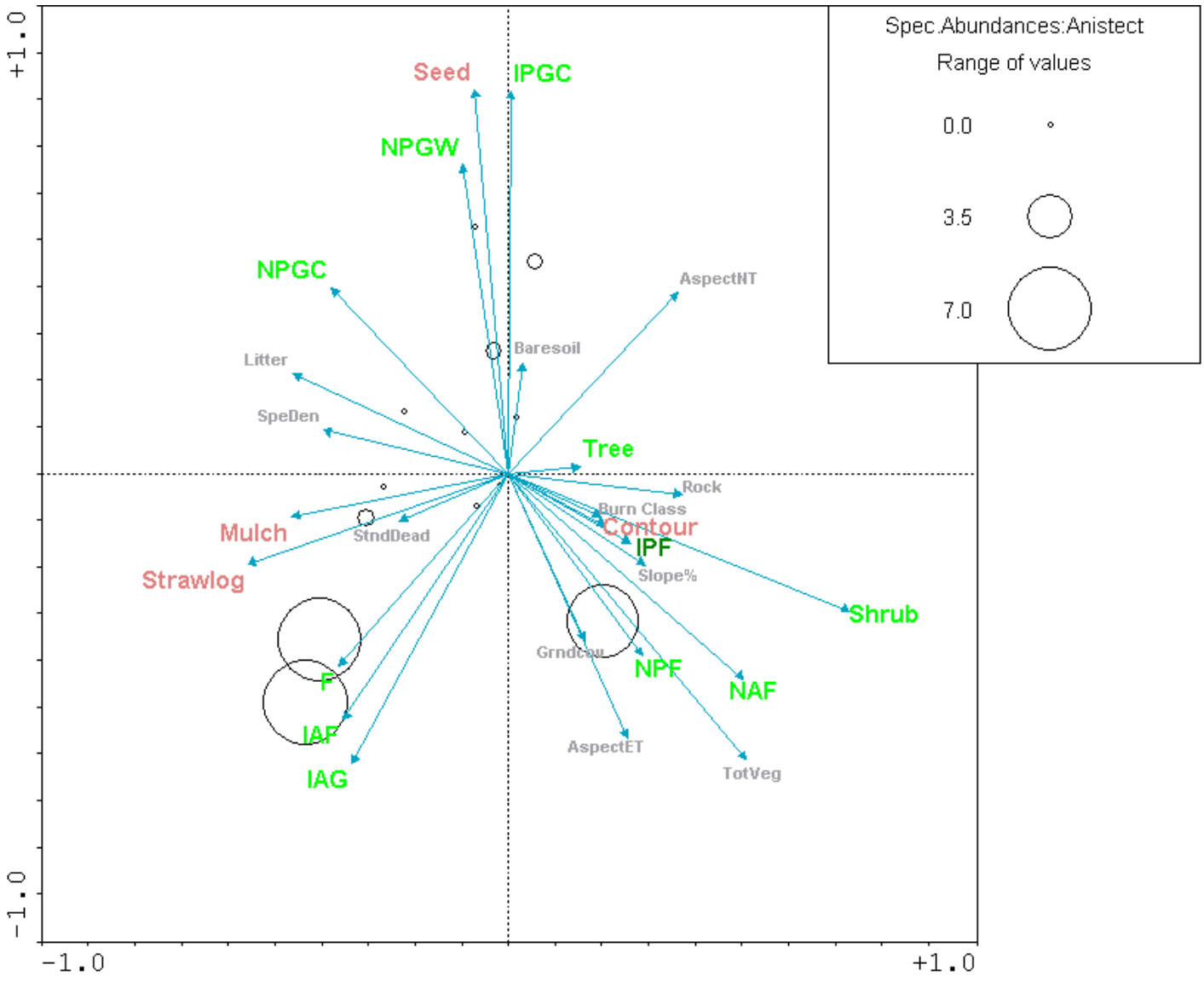


Figure 21. *Anisantha tectorum* Cover Distribution – an indicator for Groups C & D.

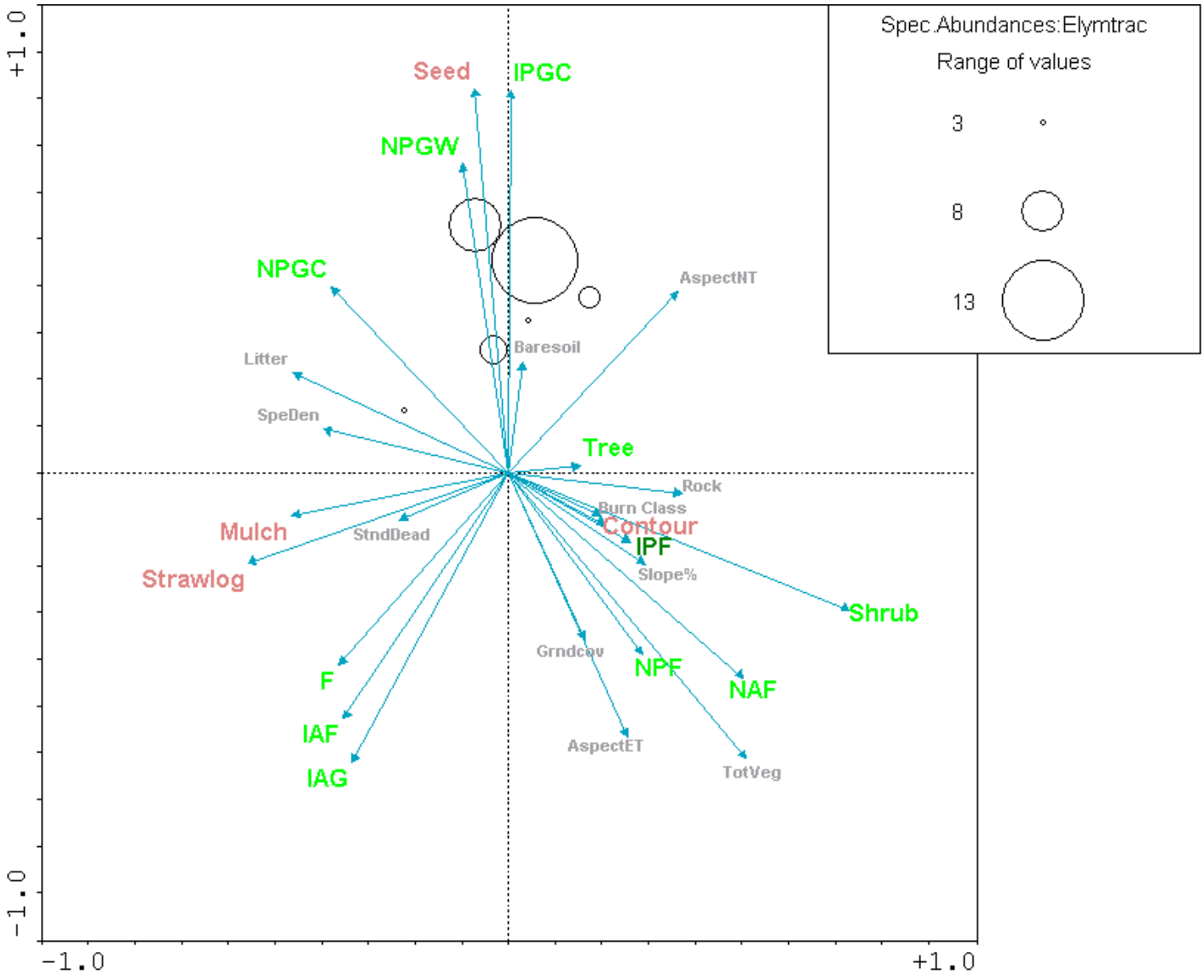


Figure 22. *Elymus trachycaulus* Cover Distribution.

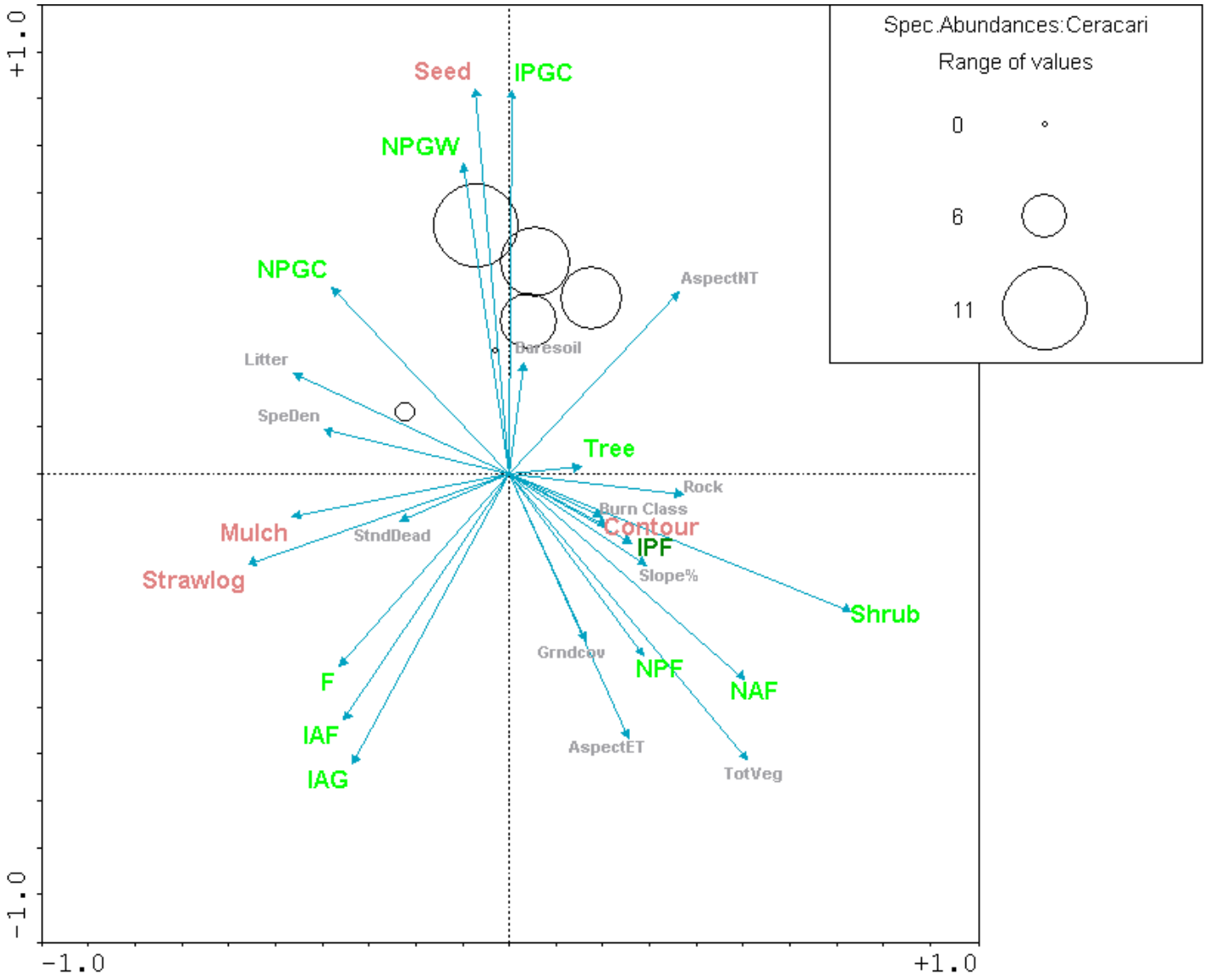


Figure 23. *Ceratochloa carinata* Cover Distribution indicator species for Group B.

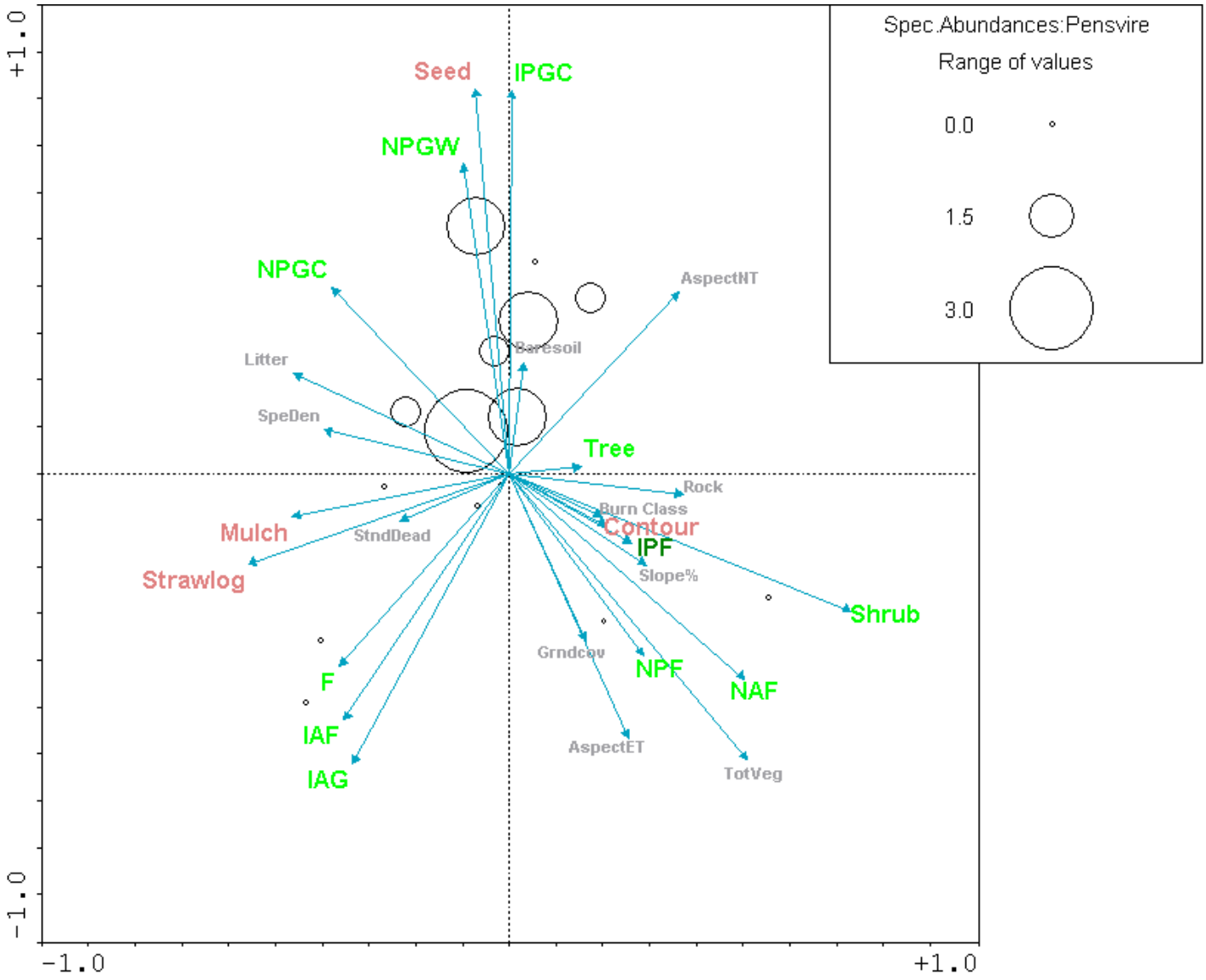


Figure 24. *Penstemon virens* Cover Distribution – non-preferential species.

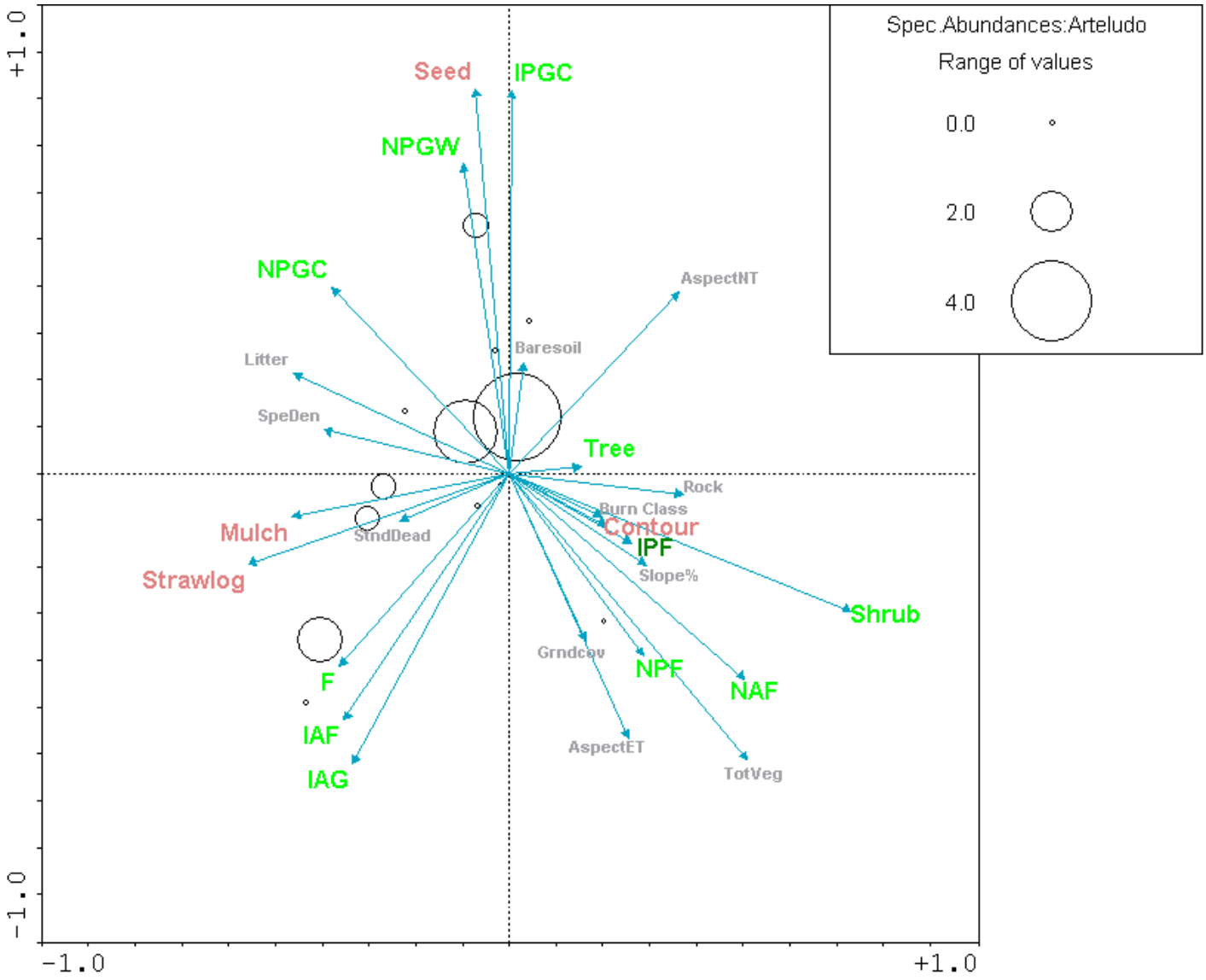


Figure 25. *Artemisia ludovisciana* Cover Distribution.

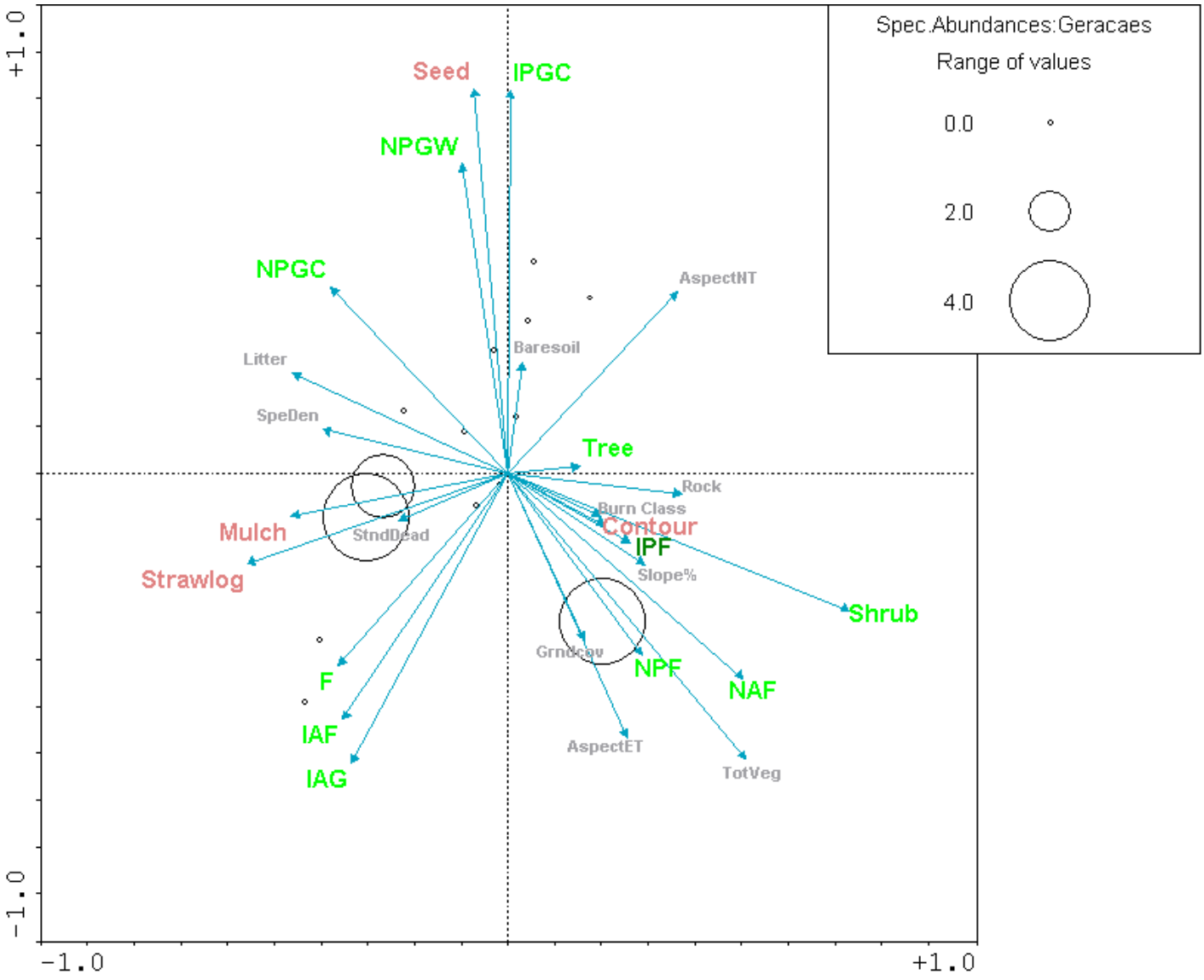


Figure 26. *Geranium caespitosum ssp. caespitosum* Cover Distribution.

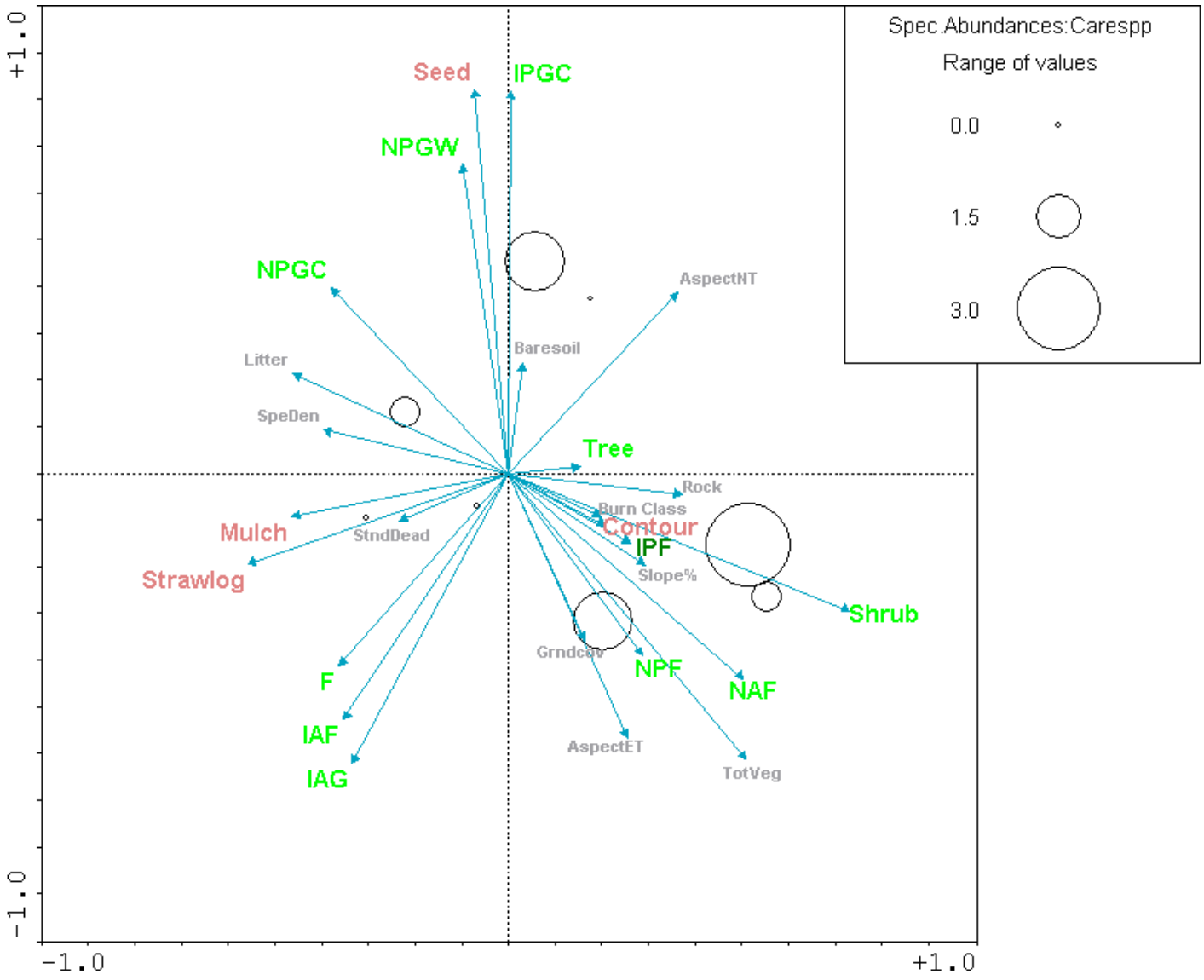


Figure 27. *Carex* spp. Cover Distribution.

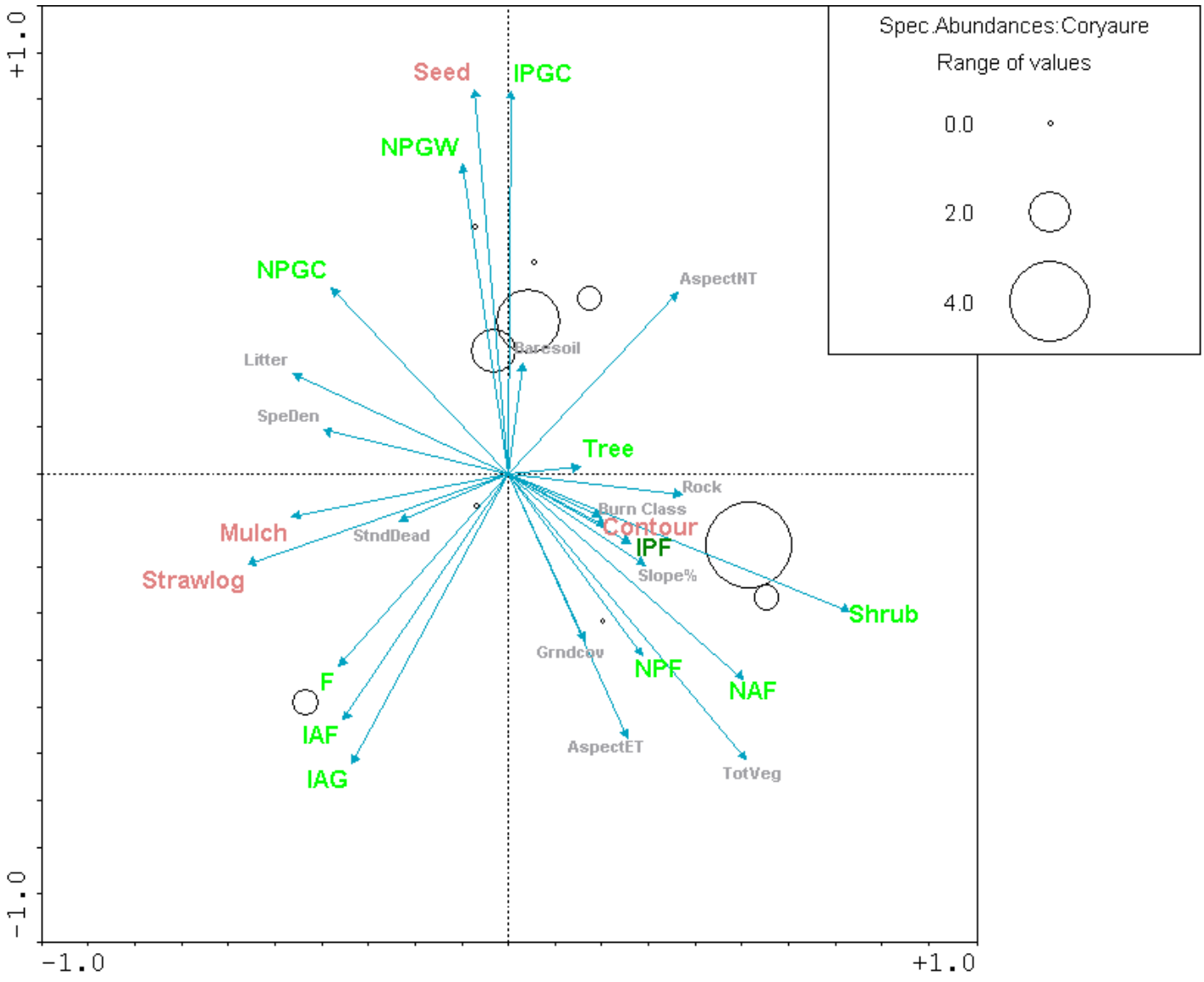


Figure 28. *Corydalis aurea* Cover Distribution.

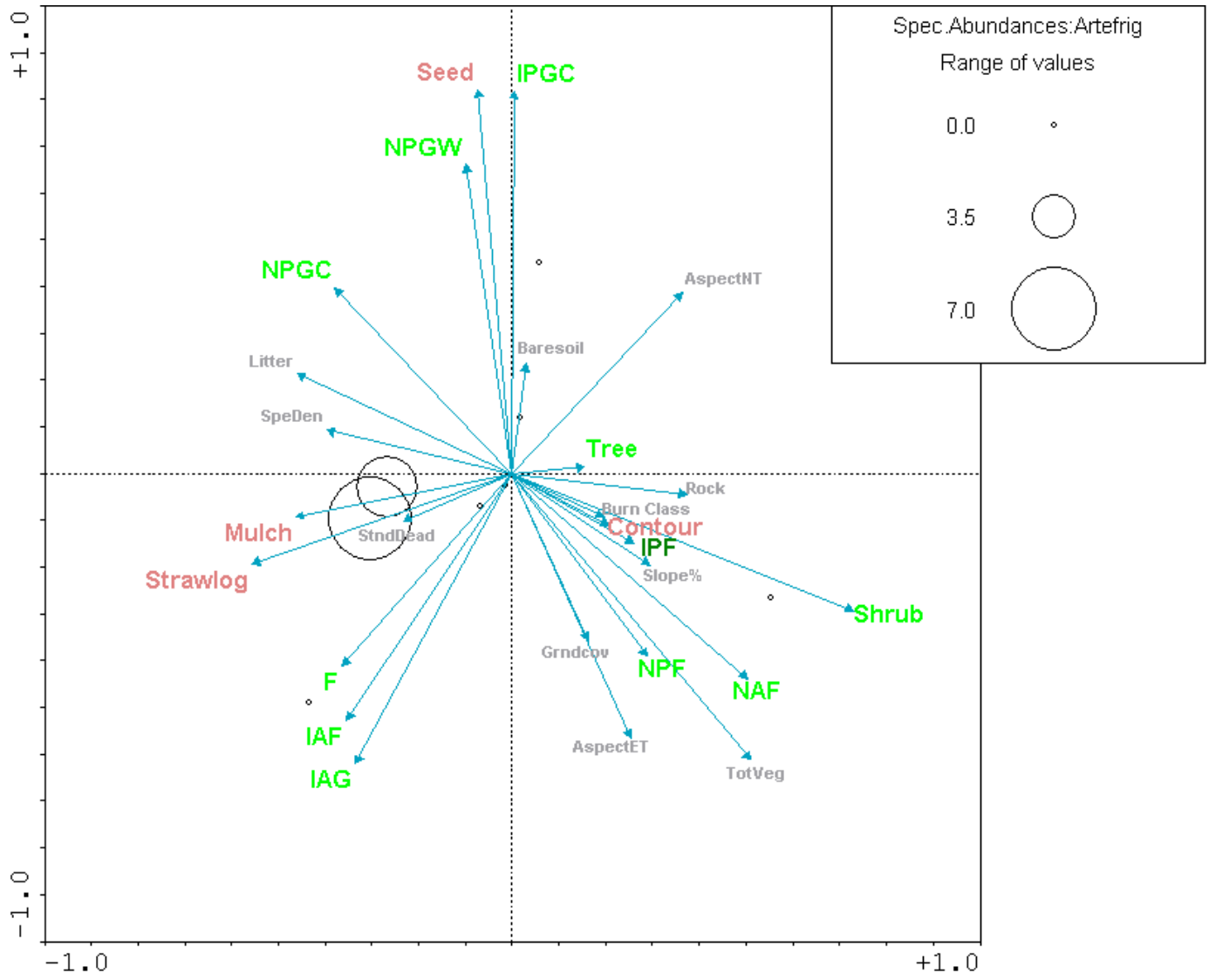


Figure 29. *Artemisia frigida* Cover Distribution.

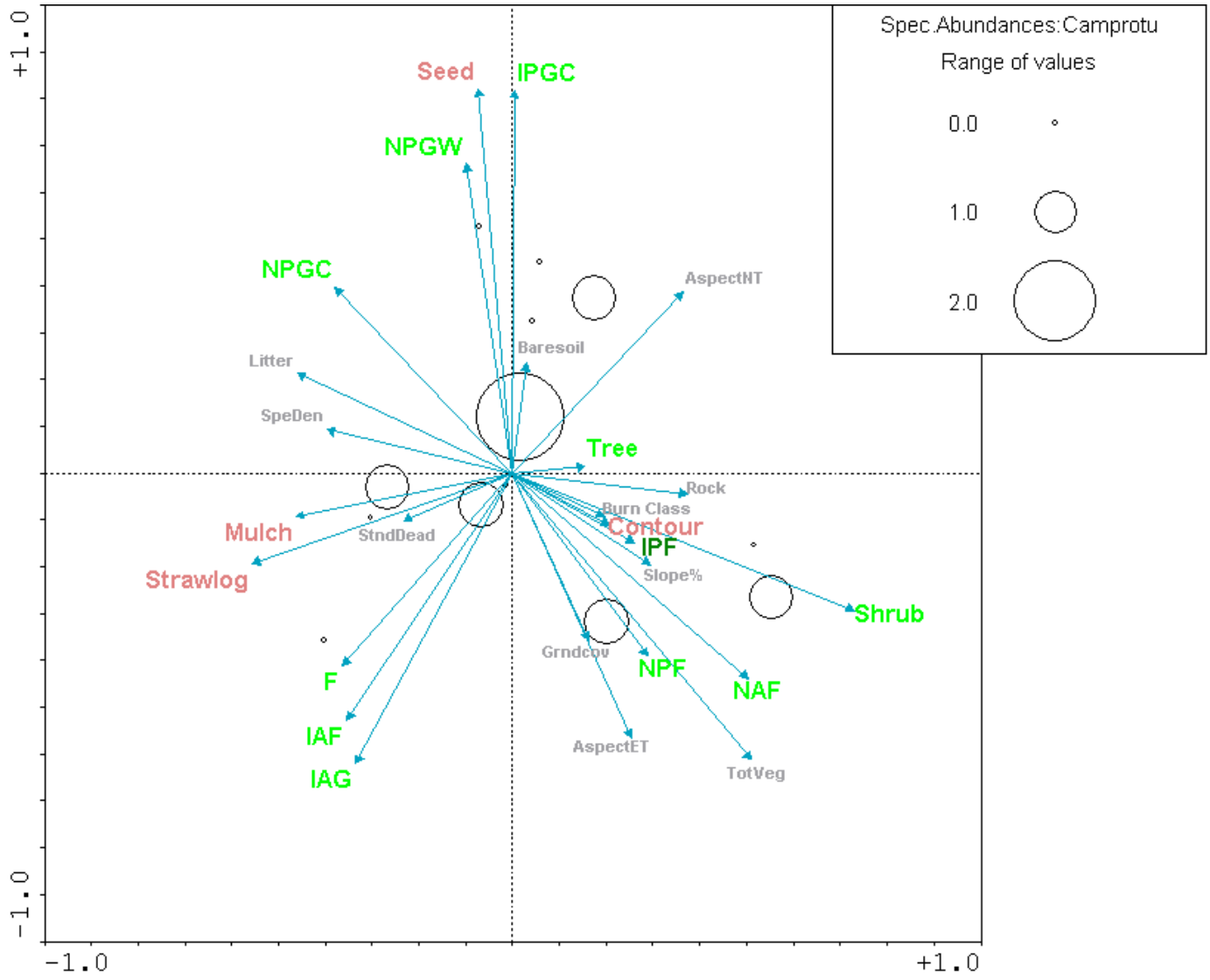


Figure 30. *Campanula rotundifolia* Cover Distribution – non-preferential species.

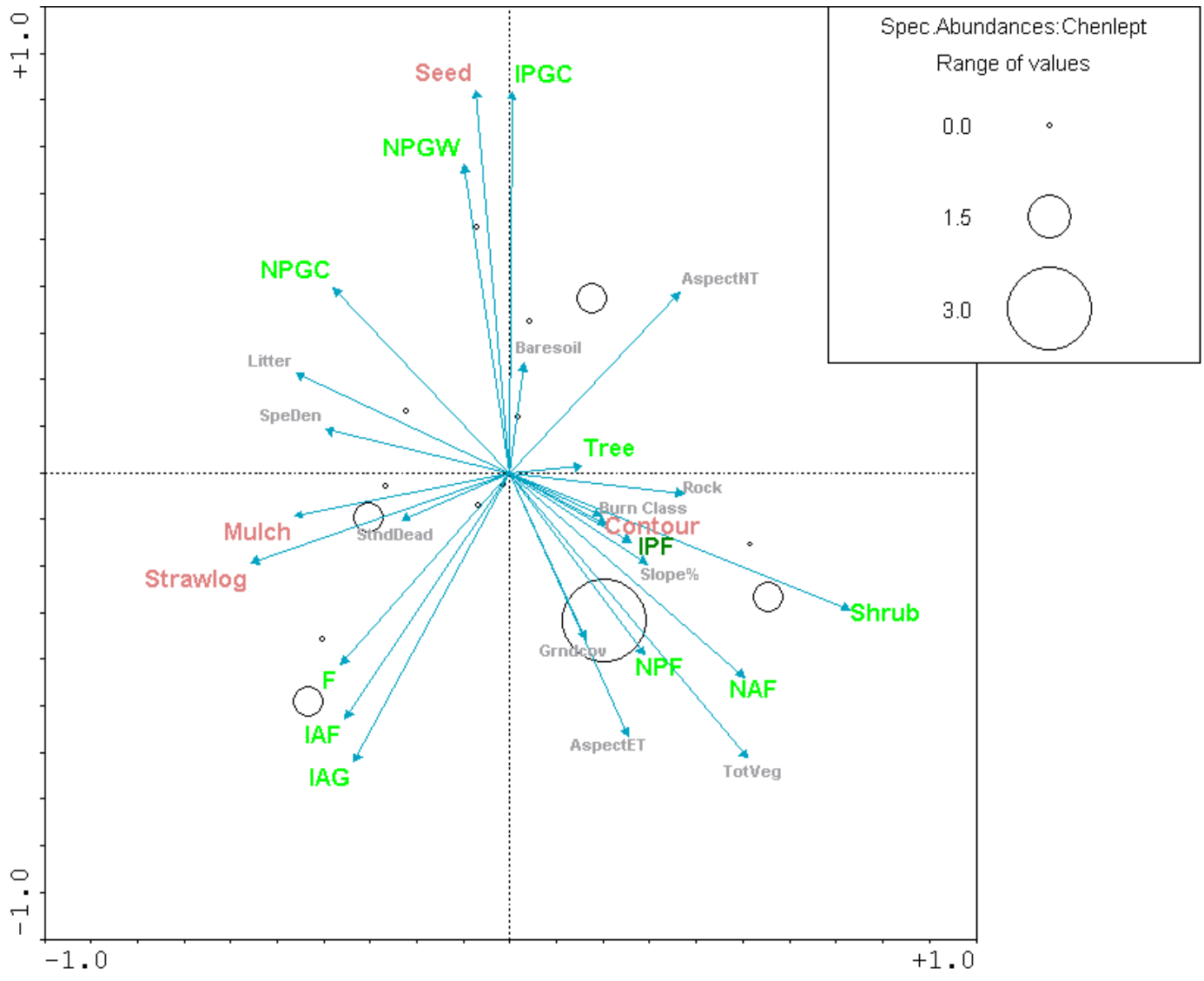


Figure 31. *Chenopodium leptophyllum* Cover Distribution – non-preferential species.

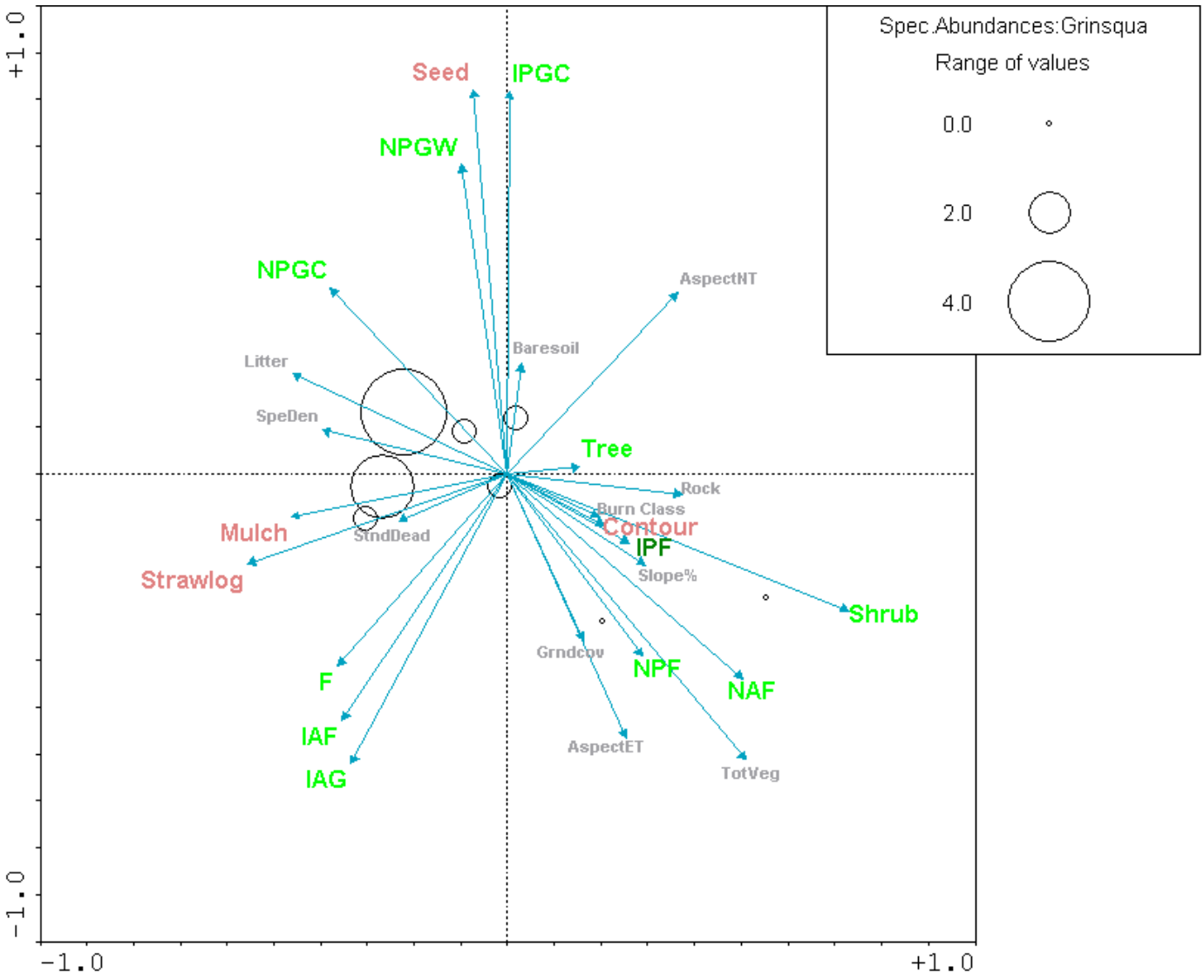


Figure 32. *Grindelia squarrosa* Cover Distribution.

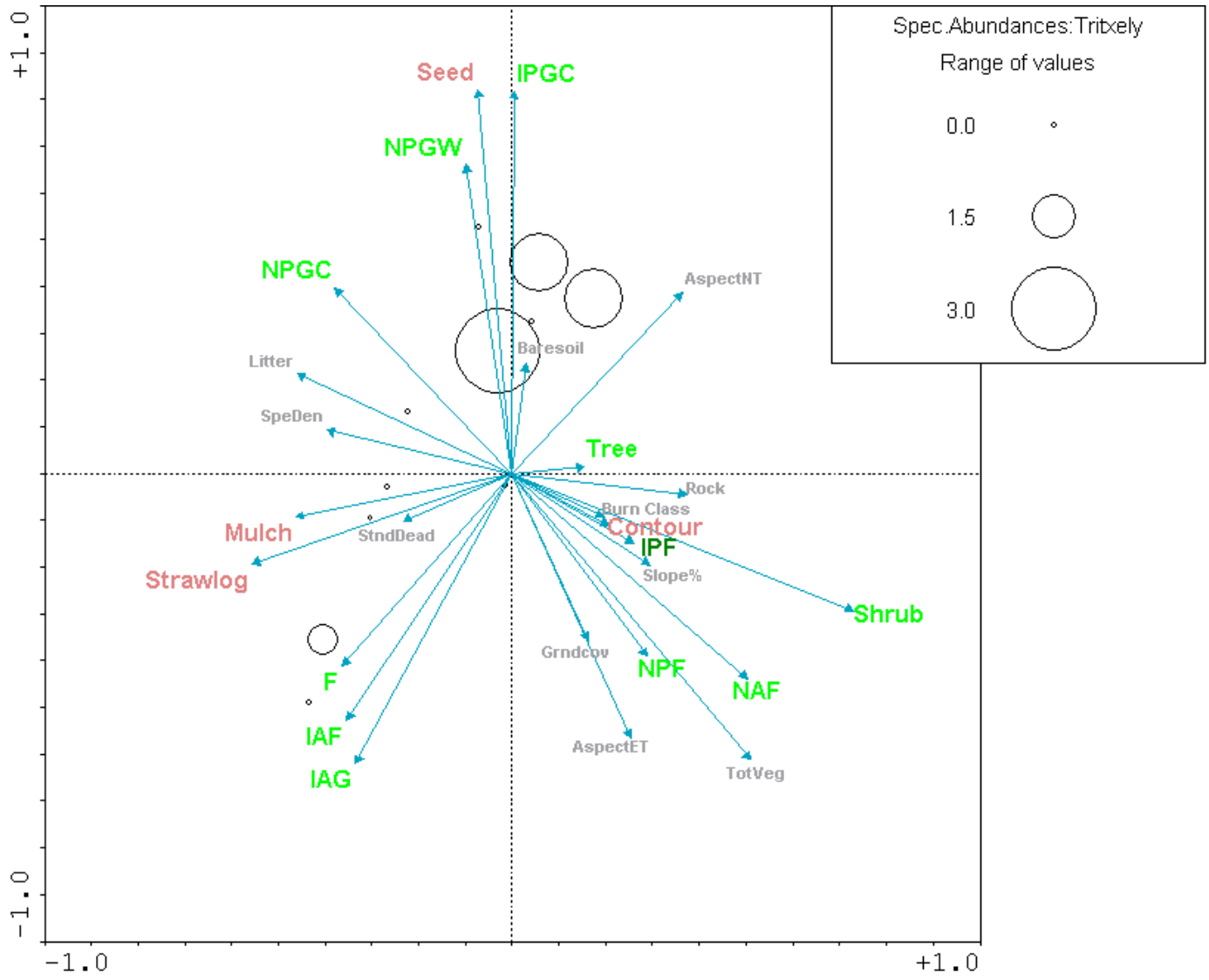


Figure 33. *Triticum aestivum x Elytrigia elongata* Cover Distribution.

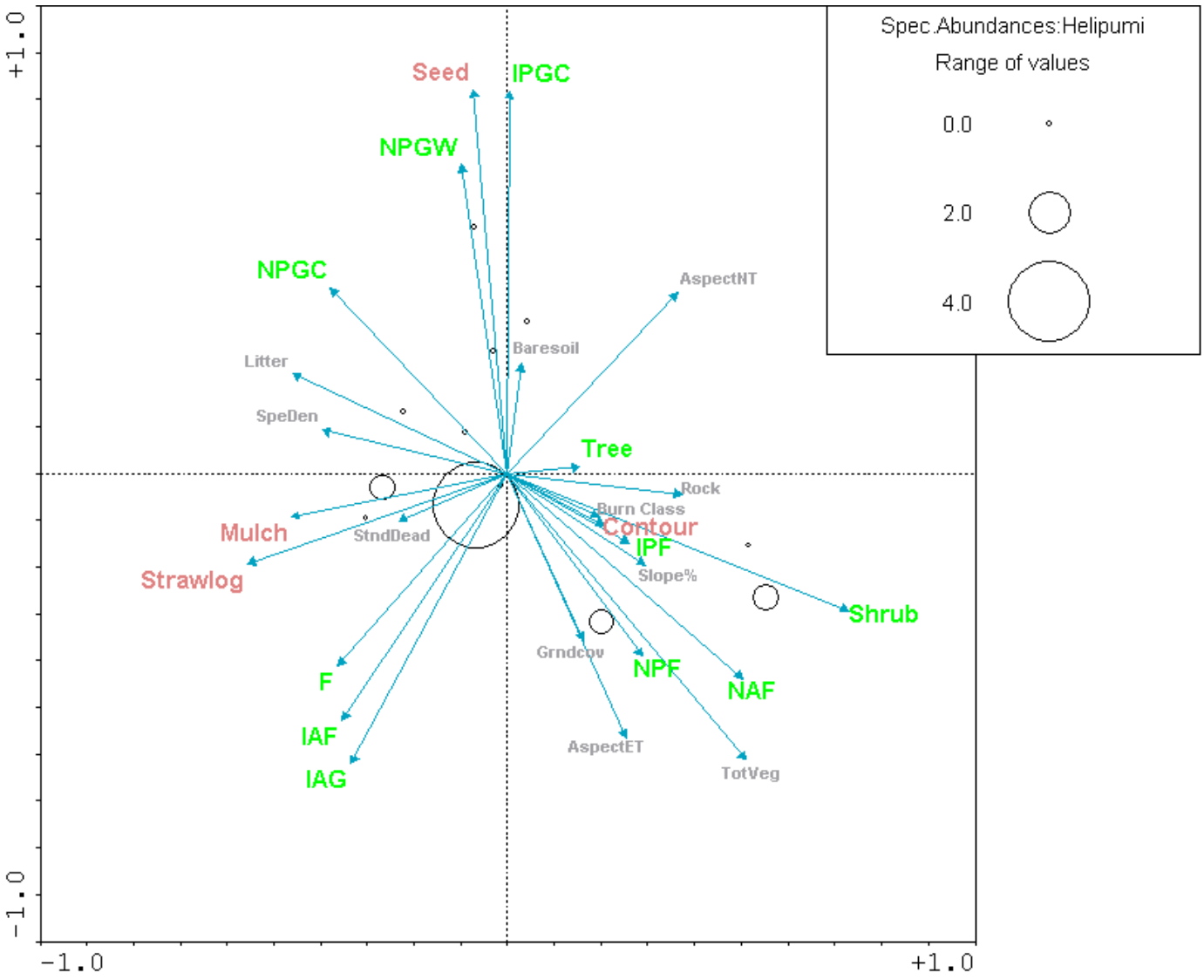


Figure 34. *Helianthus pumilus* Cover Distribution.

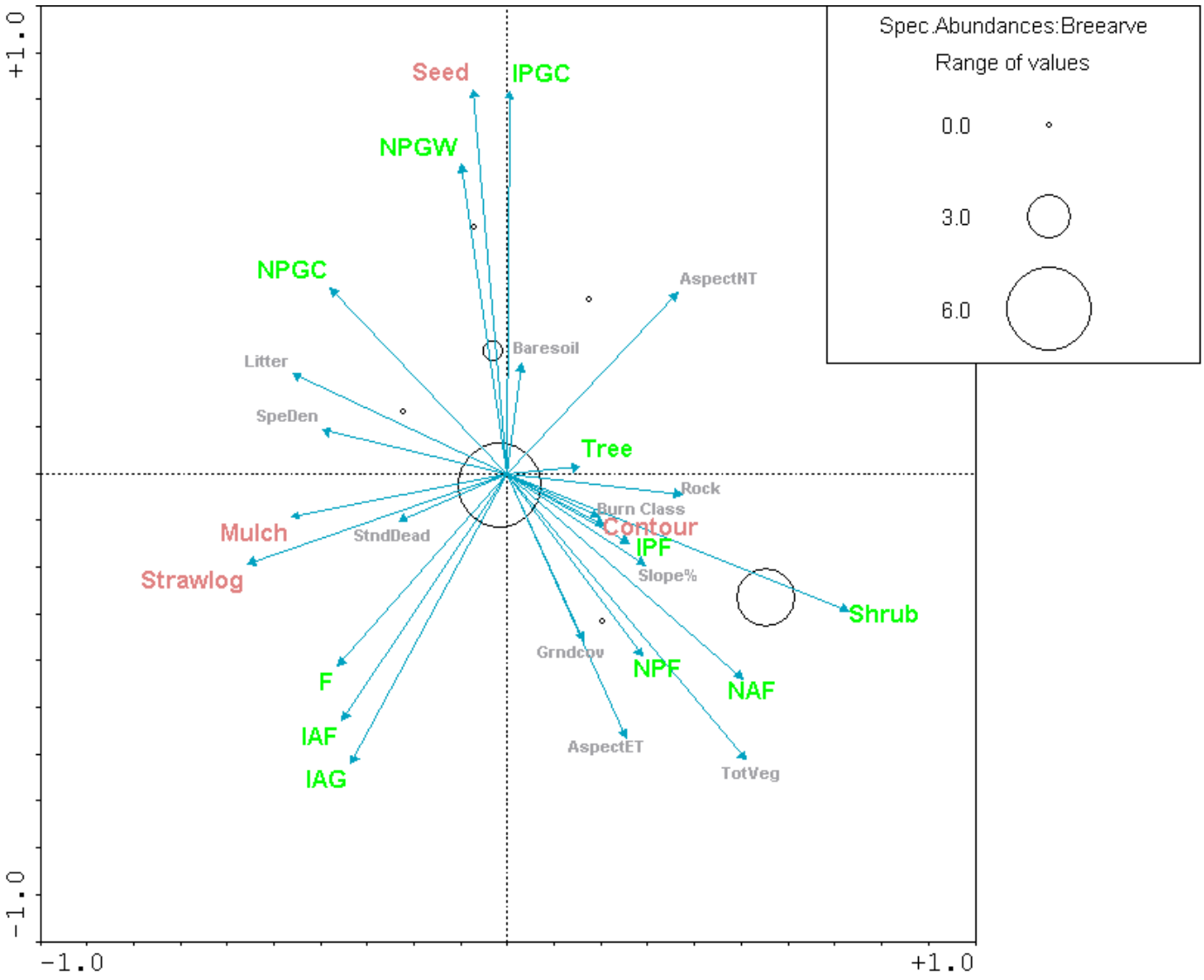


Figure 35. *Breea arvensis* Cover Distribution.

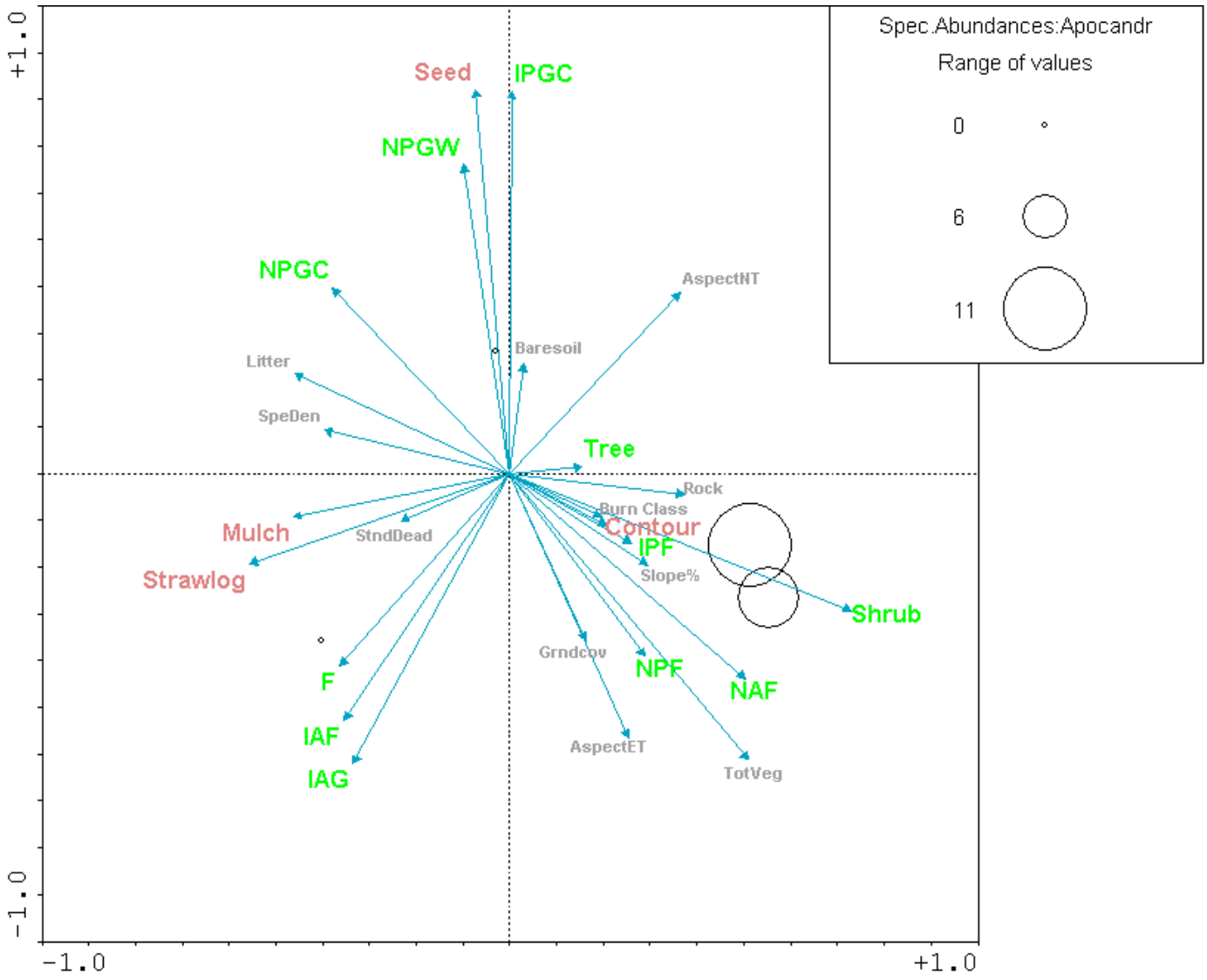


Figure 36. *Apocynum androsaemifolium* Cover Distribution.

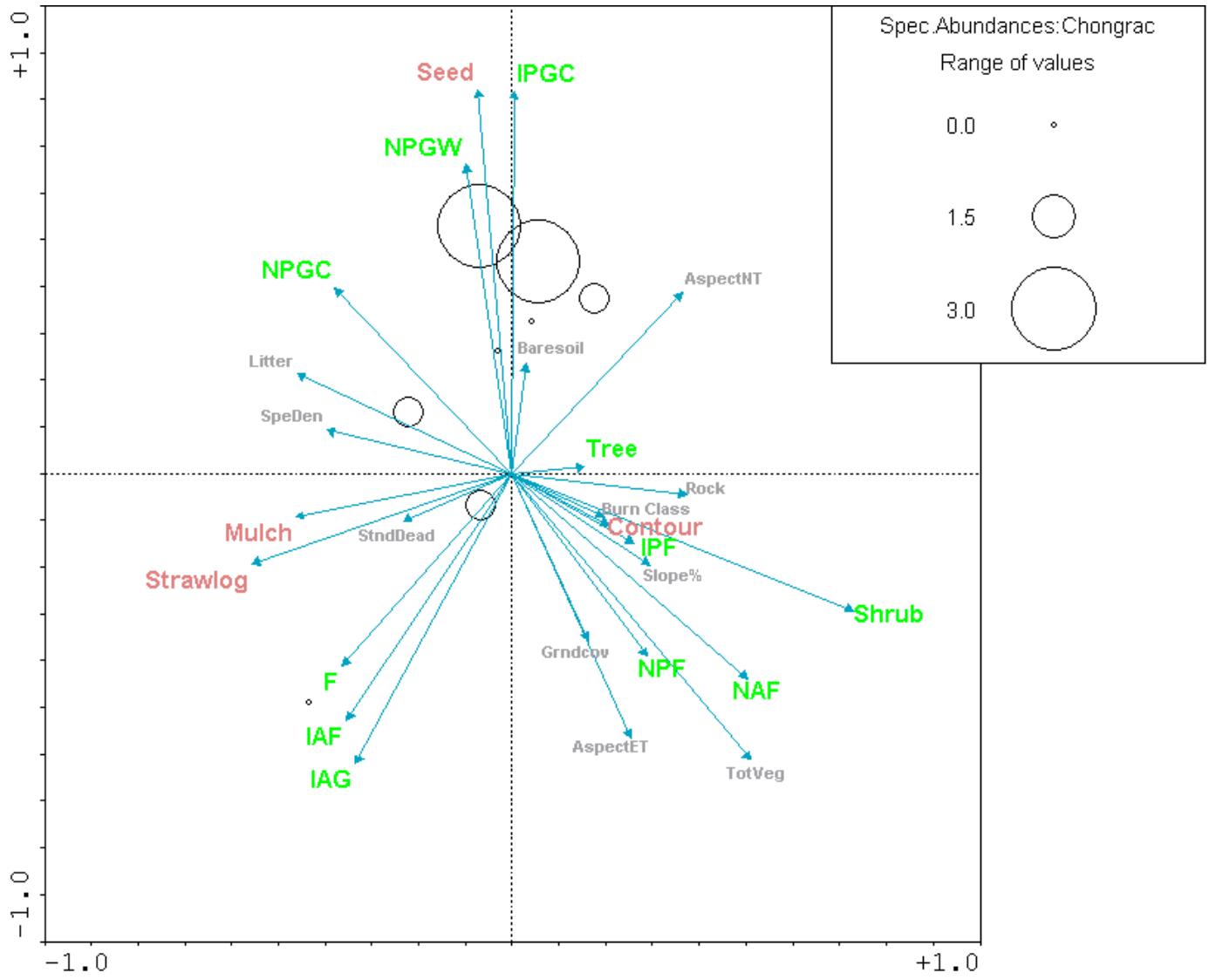


Figure 37. *Chondrosum gracile* Cover Distribution.

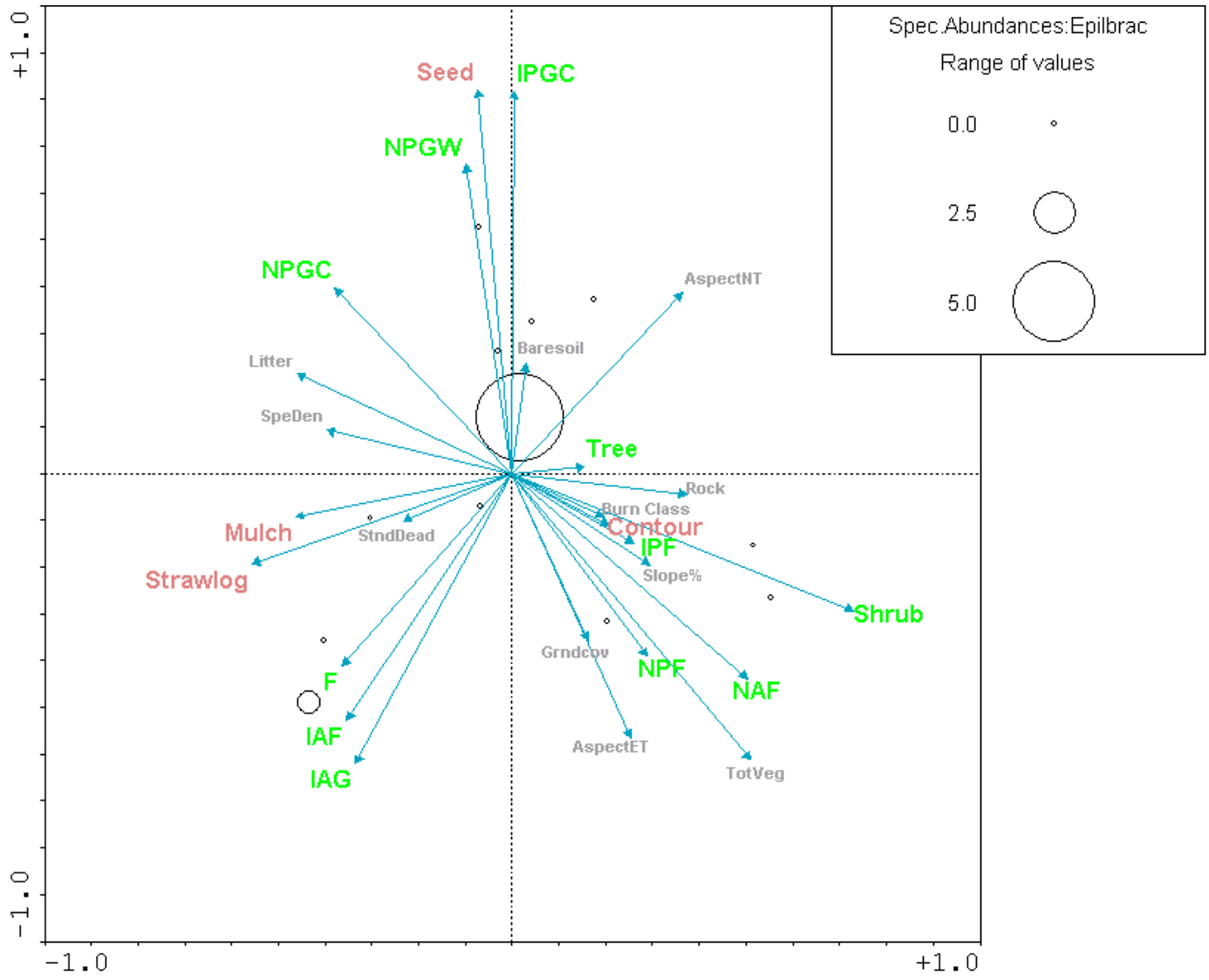


Figure 38. *Epilobium brachycarpum* Cover Distribution.

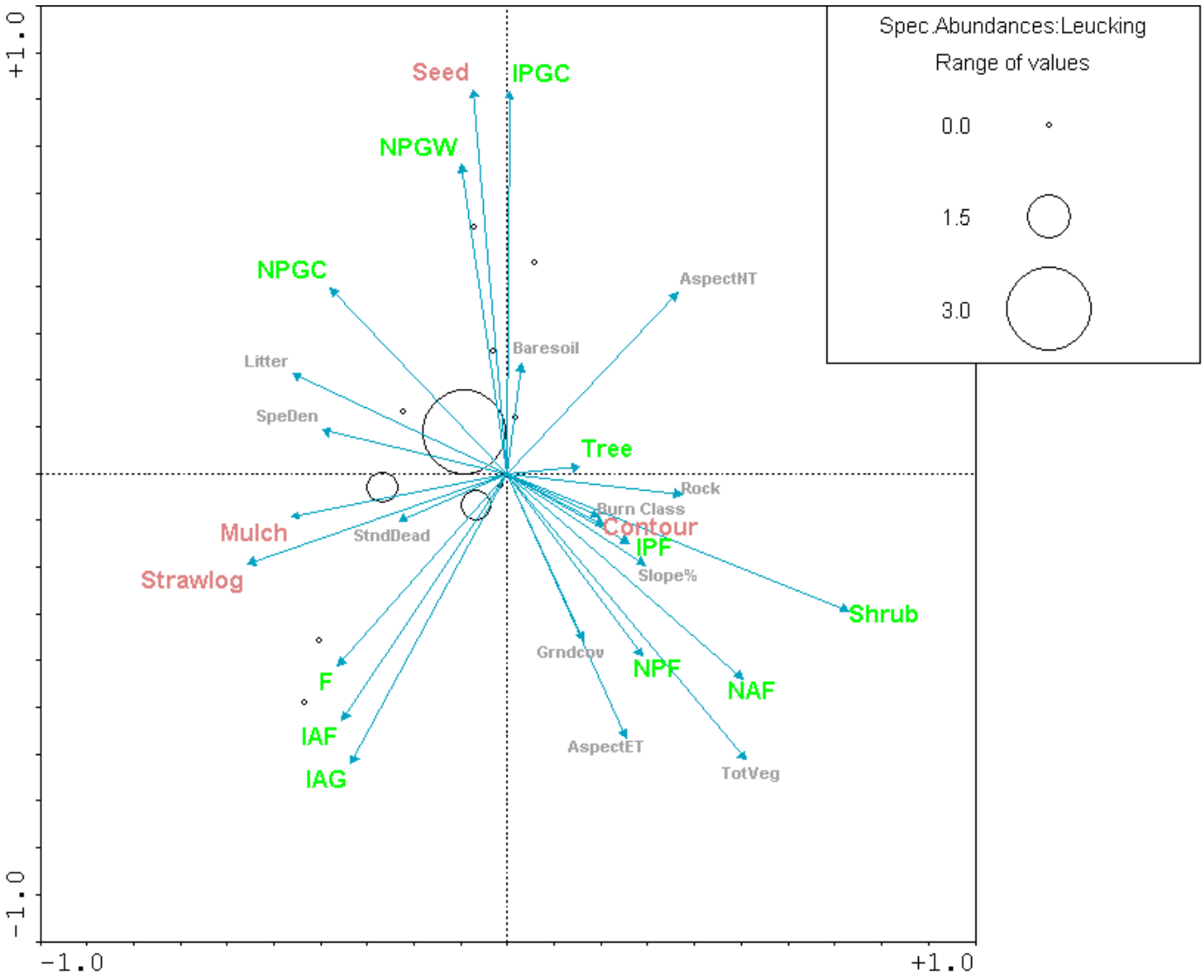


Figure 39. *Leucopoa kingii* Cover Distribution.

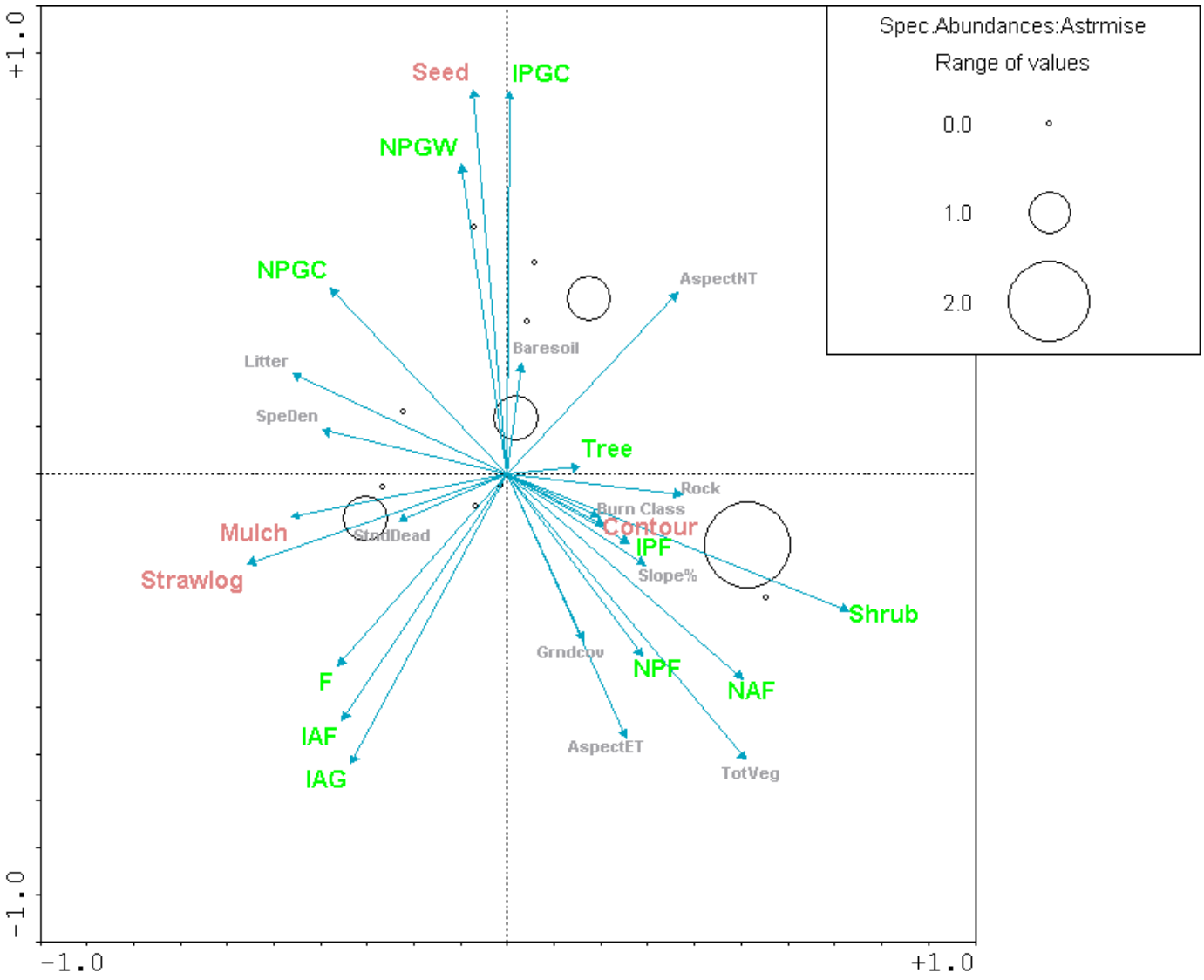


Figure 40. *Astragalus miser var. oblongifolius* Cover Distribution – non-preferential species.

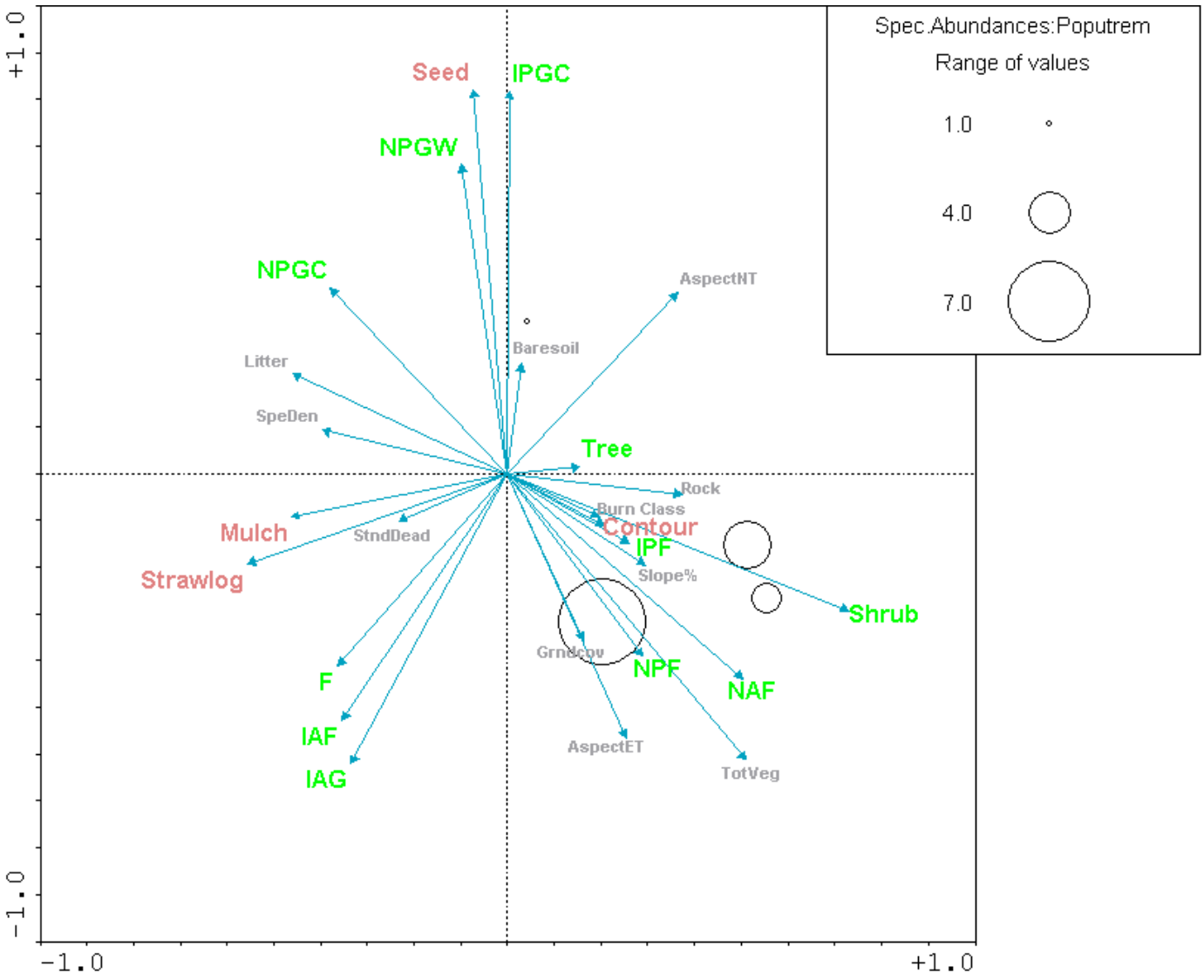


Figure 41. *Populus tremuloides* Cover Distribution – indicator species for Group A.

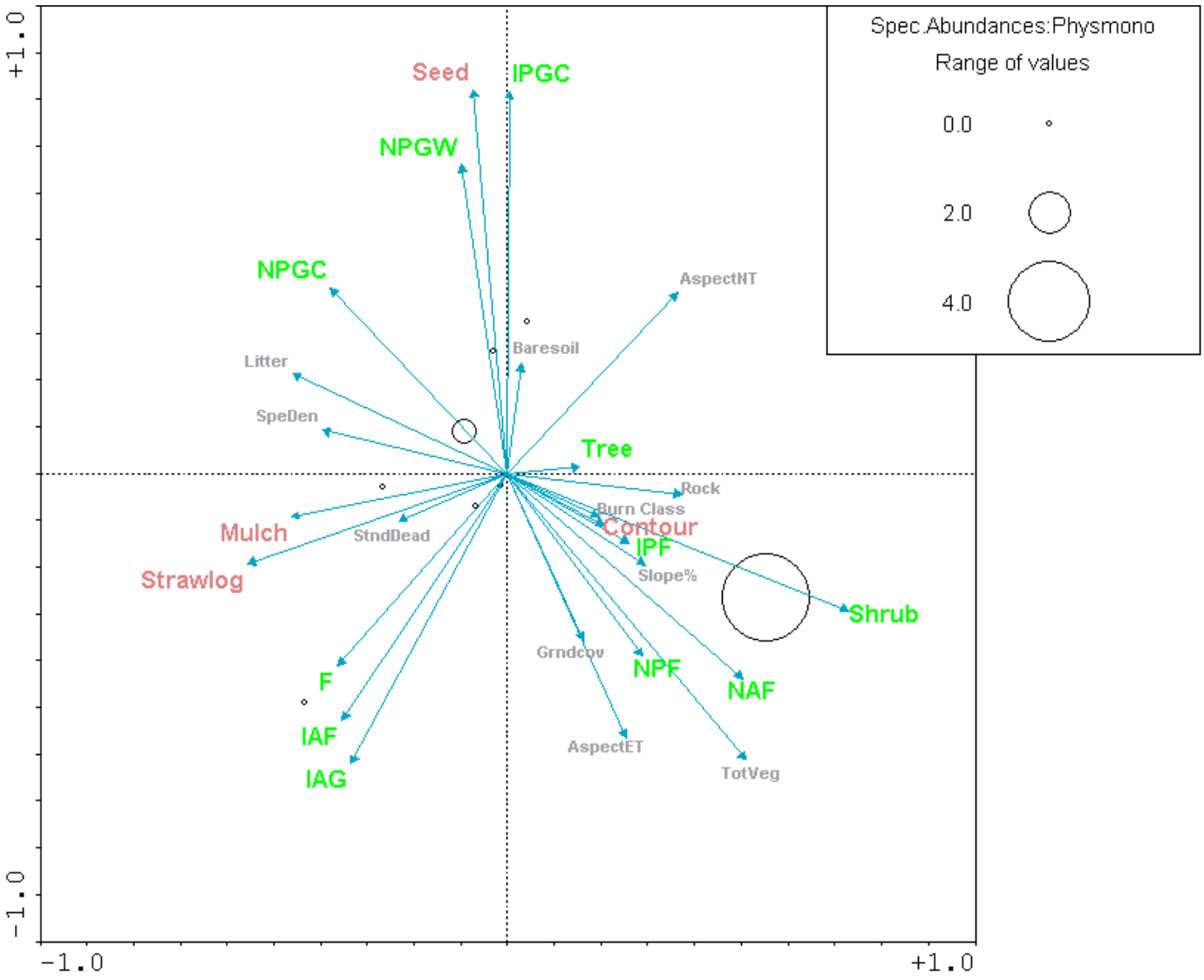


Figure 42. *Physocarpus monogynus* Cover Distribution.

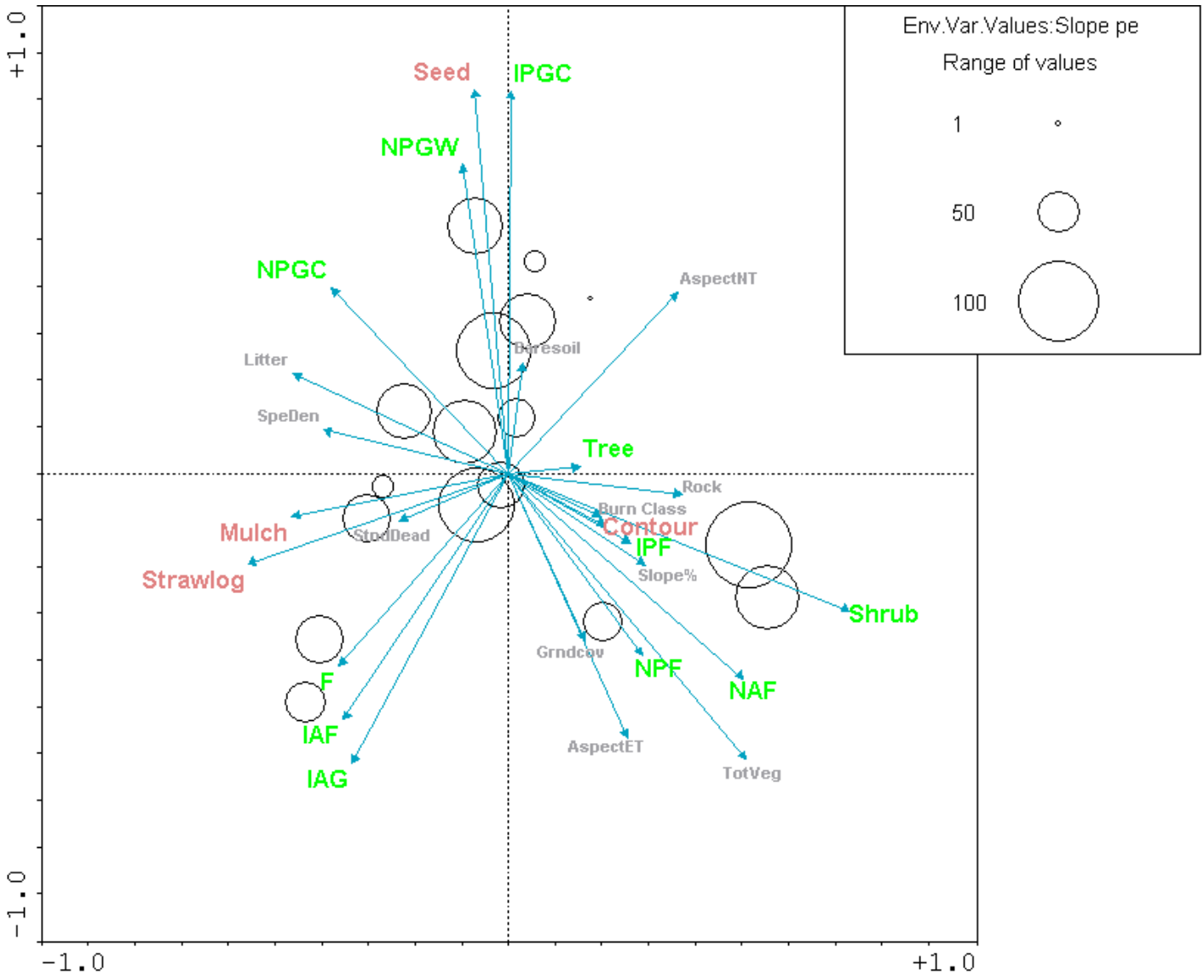


Figure 43. Distribution of Slope % of samples scaled from 100 to 0.

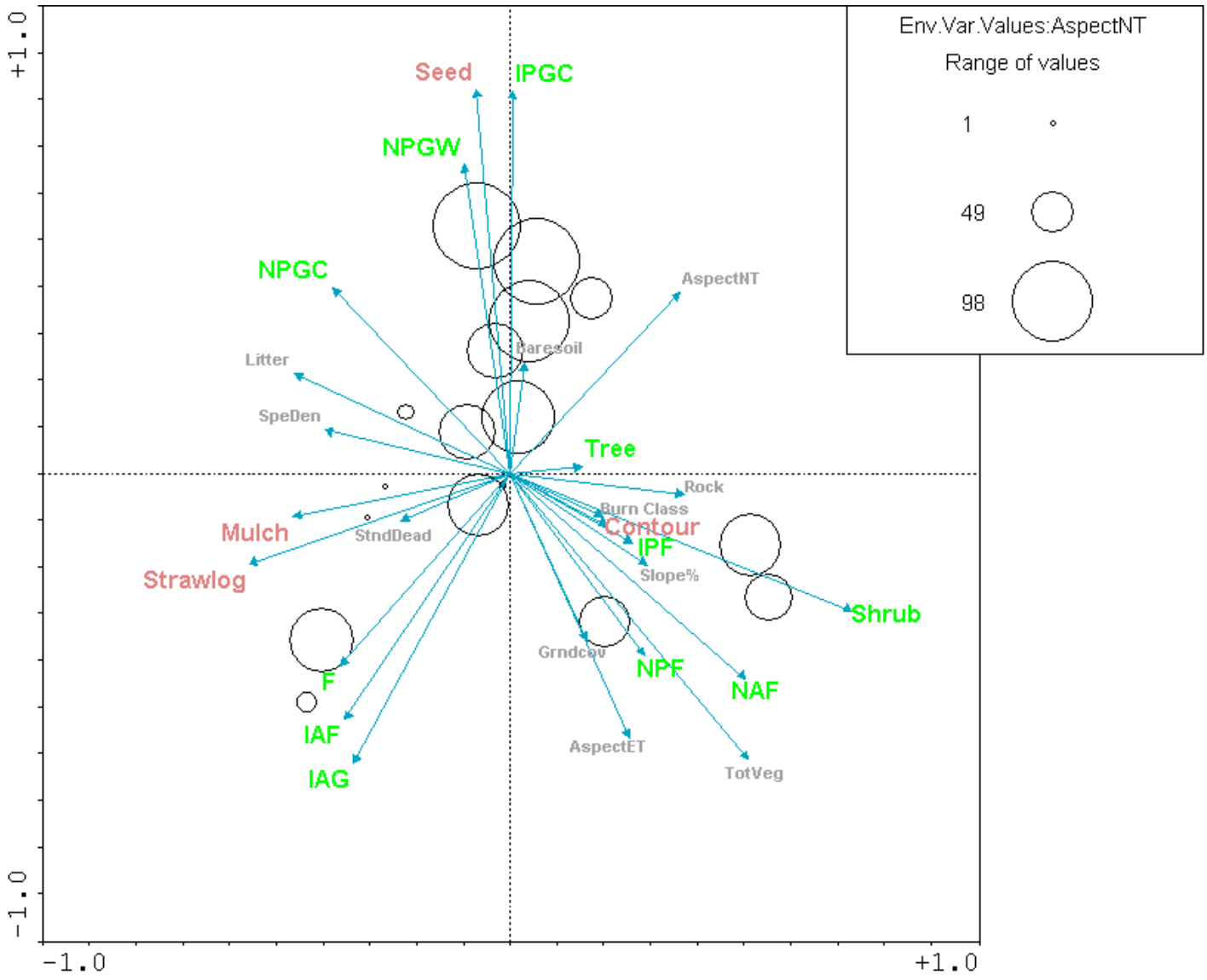


Figure 44. Distribution of "Northerly" Aspect scaled from 100 to 0.

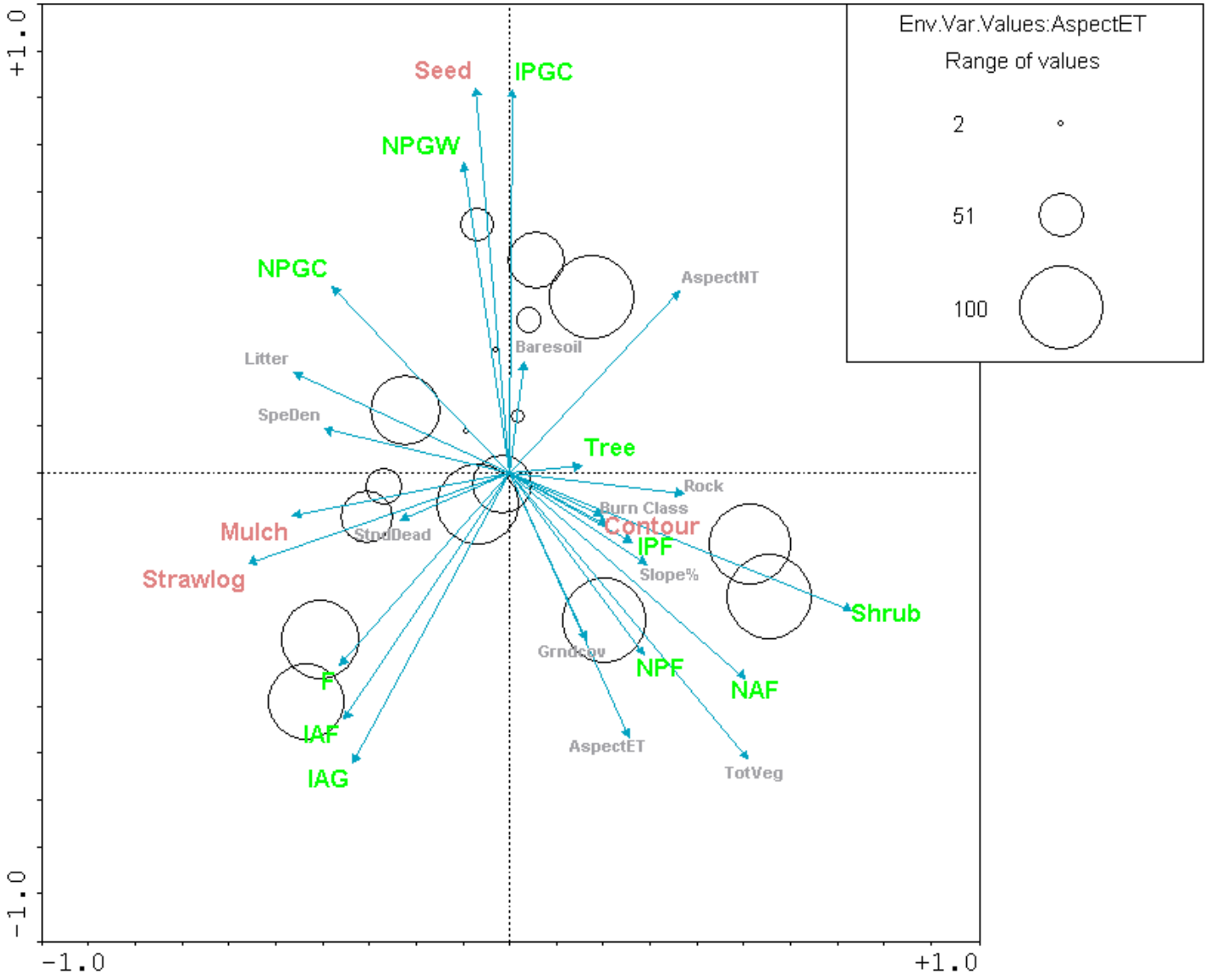


Figure 45. Distribution of "Easterly" Aspect scaled from 100 to 0

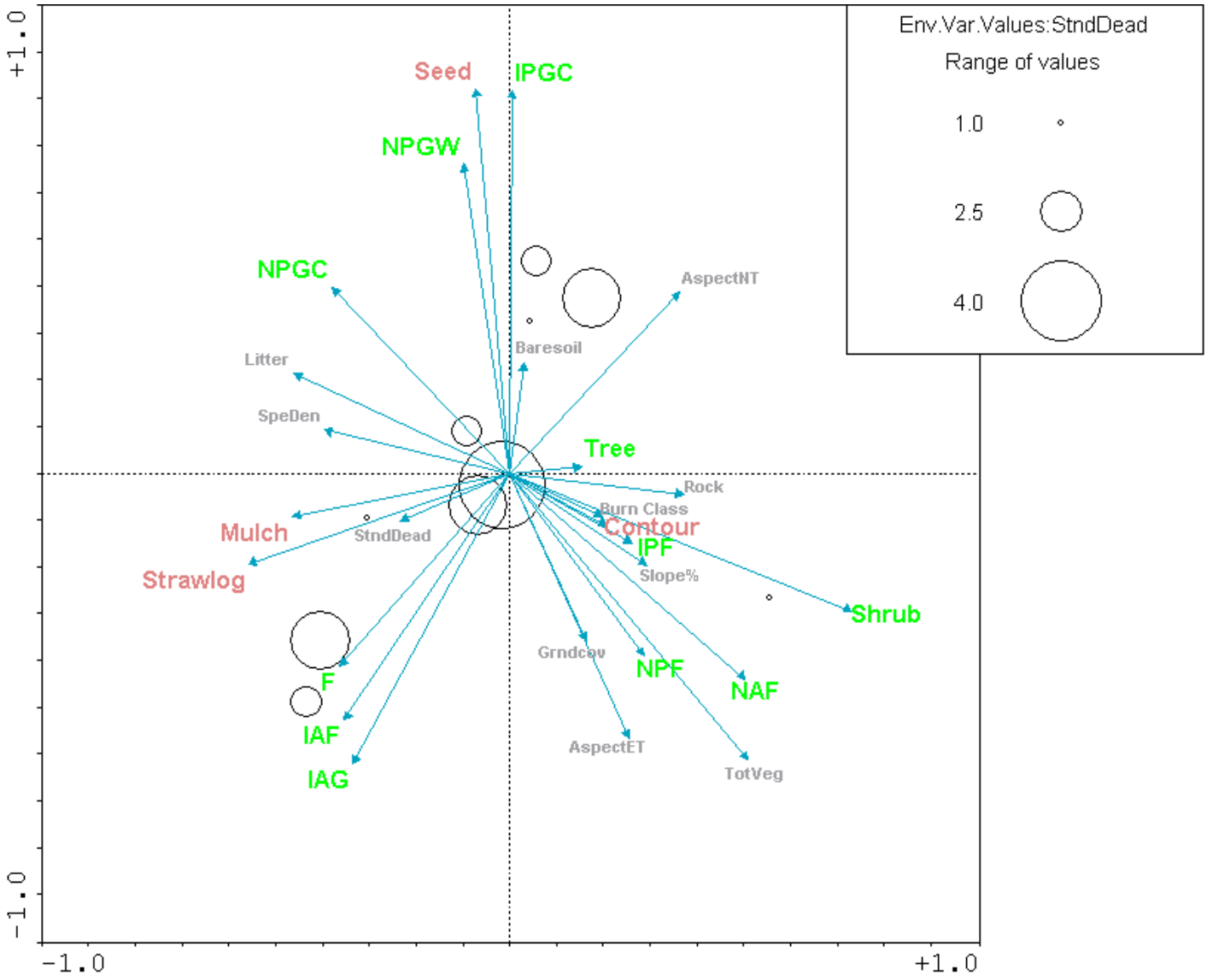


Figure 46. Distribution of Standing Dead Percent Cover.

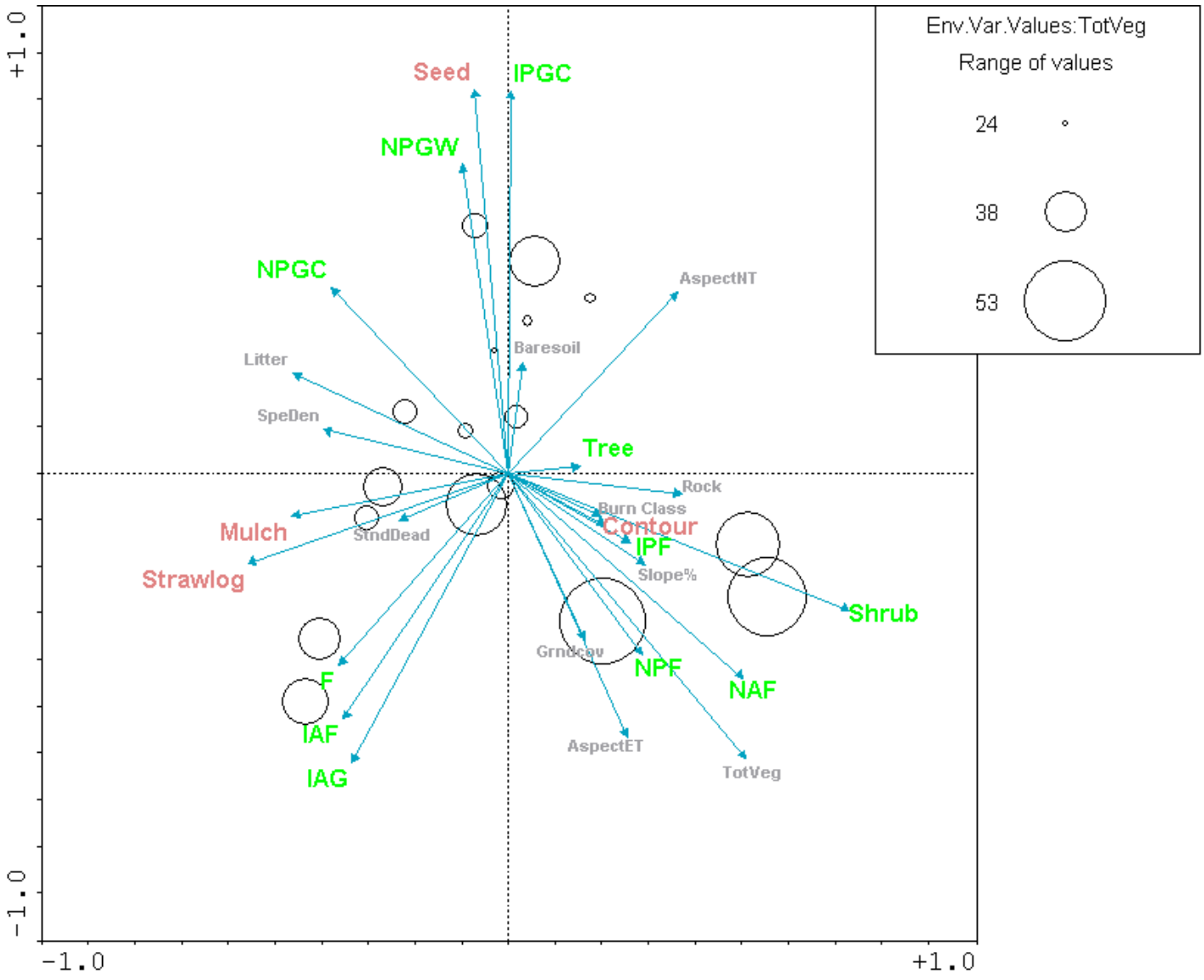


Figure 47. Distribution of Total Vegetation Percent Cover.

Group Descriptions – Synthesis of Classification and Ordination

Most of the following information is schematically summarized in Figure 6 (TWINSPAN classification dendrogram) and Figure 48 (Ground cover of the TWINSPAN classification groups).

Although five groups were defined by the classification, only four occur within the burn area. A description of the groups follows.

Group **A** was composed of 3 samples (12, 13, 14) that were defined by the presence of the indicator species quaking aspen. All three samples received the same severe burn classification and received only contour log installation. Group A was distinguished by higher total vegetation cover (36%) that was composed of only a small percentage of introduced species (3.4% see Figure 48). It also tended to have higher cover values of native annual forbs and native shrubs. Species density averaged 37.0 species/100 sq.m.

Group **B** was composed of 6 samples (1, 6, 8, 9, 10, 16) that were defined primarily by having been severely burned and seeded. The presence of mountain brome and slender wheatgrass were the predominantly distinctive species for this group with the exception of Sample 16. Sample 16 was not seeded but was included in this group primarily due to the standing dead ponderosa and Douglas fir. Sample 16 could be considered transitional to Group A. This group also typically had a more northerly aspect, more bare soil. These stands may have been denser stands with a denser layer of duff and fewer understory species prior to the fire. The fire may have burned hotter here, and the combination of these factors lead to the decision to apply seed along with some other combination of treatments. The sites may have appeared to be more sterile resulting in a post-fire management decision to apply seed. Total vegetation cover was 27% with 7% composed of introduced species and an additional 5.3% provided by slender wheatgrass (one of the reclamation species that is a non-local native). Species density averaged 40.8 species/100 sq.m.

Group **C** was composed of 5 samples (2, 4, 5, 7, 11) that were defined primarily by having been severely burned, with contour log felling, straw logs, and mulch treatment with no seeding. Samples 7 and 11 were rated as moderately burned and sample 7 received no mulch or seed, and site 11 received only seeding. A suite of species also typified this group, such as Jim Hill mustard (*Sisymbrium altissimum*), hairy golden aster (*Heterotheca villosa*), and wild buckwheat (*Eriogonum umbellatum var. umbellatum*). The abundance of standing dead ponderosa pine combined with sedge *(Carex pensylvanica ssp. heliophila*) also typified this group. This group had the highest percentage cover of introduced species with about 9.6% cover, but most of this cover was provided by annual introduced species (2.8% from cheatgrass, 5% from Jim Hill mustard, 1.4% from alyssum). Although most of these sites received no seeding, there was still a trace of the introduced reclamation grass species in these areas. This may have been due to migration of seed from the seeded areas due to either human or natural causes such as surface water flow mobilization of the seed. Species density averaged 41.6 species/100 sq.m.

Group **D** was composed of 3 samples (3, 15, 17) that were relatively intermediate with respect to many site and treatment characteristics, but were defined primarily by the indicator species bladderpod (*Lesquerella montana*), and relatively high values of buckbrush (*Ceanothus fendleri*) similar to Group A. Sample 17 is distinctly separated from the other two samples in the ordination

(Figures 11 & 12). Sample 17 may be included in this group due to similar species composition, but may be distinct due to the greater abundance of many of the species because this site was not burned. Sample 17 may be considered a target point on the trajectory of Samples 3 and 15 toward recovery of the more open forested stands in the burn area. Species density averaged 47.7 species/100 sq.m.

Group **E** was composed of only one off-site sample in a densely forested north-facing slope. This sample was distinct from all of the other samples because of the dense cover of Douglas fir along with the absence of many of the understory species that were excluded due to the closed canopy. Species density was 25-species/100 sq.m.

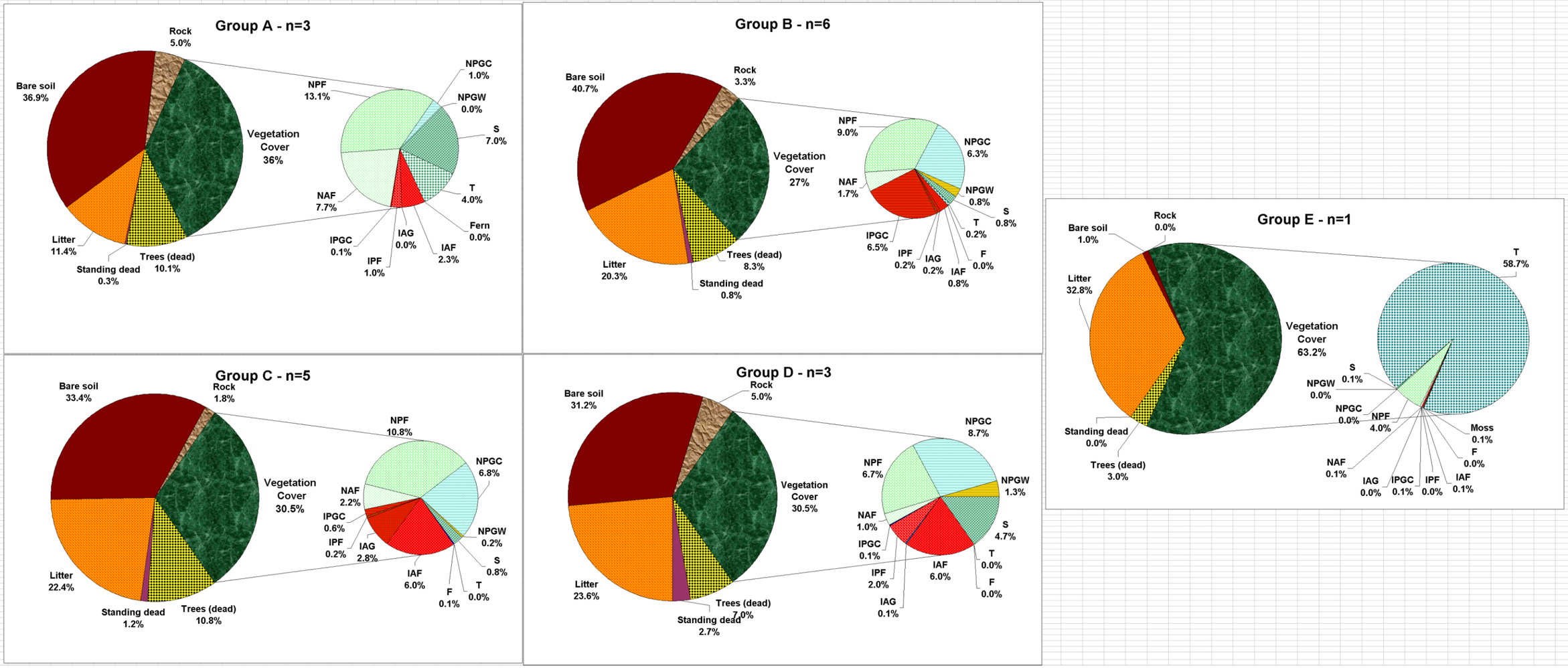


Figure 48. Ground cover of the TWINSPAN Classification Groups with Growth Form Composition.

IAF = Introduced Annual & Biennial Forbs
IAG = Introduced Annual Grasses
IPF = Introduced Perennial Forbs
IPGC = Introduced Perennial Grasses (cool season)
NAF = Native Annual & Biennial Forbs
NPF = Native Perennial Forbs
NPGC = Native Perennial Grasses (cool season)
NPGW = Native Perennial Grasses (warm season)
S = Native Shrubs
T = Native Trees
F = Native Ferns
M = Moss

Climatic Factors

Although this report does not discuss the historical disturbances or climatic factors that have resulted in the pre-fire plant associations, climatic data for the last 110 years (1894 – 2002) that may be used for that purpose are available from the author. The average annual precipitation as well as monthly temperature, precipitation and potential evapotranspiration, can provide great insight into the timing and severity of disturbance conditions that existed in the past.

The Figure 49 is the annual precipitation for Boulder from 1894 to 2002. The mean and +/- one standard deviation is also indicated on the graph. It can be seen that the precipitation was significantly above normal from 1995 to 1999 followed by below average precipitation in the year of the fire (2000) followed by a year of average precipitation in 2001, the year of the reclamation actions. This year (2002) has been significantly below average.

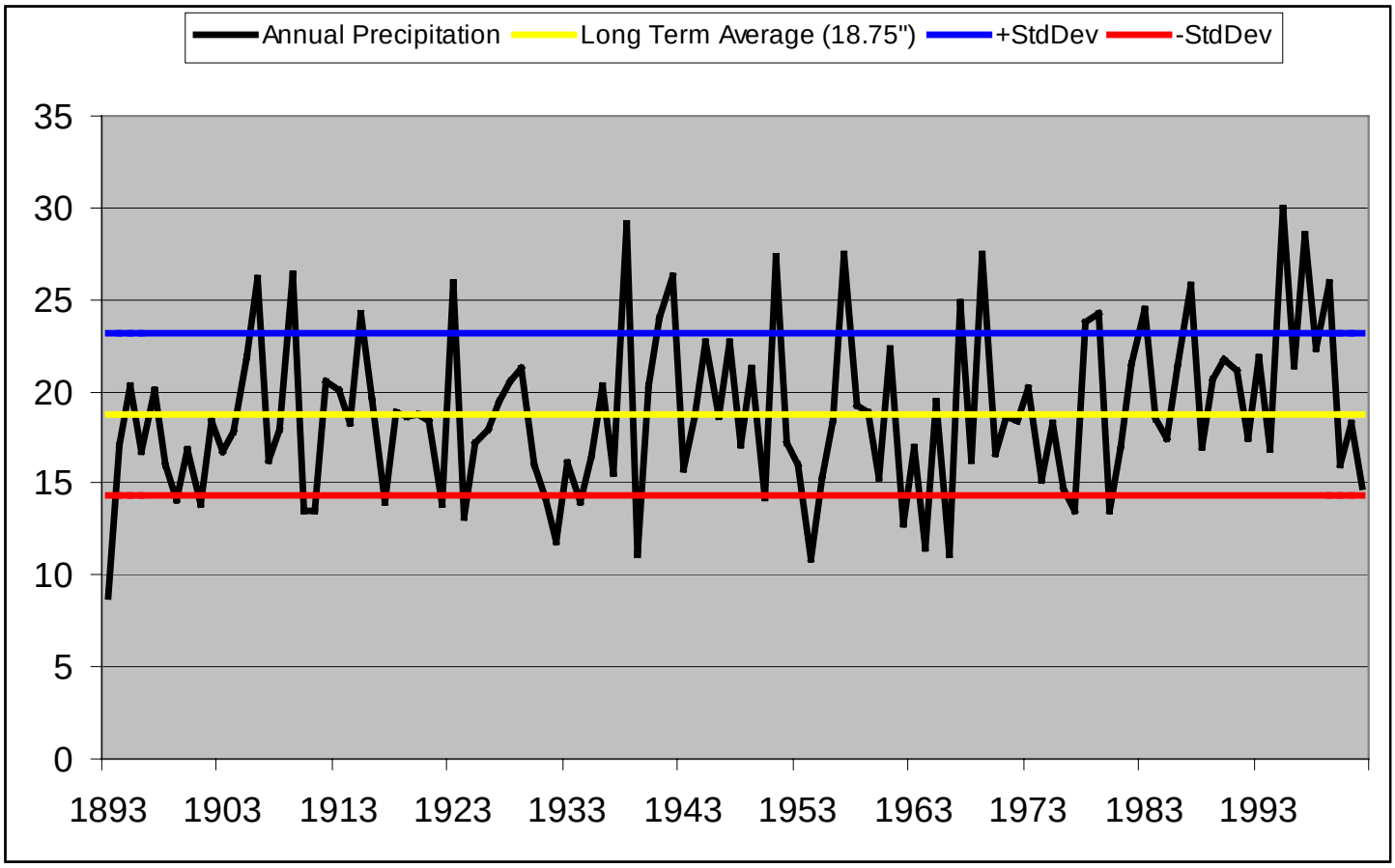


Figure 49. Boulder Annual Precipitation 1893-2002.

The Thornthwaite climate diagrams for 2000 to 2002 are shown in Figure 50. The potential evapotranspiration was calculated according to a modified Thornthwaite formula (Dunne & Leopold 1978) that includes a latitude correction. The periods of potential soil drought occur when potential evapotranspiration (ET) exceeds precipitation.

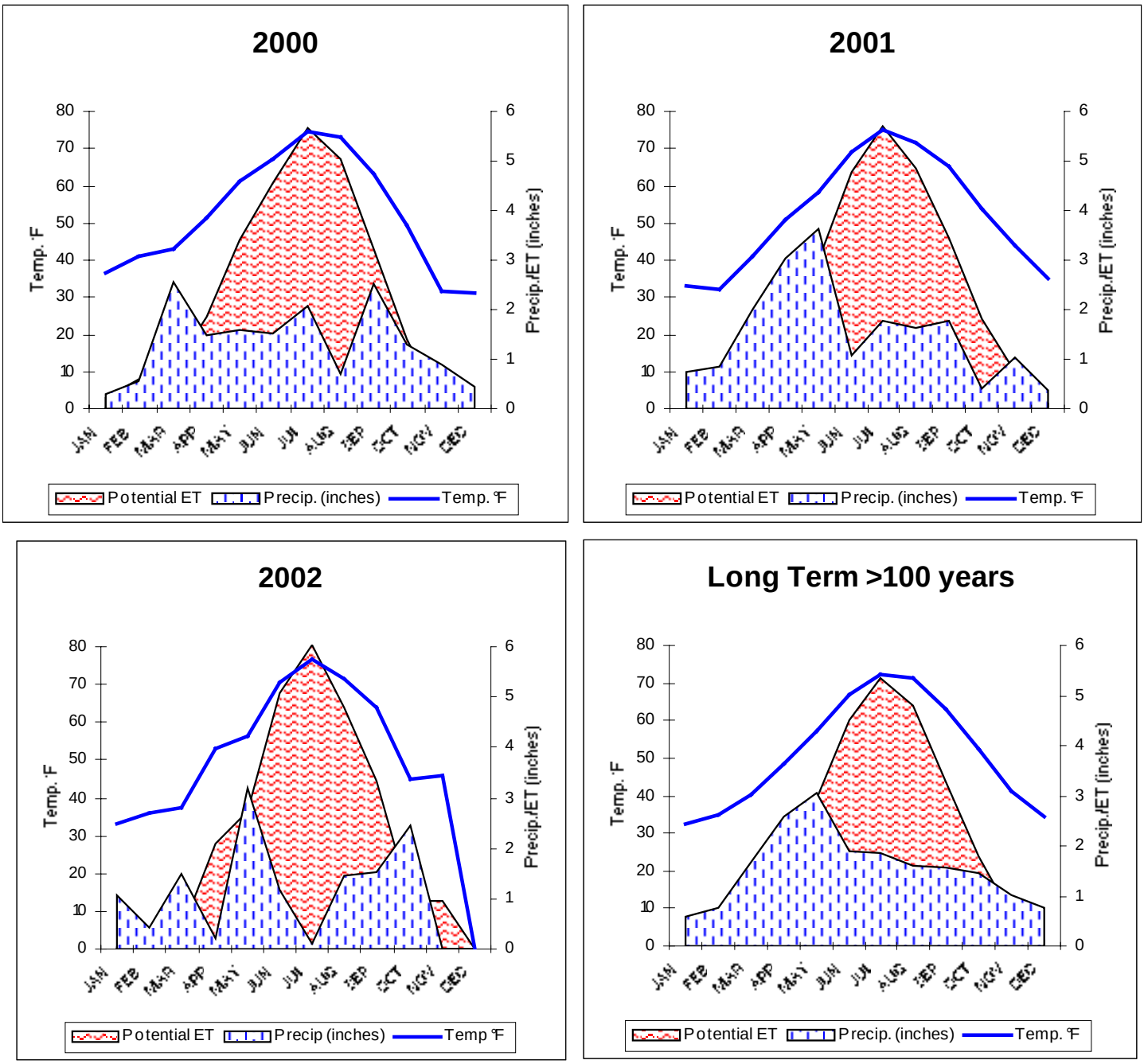


Figure 50. Boulder Climate Diagrams for 2000 - 2002.

When the combined effects of temperature and precipitation for the period of April-May-June are considered, the year 2000 was the 7th warmest and driest Spring in the last 110 years, 2001 was the 46th (relatively average), and 2002 was the 5th warmest and driest Spring. When this same type of comparison is made for the period of April to September; 2000 was the 15th warmest and driest Spring/Summer, 2001 was the 36th, and 2002 was the 3rd warmest and driest in the last 110 years. What this implies is that the year of the reclamation actions (2001) was relatively average, but the second year of growth (2002) was one of the driest ever. This could have a significant effect on next year's growth and species composition of the study area.

Temperature and precipitation gauges were installed in the study area primarily to document any large rainfall events that might result in accelerated erosion. The summer of 2002 was extremely dry and the three most significant rain events were on; May 24th with a total rainfall of 1.06 inch and a rainfall intensity that peaked at 0.37 inch/hour at about 2:00 PM, June 3rd with a total rainfall of 0.89 inch and a rainfall intensity that peaked at 0.33 inch/hour at about 7:00 PM, and August 5th with a total rainfall of 0.69 inch and a rainfall intensity that peaked at 0.40 inch/hour at about 4:00 PM. None of these rainfall events were significant enough to cause rapid erosion in the study area.

References

COB, City of Boulder. 1988. Forest Inventory Handbook. City of Boulder Open Space Department and City of Boulder Mountain Parks Division, Parks and Recreation Department.

Dunne, T.E., Leopold, L.B. 1978. Water in environmental planning. W.H. Freeman and Co., San Francisco. 818 pp.

Hill, M.O. 1979. TWINSPAN - A FORTRAN program for arranging multivariate data in an ordered two-way table by classification of the individuals and attributes. Microcomputer Power, Ithaca New York, USA.

Marr, J.W. 1961. Ecosystems of the east slope of the Front Range in Colorado. University of Colorado Studies Series in Biology No. 8. University of Colorado Press.

Oksanen, J., Minchin, P.R. 1997. Instability of ordination results under changes in input data order: explanations and remedies. Journal of Vegetation Science (8) 447-454.

Shimwell, D.W. 1971. The description and classification of vegetation. University of Washington Press, Seattle. 322 pp.

ter Braak, C.J.F. 1982. DISCRIM - A modification of TWINSPAN (Hill, 1979) to construct simple discriminant functions and to classify attributes, given a hierarchical classification of samples. Institute TNO for Mathematics, Information Processing and Statistics, Wageningen, Netherlands.

ter Braak, C.J.F. (1987-1997). CANOCO Version 3.15 - A FORTRAN program for canonical community ordination. Microcomputer Power, Ithaca, New York, USA.

Appendices

Appendix 1. Cover Data Tables

Eldorado Fire at Walker Ranch Combined Data for All Sites

Walker Ranch 2002
Sampling dates - July 16, 17, 18 ,19
PLANT SPECIES

Scientific Name	Synonym	Common Name	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	01D	01DWU	01U	02D	02DWU	02U	03D	03DWU	03U	04D	04DWU	04U	05D	05DWU	05U	06D	06DWU	06U	07D	07DWU	07U	08D	08DWU	08U	09D	09DWU	09U	10D	10DWU	10U	11D	11DWU	11U	12D	12DWU	12U	13D	13DWU	13U	14D	14DWU	14U	15D	15DWU	15U	16D	16DWU	16U	17D	17DWU	17U	18D	18DWU	18U
NATIVE ANNUAL & BIENNIAL FORBS																																																													
Acrolasia dispersa	MENTZELIA		0.06 {0.11}	33.33	0.17 {0.36}	0.11	0.24				P																								P												1	1		P			P			P					
Androsace septentrionalis		PYGMYFLOWER ROCKJASMINE	0.06	38.89	0.17	0.06	0.12	P															1						P			P									P			P									P								
Bahia dissecta		CUTLEAF	0.00	5.56	0.00	0.00	0.00										P																																												
Boechera fendleri	ARABIS FENDLERI	FENDLER'S FALSE ARABIS	0.00	5.56	0.00	0.00	0.00																						P																																
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	0.33 {0.39}	77.78	1.04 {1.24}	0.39	0.83				1			P			1			P						P			P			P			1			P				1		P			3			P			P								
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	1.00 {1.22}	77.78	3.13 {3.91}	1.33	2.84	P						P			P			P			P						P			1			2			1			4(1)	1		2	1(1)		8	2		P						P					
Collinsia parviflora		BABY BLUE-EYES	0.00	5.56	0.00	0.00	0.00																																								P														
Collomia linearis		LINEARLEAF COLLOMIA	0.00	11.11	0.00	0.00	0.00																																		P						P														
Draba spp.		WHITLOWWORT	0.00	5.56	0.00	0.00	0.00																																																				P		
Dracocephalum parviflorum	MOLDAVICA PARVIFLORA	DRAGONHEAD	0.11	16.67	0.35	0.22	0.47																									P									2(2)			P																	
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.28	66.67	0.87	0.33	0.71				P						1			P			P						P			P			P						P			P			P			P			4(1)								
Frasera speciosa		GREEN GENTIAN	0.00	11.11	0.00	0.00	0.00	P																					P																																
Gaura mollis	GAURA PARVIFLORA	BUTTERFLY WEED	0.00	11.11	0.00	0.00	0.00	P																																										P											
Grindelia squarrosa		GUMWEED	0.50	44.44	1.56	0.61	1.30				1			1												3												3(1)			P						P						(1)			1					
Helianthus annuus		COMMON SUNFLOWER	0.11	22.22	0.35	0.11	0.24	P																					1			P															1														
Machaeranthera bigelovii		BIGELOW ASTER	0.06	5.56	0.17	0.06	0.12																																																	1					
Oreocarya virgata	CRYPTANTHA VIRGATA	MINER'S CANDLE	0.00	5.56	0.00	0.00	0.00				P																																																		
Polygonum douglasii	POLYGONUM SAWATCHENSE,POLYGONUM MONTANUM	DOUGLAS KNOTWEED	0.00	27.78	0.00	0.00	0.00	P									P			P																											P			P											
Pterogonum alatum	ERIOGONUM ALATUM	WINGED BUCKWHEAT	0.00	5.56	0.00	0.00	0.00																																														P								
Silene antirrhina		SLEEPY CATCHFLY	0.11 {0.17}	55.56	0.35 {0.53}	0.17	0.35	P			P			P						P									P						P						P						2			P	1								P		
TOTAL NATIVE ANN. & BIEN. FORBS			**2.6 {3.0}**	**100.0**	**8.2 {9.6}**	**3.4**	**9.0**	**P**	**---**	**---**	**2**	**---**	**---**	**1**	**---**	**---**	**2**	**---**	**---**	**P**	**---**	**---**	**1**	**---**	**---**	**3**	**---**	**---**	**1**	**---**	**---**	**1**	**---**	**---**	**3**	**---**	**---**	**4(1)**	**---**	**---**	**6(3)**	**2**	**---**	**2**	**1(1)**	**---**	**15**	**3**	**---**	**P**	**1**	**---**	**4(2)**	**---**	**---**	**2**	**---**	**---**	**P**	**---**	**---**
INTRODUCED ANNUAL & BIENNIAL FORBS																																																													
Acosta diffusa	CENTAUREA DIFFUSA	TUMBLE KNAPWEED	0.00	11.11	0.00	0.00	0.00																									P						P																							
Alyssum minus		ALYSSUM	0.33 {0.39}	27.78	1.04 {1.24}	0.44	0.95				P			P			5(1)												P									1	1																						
Bassia sieversiana	KOCHIA SCOPARIA,K. SIEVERSIANA	BURNING-BUSH	0.00 {0.06}	27.78	0.00 {0.18}	0.06	0.12				P				1		P			P			P																																						
Camelina microcarpa		LITTLEPOD FALSEFLAX	0.00	11.11	0.00	0.00	0.00				P																											P																							
Carduus nutans ssp. macrolepis		MUSK THISTLE	0.06	38.89	0.17	0.11	0.24	P																					P			P						P									P			1			(1)								
Chenopodium foliosum		LEAFY GOOSEFOOT	0.00	5.56	0.00	0.00	0.00																																								P														
Cirsium vulgare		BULL THISTLE	0.06	5.56	0.17	0.06	0.12																																											1											
Conyza canadensis		HORSEWEED	0.00	16.67	0.00	0.00	0.00																P						P												P																				
Lactuca serriola		PRICKLY LETTUCE	0.06 {0.17}	66.67	0.17 {0.53}	0.22	0.47	P						P			P			P			P						P			P									1(1)	1		P			P	1		P			P								
Lappula redowskii		EARLY STICKSEED	0.06	16.67	0.17	0.06	0.12				P						1									P																																			
Lepidium densiflorum		DENSEFLOWER PEPPERWEED	0.00	5.56	0.00	0.00	0.00																																								P														
Melilotus albus	MELILOTUS ALBA	WHITE SWEET-CLOVER	0.00	5.56	0.00	0.00	0.00																																								P														
Melilotus officinale	MELILOTUS OFFICINALIS	YELLOW SWEETCLOVER	0.00	5.56	0.00	0.00	0.00	P																																																					
Nicotiana attenuata		TOBACCO	0.00	16.67	0.00	0.00	0.00										P			P																																									
Noccaea montana	THLASPI MONTANA	MOUNTAIN CANDYTUFT	0.00	5.56	0.00	0.00	0.00																						P																																
Podospermum laciniatum	SCORZONERA LACINIATIUM	FALSE SALSIFY	0.00	5.56	0.00	0.00	0.00	P																																																					
Sisymbrium altissimum		JIM HILL MUSTARD	1.50 {1.72}	61.11	4.69 {5.51}	1.72	3.66	2			1			P			3			16	4		P												P			1			1			P			3														
Solanum spp.		NIGHTSHADE	0.00	5.56	0.00	0.00	0.00																																											P											
Solanum triflorum		NIGHTSHADE	0.00	5.56	0.00	0.00	0.00																																														P								
Teloxys botrys	CHENOPODIUM BOTRYS	WORMSEED,JERUSALEM OAK	0.00	5.56	0.00	0.00	0.00													P																																									
Tithymalus peplus		SPURGE	0.00	5.56	0.00	0.00	0.00																												P																										
Tragopogon dubius ssp. major		YELLOW SALSIFY	0.00	16.67	0.00	0.00	0.00	P						P																																				P											
Verbascum thapsus		MULLEIN	1.28	94.44	3.99	1.44	3.07	2			P			8(1)			P			P			1			P			P			P			P			2			2			P			P			7(2)			P			1					
TOTAL INTRO. ANN. & BIEN. FORBS			**3.3 {3.8}**	**94.4**	**10.4 {12.1}**	**4.1**	**10.9**	**4**	**---**	**---**	**1**	**---**	**---**	**8(1)**	**1**	**---**	**9(1)**	**---**	**---**	**16**	**4**	**---**	**1**	**---**	**---**	**P**	**---**	**---**	**P**	**---**	**---**	**P**	**---**	**---**	**P**	**---**	**---**	**4**	**1**	**---**	**4(1)**	**1**	**---**	**P**	**---**	**---**	**3**	**1**	**---**	**9(2)**	**---**	**---**	**(1)**	**---**	**---**	**1**	**---**	**---**	**---**	**---**	**---**
INTRODUCED ANNUAL GRASSES																																																													
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	1.00 {1.06}	72.22	3.13 {3.37}	1.28	2.72	1			1			P			7			6	(1)			1		P			P									P									3(3)			P			P			P					
Bromus japonicus		JAPANESE BROME	0.00	11.11	0.00	0.00	0.00																															P												P											
Cylindropyrum cylindricum	AEGILOPS CYLINDRICA	GOAT GRASS	0.00	11.11	0.00	0.00	0.00				P									P																																									
Triticum aestivum		WHEAT	0.00	5.56	0.00	0.00	0.00																P																																						
TOTAL INTRO. ANN. GRASSES			**1.0 {1.1}**	**72.2**	**3.1 {3.4}**	**1.3**	**3.4**	**1**	**---**	**---**	**1**	**---**	**---**	**P**	**---**	**---**	**7**	**---**	**---**	**6**	**(1)**	**---**	**P**	**1**	**---**	**P**	**---**	**---**	**P**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**P**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**3(3)**	**---**	**---**	**P**	**---**	**---**	**P**	**---**	**---**	**P**	**---**	**---**	**---**	**---**	**---**
NATIVE PERENNIAL FORBS																																																													
Achillea lanulosa		WESTERN YARROW	0.06	61.11	0.17	0.06	0.12	P						P			1			P						P			P						P						P									P			P						P		
Aletes acaulis		STEMLESS INDIAN PARSLEY	0.11	38.89	0.35	0.11	0.24													P									P			1												P									1			P			P		
Allium cernuum		NODDING ONION	0.00	16.67	0.00	0.00	0.00							P																																							P			P					
Amerosedum lanceolatum	SEDUM LANCEOLATUM	YELLOW STONECROP	0.00	11.11	0.00	0.00	0.00																																																	P			P		
Antennaria rosea		ROSE PUSSYTOES	0.00	5.56	0.00	0.00	0.00																																																				P		
Apocynum androsaemifolium		SPREADING DOGBANE	1.00	22.22	3.13	1.06	2.25													P			P																		7(1)			11																	
Arnica fulgens		ARNICA	0.00	11.11	0.00	0.00	0.00																																		P			P																	
Artemisia frigida		FRINGED SAGE	0.61	50.00	1.91	0.67	1.42	P			7			P			P									4(1)															P									P			P						P		
Artemisia ludoviciana		PASTURE SAGE	0.50	72.22	1.56	0.67	1.42				1			P			P			1(1)			P			1			1			P						P									P			P			2(2)			3					
Asclepias stenophylla		SLIMLEAF MILKWEED	0.00	5.56	0.00	0.00	0.00																																											P											
Asclepias viridiflora		MILKWEED	0.00	5.56	0.00	0.00	0.00																																											P											
Aster porteri		PORTER'S ASTER	0.11	61.11	0.35	0.11	0.24	P			P			P			1			P			P			1									P															P			P			P					
Astragalus agrestis		FIELD MILKVETCH	0.06	11.11	0.17	0.06	0.12																			1																											P								
Astragalus drummondii		DRUMMOND MILKVETCH	0.00	5.56	0.00	0.00	0.00																																											P											
Astragalus laxmannii	ASTRAGALUS ADSURGENS VAR.ROBUSTIER	LAXMANN'S MILKVETCH	0.11	38.89	0.35	0.11	0.24	1															P			1			P															P			P									P					
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	0.28	72.22	0.87	0.28	0.59	P			1			P												P			P			P			1			P			P			2						P			1						P		
Astragalus shortianus		MILK VETCH	0.00	16.67	0.00	0.00	0.00							P												P																														P					
Astragalus spp.		MILK VETCH	0.00	11.11	0.00	0.00	0.00																									P																					P								
Campanula rotundifolia		HAREBELL	0.33	77.78	1.04	0.39	0.83	P			P			P						P						1			P			P			1						1			P			(1)			1			2						P		
Cerastium strictum	CERASTIUM ARVENSE	MOUSE-EAR	0.00	11.11	0.00	0.00	0.00																																								P			P											
Cirsium ochrocentrum	CIRSIUM MEGACEPHALUM	THISTLE	0.06	16.67	0.17	0.11	0.24				P			1																								(1)																							
Corydalis aurea		GOLDEN SMOKE	0.61	55.56	1.91	0.67	1.42	P									1						2						P			2(1)			1						1			4			P			P											
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.11	66.67	0.35	0.11	0.24	P			P						P						P			P						P			1			P						1						P			P						P		
Erigeron speciosus		SHOWY FLEABANE	0.00	5.56	0.00	0.00	0.00																																											P											
Eriogonum umbellatum var. umbellatum		WILD BUCKWHEAT	0.00	38.89	0.00	0.00	0.00				P						P									P			P									P															P			P					
Erysimum capitatum		COAST WALLFLOWER	0.17	66.67	0.52	0.17	0.35				P			P			P						P			1			P			P			P			P												P			1			1					
Euphorbia spp.		WILLOWHERB	0.00	11.11	0.00	0.00	0.00				P															P																																			
Gaillardia aristata		BLANKET-FLOWER	0.11	50.00	0.35	0.17	0.35				1			P			P			P						P									P			P									1(1)			P											
Galium septentrionale	GALIUM BOREALE	NORTHERN BEDSTRAW	0.00	16.67	0.00	0.00	0.00	P																																				P			P														
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	0.56	77.78	1.74	0.61	1.30	P			4			P			P			P			P			3						P			P			P									3(1)			P			P			P					
Harbouria trachypleura		WHISKBROOM PARSLEY	0.06	33.33	0.17	0.06	0.12							P						1						P			P						P			P																							
Helianthus pumilus		SUNFLOWER	0.39	66.67	1.22	0.39	0.83				P			P									P			1			P			P						P			1			P			1			4						P					
Heterotheca foliosa		GOLDENASTER	0.28	27.78	0.87	0.28	0.59										5									P						P												P												P					
Heterotheca villosa	HETEROTHECA HORRIDA,CHRYSOPSIS VILLOSA	HAIRY GOLDEN ASTER	0.33	50.00	1.04	0.33	0.71	P			3			P			1									1									P			1												P									P		
Heuchera spp.		ALUM-ROOT	0.00	5.56	0.00	0.00	0.00																																											P											
Lesquerella montana		BLADDERPOD	0.00	16.67	0.00	0.00	0.00							P																																				P						P					
Liatris punctata		GAYFEATHER	0.06	16.67	0.17	0.06	0.12				1																																										P			P					
Lupinus argenteus		SILVER LUPINE	0.00	11.11	0.00	0.00	0.00																																					P			P														
Maianthemum stellatum	SMILACINA STELLATA	FEW-FLOWERED FALSE SOLOMON'S SEAL	0.00	5.56	0.00	0.00	0.00																																																				P		
Mertensia lanceolata		LANCELEAF BLUEBELLS	0.00	50.00	0.00	0.00	0.00	P			P			P						P						P			P						P															P			P								
Monarda fistulosa var. menthifolia		HORSEMINT	0.00	11.11	0.00	0.06	0.12																															P									(1)														
Oenothera caespitosa ssp. caespitosa		EVENING PRIMROSE	0.11	38.89	0.35	0.11	0.24	P			1			P			P									P												P									1														
Oligosporus dracunculus ssp. glaucus	ARTEMISIA DRACUNCULUS SSP. GLAUCUS	WILD TARRAGON	0.00	5.56	0.00	0.00	0.00	P																																																					
Oxybaphus hirsutus	MIRABILIS HIRSUTA	UMBRELLAWORT	0.00	5.56	0.00	0.00	0.00										P																																												
Oxytropis lambertii		LOCOWEED	0.06	11.11	0.17	0.06	0.12				1																											P																							
Packera fendleri	SENECIO FENDLERI	FENDLER'S RAGWORT	0.00	16.67	0.00	0.00	0.00																			P																											P			P					
Paronychia jamesii		NAILWORT	0.00	5.56	0.00	0.00	0.00																																																	P					
Penstemon glaber	PENSTEMON ALPINUS	BEARD TONGUE	0.00	16.67	0.00	0.00	0.00	P																																	P			P																	
Penstemon spp.		BEARD-TONGUE	0.00	5.56	0.00	0.00	0.00																																																	P					
Penstemon virens		GREEN BEARD-TONGUE	0.61	88.89	1.91	0.67	1.42	P						P			P			P			1			P			2			2			1			1			P						P			P			2			2(1)			P		
Phacelia heterophylla		VARILEAF SCORPIONWEED	2.33 {2.39}	77.78	7.29 {7.64}	2.56	5.44				P			1	(1)		P			1			7			2			2			7						P						3			2(1)	(1)		5	1		12			P					
Physaria vitulifera		DOUBLE BLADDERPOD	0.00	11.11	0.00	0.00	0.00																																											P						P					
Potentilla hippiana		HORSE CINQUEFOIL	0.00	16.67	0.00	0.00	0.00																P									P																		P											
Pulsatilla ludoviciana	P. PATENS SSP. MULTIFIDA	PASQUEFLOWER	0.06	50.00	0.17	0.06	0.12	P						P			P			P			P									P			P															1			P								
Rumex triangulivalvis	RUMEX SALICIFOLIUS	WILLOW DOCK	0.00	5.56	0.00	0.00	0.00																															P																							
Scutellaria brittonii		SKULLCAP	0.00 {0.06}	50.00	0.00 {0.18}	0.06	0.12				P						P			P							1								P			P									P			P						P					
Senecio integerrimus		LAMBSTONGUE GROUNDSEL	0.00	5.56	0.00	0.00	0.00																						P																																
Solidago missouriensis		MISSOURI GOLDENROD	0.00	5.56	0.00	0.00	0.00																																								P														
Solidago simplex var. simplex	SOLIDAGO SPATHULATA VAR. NEOMEXICANA	MT. ALBERT GOLDENROD	0.22	50.00	0.69	0.28	0.59	P									(1)			3			P						P			P															P			1									P		
Unknown forb		UNKNOWN FORB	0.00	5.56	0.00	0.00	0.00																																																				P		
Urtica gracilis ssp. gracilis	URTICA DIOICA	STINGING NETTLE	0.00	5.56	0.00	0.00	0.00																P																																						
Vaccinium myrtillus ssp. oreophilum		BLUEBERRY	0.00	5.56	0.00	0.00	0.00																																								P														
TOTAL NATIVE PERENNIAL FORBS			**9.3 {9.4}**	**100.0**	**29.0 {30.0}**	**10.3**	**27.2**	**1**	**---**	**---**	**20**	**---**	**---**	**2**	**(1)**	**---**	**9(1)**	**---**	**---**	**6(1)**	**---**	**---**	**10**	**---**	**---**	**17(1)**	**1**	**---**	**5**	**---**	**---**	**12(1)**	**---**	**---**	**5**	**---**	**---**	**2(1)**	**---**	**---**	**10(1)**	**---**	**---**	**21**	**---**	**---**	**8(5)**	**(1)**	**---**	**12**	**1**	**---**	**21(2)**	**---**	**---**	**6(1)**	**---**	**---**	**P**	**---**	**---**
INTRODUCED PERENNIAL FORBS																																																													
Arabis hirsuta		HAIRY ROCKCRESS	0.00	5.56	0.00	0.00	0.00																																																			P		
Breea arvensis	CIRSIUM ARVENSE	CANADA THISTLE	0.56	38.89	1.74	0.61	1.30							6									1						P						P			P			3(1)						P														
Taraxacum officinale		COMMON DANDELION	0.00 {0.06}	38.89	0.00 {0.18}	0.06	0.12	P	1					P															P												P			P			P			P											
Verbena bracteata		VERVAIN	0.06	11.11	0.17	0.06	0.12	P																														1																							
TOTAL INTRO. PERENNIAL FORBS			**0.6 {0.7}**	**61.1**	**1.9 {2.1}**	**0.7**	**1.9**	**P**	**1**	**---**	**---**	**---**	**---**	**6**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**1**	**---**	**---**	**---**	**---**	**---**	**P**	**---**	**---**	**---**	**---**	**---**	**P**	**---**	**---**	**1**	**---**	**---**	**3(1)**	**---**	**---**	**P**	**---**	**---**	**P**	**---**	**---**	**P**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**P**	**---**	**---**

Eldorado Fire at Walker Ranch Combined Data for All Sites (concluded).

NATIVE PERENNIAL GRASSES (cool)																																																													
Achnatherum nelsonii	STIPA NELSONII	NELSON NEEDLEGRASS	0.00	5.56	0.00	0.00	0.00																																												P								
Agrostis scabra		TICKLEGRASS	0.00	5.56	0.00	0.00	0.00	P																																																			
Bromopsis lanatipes	BROMUS LANATIPES	WOOLY BROME	0.00	11.11	0.00	0.00	0.00							P																																								P					
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	2.61 {2.89}	77.78	8.16 {9.24}	3.17	6.74				4	1(1)		5			10			1			1			6			1			P						4(2)	1								P			11(2)			P			2			2	3	
Carex sp. 1		SEDGE	0.00	5.56	0.00	0.00	0.00																										P																														
Carex spp.		SEDGE	0.33 {0.67}	50.00	1.04 {2.13}	0.83	1.77	1(1)			P																								P			1			(1)			1(1)	1		2			P									1	5	
Elymus elymoides	SITANION HYSTRIX	BOTTLEBRUSH SQUIRRELTAIL	0.22	44.44	0.69	0.22	0.47	2			P			1			P									1												P												P			P								
Elymus lanceolatus fm. albicans	AGROPYRON DASYSTACHYUM,A. ALBICANS,AGROPYRON RIPARIUM	MONTANA WHEATGRASS	0.33	38.89	1.04	0.33	0.71				P			1						1						3			P																					P						1					
Elymus spp.			0.00	5.56	0.00	0.00	0.00																													P																										
Elymus trachycaulus	AGROPYRON TRACHYCAULUM	SLENDER WHEATGRASS	1.89 {2.11}	33.33	5.90 {6.75}	2.17	4.61	11	2														5	1					8(1)			3			5			2	1																						
Elymus virginicus		VIRGINIA WILDRYE	0.00	5.56	0.00	0.00	0.00																						P																																
Festuca brachyphylla ssp. coloradensis	FESTUCA OVINA VAR. BRACHYPHYLLA	SHEEP FESCUE	0.00	5.56	0.00	0.06	0.12																																					(1)																	
Hesperostipa comata	STIPA COMATA	NEEDLE-AND-THREAD GRASS	0.06	22.22	0.17	0.06	0.12							P			P																					P												1											
Koeleria macrantha	KOELERIA CRISTATA,K. PYRAMIDATA,K.GRACILIS	JUNEGRASS	0.00	33.33	0.00	0.00	0.00	P						P			P						P			P																											P								
Leucopoa kingii		SPIKE FESCUE	0.33	66.67	1.04	0.33	0.71	P						P			P			P			P			1			P									P												1			P			3			1		
Poa agassizensis		AGASSIZ BLUEGRASS	0.06	27.78	0.17	0.06	0.12	1						P																					P						P												P								
Poa fendleriana		MUTTON BLUEGRASS	0.00	5.56	0.00	0.00	0.00																																		P																				
Schedonnardus paniculatus		TUMBLEGRASS	0.00	5.56	0.00	0.00	0.00																						P																																
TOTAL NATIVE PERENNIAL GRASSES (c)			**5.8 {6.7}**	**100.0**	**18.2 {21.3}**	**7.2**	**19.1**	**15(1)**	**2**	---	**4**	**1(1)**	---	**7**	---	---	**10**	---	---	**2**	---	---	**6**	**1**	---	**11**	---	---	**9(1)**	---	---	**3**	---	---	**5**	---	---	**7(2)**	**2**	---	**(1)**	---	---	**1(2)**	**1**	---	**2**	---	---	**13(2)**	---	---	**P**	---	---	**6**	---	---	**4**	**8**	---
INTRODUCED PERENNIAL GRASSES (cool)																																																													
Ceratochloa carinata	CERATOCHLOA MARGINATA,BROMUS MARGINATUS	MOUNTAIN BROME	1.83 {1.94}	33.33	5.73 {6.22}	2.06	4.37	7	1(1)														P						10(1)			7			8			1	1																						
Dactylis glomerata		ORCHARD GRASS	0.00	5.56	0.00	0.00	0.00																												P																										
Poa compressa		CANADA BLUEGRASS	0.11	11.11	0.35	0.11	0.24	1																		1																																			
Triticum aestivum x elytrigia elongata		REGREEN	0.39	61.11	1.22	0.44	0.95	1(1)			P			P			P			1			3			P			P			P			2			P																							
TOTAL INTRO. PERENNIAL GRASSES (c)			**2.3 {2.4}**	**61.1**	**7.3 {7.8}**	**2.6**	**6.9**	**9(1)**	**1(1)**	---	**P**	---	---	**P**	---	---	**P**	---	---	**1**	---	---	**3**	---	---	**1**	---	---	**10(1)**	---	---	**7**	---	---	**10**	---	---	**1**	**1**	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NATIVE PERENNIAL GRASSES (warm)																																																													
Chondrosum gracile	BOUTELOUA GRACILIS	BLUE GRAMA GRASS	0.39	44.44	1.22 {1.24}	0.50	1.06	2	(1)								P						P						3			P			(1)			1												1											
Muhlenbergia montana		MOUNTAIN MUHLY	0.17	11.11	0.52	0.17	0.35										P																																							3					
Schizachyrium scoparium	ANDROPOGON SCOPARIUM	LITTLE BLUESTEM	0.00	5.56	0.00	0.00	0.00																																																	P					
Sporobolus cryptandrus		SAND DROPSEED	0.00	11.11	0.00	0.00	0.00													P									P																																
TOTAL NATIVE PERENNIAL GRASSES (w)			**0.6**	**55.6**	**1.7**	**0.7**	**1.8**	**2**	**(1)**	---	---	---	---	---	---	---	**P**	---	---	**P**	---	---	**P**	---	---	---	---	---	**3**	---	---	**P**	---	---	**(1)**	---	---	**1**	---	---	---	---	---	---	---	---	---	---	---	**1**	---	---	---	---	---	**3**	---	---	---	---	---
NATIVE SHRUBS																																																													
Acer glabrum		ROCKY MOUNTAIN MAPLE	0.00	11.11	0.00	0.00	0.00																																					P						P											
Arctostaphylos uva-ursi		KINNIKINNICK	0.06	16.67	0.17	0.06	0.12	1																											P												P														
Ceanothus fendleri		BUCKBRUSH	1.39 {1.61}	94.44	4.34 {5.15}	2.11	4.49	P			1			2(1)	1(1)		1			P			P			1(1)			P			P			2			1(1)			2(2)	1(1)		9	2		(1)			4			P			2(1)					
Cercocarpus montanus		BIRCHLEAF MOUNTAIN MAHOGANY	0.22	22.22	0.69	0.28	0.59										P			P																		(1)																		4					
Chrysothamnus parryi		PARRY RABBITBRUSH	0.00	5.56	0.00	0.00	0.00																																																				P		
Oreobatus deliciosus	RUBUS DELICIOSUS	BOULDER RASPBERRY	0.00	22.22	0.00	0.00	0.00										P															P																		P						P					
Padus virginiana ssp. melanocarpa	PRUNUS VIRGINIANA SSP. MELANOCARPA	CHOKECHERRY	0.00	5.56	0.00	0.00	0.00																																								P														
Physocarpus monogynus		NINEBARK	0.28	44.44	0.87	0.39	0.83							P			P						P			P						P									4(2)									P						1					
Ribes cereum		WAX CURRANT	0.11	66.67	0.35	0.11	0.24	P			P			P															1			P			P			P									P			P			P			1			P		
Rosa arkansana		ARKANSAS ROSE	0.17	33.33	0.52	0.17	0.35				P									P												1						P						2						P											
Rosa woodsii		WOOD'S ROSE	0.00	11.11	0.00	0.00	0.00																																								P												P		
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	0.17	55.56	0.52	0.17	0.35				P			P			P						P						P			P									3			P			P						P								
Symphoricarpos rotundifolius	SYMPHORICARPOS OREOPHILUS	MOUNTAIN SNOWBERRY	0.06	16.67	0.17	0.06	0.12																																		P						1												P		
Yucca glauca		SPANISH BAYONET	0.00	5.56	0.00	0.00	0.00																																																	P					
TOTAL NATIVE SHRUBS			**2.4 {2.7}**	**100.0**	**7.6 {8.5}**	**3.3**	**8.8**	**1**	---	---	**1**	---	---	**2(1)**	**1(1)**	---	**1**	---	---	**P**	---	---	**P**	---	---	**1(1)**	---	---	**1**	---	---	**1**	---	---	**2**	---	---	**1(2)**	---	---	**9(4)**	**1(1)**	---	**11**	**2**	---	**1(1)**	---	---	**4**	---	---	**P**	---	---	**8(1)**	---	---	**P**	---	---
NATIVE TREES																																																													
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	5.39 {0.22}	66.67	16.84 {0.71}	5.61	11.94			[1]			[12]			[5]						[7]		[1]	[8]			[6]		[2]	[8]			[9]					[1]	[28]												[7]			[3]						[3]
Populus tremuloides	POPULUS TREMULA	QUAKING ASPEN	0.72 {0.78}	22.22	2.26 {2.49}	0.83	1.77																									1									3			2(1)	1		7														
Populus tremuloides (dead)		ASPEN (DEAD)	0.11 {0.06}	11.11		0.11	0.24																											[1]							[1]																				
Pseudotsuga menziesii		DOUGLAS-FIR	3.28 {0.17}	5.56	10.24	3.28	6.97																																																				3		56
Pseudotsuga menziesii (dead)		DOUGLAS FIR	2.78 {0.11}	55.56	8.68 {0.36}	2.89	6.15			[8]														[2]														[4]						[9]			[9]			[7]			[4]			[6]			[1]		[2]	
Sabina scopulorum (dead)	JUNIPERUS SCOPULORUM	ROCKY MOUNTAIN JUNIPER	0.50 {0.06}	22.22	1.56 {0.18}	0.56	1.18												[1]	P																													[4]		[1]	[4]									
TOTAL NATIVE TREES			**4.0 {0.9}**	**27.8**	**12.5 {3.0}**	**4.1**	**10.9**	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**1**	---	---	---	---	---	---	---	---	**3**	---	---	**2(1)**	**1**	---	**7**	---	---	---	---	---	---	---	---	---	---	---	**3**	---	**56**
FERNS																																																													
Cystopteris fragilis		BRITTLEFERN	0.00	5.56	0.00	0.00	0.00										P																																												
TOTAL FERNS			**0.0**	**5.6**	**0.0**	**0.0**	**0.0**	---	---	---	---	---	---	---	---	---	**P**	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MOSS																																																													
Moss		MOSS	0.00 {0.11}	5.56	0.00 {0.36}	0.11	0.24																																																						2	
TOTAL MOSS			**0.0 {0.1}**	**5.6**	**0.0 {0.4}**	**0.1**	**0.3**	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**2**	---
Standing dead		STANDING DEAD	1.11 {0.00}	55.56		1.22		1	1		1			4			2			3												1			3						1									2	1					2					
Litter		LITTER	20.67 {24.17}	100.00		24.17		41	2		18	1		30			26			30			19			20			15	1		16	1		14	1		18	1		12	1		8	1		14	1		13	3		17	3		28	1		33	46	
Bare soil		BARE SOIL	34.22 {39.06}	100.00		39.06		16	2		39	10		34	3		28	1		29	2		43	6		38	5		39	5		44	7		54	3		33	22		35	2		40	2		35	6		27	4		48	6		33			1	1	
Rock		ROCK	3.28 {3.89}	77.78		3.89					1			1			5				1		6	1		3			9			4	2								8	2		6	1		1			4	4		1			10					
TOTALS			91.3 {98.8}			115.3		91			88			95			99			93			90			94			92			90			96			72			91			91			89			85			91			99			97		
TOTALS (LAYER)								91	9	0	88	12	0	95	5	0	99	1	0	93	7	0	90	9	0	94	6	0	92	6	0	90	10	0	96	4	0	72	27	0	91	9	0	91	9	0	89	11	0	85	14	0	91	9	0	99	1	0	41	57	56
TOTAL VEGETATION COVER (LAYER)								33(2)	4(2)	0	29	1(1)	0	26(2)	2(2)	0	38(2)	0	0	31(1)	4(1)	0	22	2	0	33(2)	1	0	29(2)	0	0	25(1)	0	0	25(1)	0	0	21(6)	4	0	35(11)	4(1)	0	37(3)	5(1)	0	39(9)	4(1)	0	39(4)	2	0	25(5)	0	0	26(2)	0	0	7	10	56
TOTAL VEGETATION COVER			32.0 {31.7}		100.0 {101.4}	47.0 (s=12.3)	100.0	33(8)			29(2)			26(6)			38(2)			31(6)			22(2)			33(3)			29(2)			25(1)			25(1)			21(10)			35(16)			37(9)			39(14)			39(6)			25(5)			26(2)			63(10)		
			Std.Dev.= 9.7																																																												
GROUND COVER (Litter+Rock+Veg+St.Dead)			57.1 {60.6}			76.3 { 64.4}		75(2)	7(2)	0	49	2(1)	0	61(2)	2(2)	0	71(2)	0	0	64(1)	5(1)	0	47	3	0	56(2)	1	0	53(2)	1	0	46(1)	3	0	42(1)	1	0	39(6)	5	0	56(11)	7(1)	0	51(3)	7(1)	0	54(9)	5(1)	0	58(4)	10	0	43(5)	3	0	66(2)	1	0	40	56	56
SPECIES DENSITY (# of species/100 sq.m.)								49			43			47			46			36			36			39			46			39			35			44			32			31			48			57			40			39			25		
(AVERAGE= 40.7 Std.Dev.= 7.7)																																																													
SPECIES DENSITY (LAYER)								49	4	0	43	1	0	46	3	0	46	0	0	36	2	0	35	2	0	38	1	0	46	0	0	39	0	0	35	0	0	44	4	0	31	4	0	31	4	0	48	4	0	57	2	0	40	0	0	39	0	0	24	3	1
(#) = second hit																																																													
[#] = dead value not included in live vegetation totals																																																													
{#} = cover value if tree canopy is excluded																																																													

Group A Summary

DATA FROM FILE Grpa																	
Walker Ranch 2002 - Group A					RELATIVE		RELATIVE										
PLANT SPECIES			AVERAGE		VEGETATION	AVERAGE	VEGETATION										
			COVER	FREQUENCY	COVER	COVER-ALL	COVER-ALL										
Scientific Name	Synonym	Common Name	(%)	(%)	(%)	(%)	(%)	12D	12DWU	12U	13D	13DWU	13U	14D	14DWU	14U
NATIVE ANNUAL & BIENNIAL FORBS																
Acrolasia dispersa	MENTZELIA		0.33 {0.67}	33.33	0.90 {1.61}	0.67	1.11							1	1	
Androsace septentrionalis		PYGMYFLOWER ROCKJASMINE	0.00	66.67	0.00	0.00	0.00	P			P					
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	1.00 {1.33}	100.00	2.70 {3.23}	1.33	2.22		1		P			3		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	4.67 {6.00}	100.00	12.61 {14.52}	6.67	11.11	4(1)	1		2	1(1)		8	2	
Collinsia parviflora		BABY BLUE-EYES	0.00	33.33	0.00	0.00	0.00							P		
Collomia linearis		LINEARLEAF COLLOMIA	0.00	66.67	0.00	0.00	0.00	P						P		
Dracocephalum parviflorum	MOLDAVICA PARVIFLORA	DRAGONHEAD	0.67	66.67	1.80	1.33	2.22	2(2)			P					
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.00	100.00	0.00	0.00	0.00	P			P			P		
Grindelia squarrosa		GUMWEED	0.00	66.67	0.00	0.00	0.00	P						P		
Helianthus annuus		COMMON SUNFLOWER	0.33	33.33	0.90	0.33	0.56							1		
Polygonum douglasii	POLYGONUM SAWATCHENSE,POLYGONUM MONTANUM	DOUGLAS KNOTWEED	0.00	33.33	0.00	0.00	0.00							P		
Silene antirrhina		SLEEPY CATCHFLY	0.67	66.67	1.80	0.67	1.11	P						2		
TOTAL NATIVE ANN. & BIEN. FORBS			**7.7 {9.7}**	**100.0**	**20.7 {23.4}**	**11.0**	**22.0**	**6(3)**	**2**	**---**	**2**	**1(1)**	**---**	**15**	**3**	**---**
INTRODUCED ANNUAL & BIENNIAL FORBS																
Carduus nutans ssp. macrolepis		MUSK THISTLE	0.00	33.33	0.00	0.00	0.00							P		
Chenopodium foliosum		LEAFY GOOSEFOOT	0.00	33.33	0.00	0.00	0.00							P		
Conyza canadensis		HORSEWEED	0.00	33.33	0.00	0.00	0.00	P								
Lactuca serriola		PRICKLY LETTUCE	0.33 {1.00}	100.00	0.90 {2.42}	1.33	2.22	1(1)	1		P			P	1	
Lepidium densiflorum		DENSEFLOWER PEPPERWEED	0.00	33.33	0.00	0.00	0.00							P		
Melilotus albus	MELILOTUS ALBA	WHITE SWEET-CLOVER	0.00	33.33	0.00	0.00	0.00							P		
Nicotiana attenuata		TOBACCO	0.00	33.33	0.00	0.00	0.00				P					
Sisymbrium altissimum		JIM HILL MUSTARD	1.33	100.00	3.60	1.33	2.22	1			P			3		
Verbascum thapsus		MULLEIN	0.67	100.00	1.80	0.67	1.11	2			P			P		
TOTAL INTRO. ANN. & BIEN. FORBS			**2.3 {3.0}**	**100.0**	**6.3 {7.3}**	**3.3**	**6.7**	**4(1)**	**1**	**---**	**P**	**---**	**---**	**3**	**1**	**---**
INTRODUCED ANNUAL GRASSES																
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	1.00	33.33	2.70	2.00	3.33							3(3)		
TOTAL INTRO. ANN. GRASSES			**1.0**	**33.3**	**2.7**	**2.0**	**4.0**	**---**	**---**	**---**	**---**	**---**	**---**	**3(3)**	**---**	**---**
NATIVE PERENNIAL FORBS																
Achillea lanulosa		WESTERN YARROW	0.00	33.33	0.00	0.00	0.00	P								
Aletes acaulis		STEMLESS INDIAN PARSLEY	0.00	33.33	0.00	0.00	0.00				P					
Apocynum androsaemifolium		SPREADING DOGBANE	6.00	66.67	16.22	6.33	10.56	7(1)			11					
Arnica fulgens		ARNICA	0.00	66.67	0.00	0.00	0.00	P			P					
Artemisia frigida		FRINGED SAGE	0.00	33.33	0.00	0.00	0.00	P								
Artemisia ludoviciana		PASTURE SAGE	0.00	33.33	0.00	0.00	0.00							P		
Astragalus laxmannii	ASTRAGALUS ADSURGENS VAR.ROBUSTIER	LAXMANN'S MILKVETCH	0.00	66.67	0.00	0.00	0.00				P			P		
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	0.67	66.67	1.80	0.67	1.11	P			2					
Campanula rotundifolia		HAREBELL	0.33	100.00	0.90	0.67	1.11	1			P			(1)		
Cerastium strictum	CERASTIUM ARVENSE	MOUSE-EAR	0.00	33.33	0.00	0.00	0.00							P		
Corydalis aurea		GOLDEN SMOKE	1.67	100.00	4.50	1.67	2.78	1			4			P		
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.33	33.33	0.90	0.33	0.56				1					
Gaillardia aristata		BLANKET-FLOWER	0.33	33.33	0.90	0.67	1.11							1(1)		
Galium septentrionale	GALIUM BOREALE	NORTHERN BEDSTRAW	0.00	66.67	0.00	0.00	0.00				P			P		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	1.00	33.33	2.70	1.33	2.22							3(1)		
Helianthus pumilus		SUNFLOWER	0.67	100.00	1.80	0.67	1.11	1			P			1		
Heterotheca foliosa		GOLDENASTER	0.00	33.33	0.00	0.00	0.00				P					
Lupinus argenteus		SILVER LUPINE	0.00	66.67	0.00	0.00	0.00				P			P		
Monarda fistulosa var. menthifolia		HORSEMINT	0.00	33.33	0.00	0.33	0.56							(1)		
Oenothera caespitosa ssp. caespitosa		EVENING PRIMROSE	0.33	33.33	0.90	0.33	0.56							1		
Penstemon glaber	PENSTEMON ALPINUS	BEARD TONGUE	0.00	66.67	0.00	0.00	0.00	P			P					
Penstemon virens		GREEN BEARD-TONGUE	0.00	66.67	0.00	0.00	0.00	P						P		

Group A Summary (concluded).

Phacelia heterophylla		VARILEAF SCORPIONWEED	1.67	66.67	4.50 {4.03}	2.33	3.89				3			2(1)	(1)	
Scutellaria brittonii		SKULLCAP	0.00	33.33	0.00	0.00	0.00							P		
Solidago missouriensis		MISSOURI GOLDENROD	0.00	33.33	0.00	0.00	0.00							P		
Solidago simplex var. simplex	SOLIDAGO SPATHULATA VAR. NEOMEXICANA	MT. ALBERT GOLDENROD	0.00	33.33	0.00	0.00	0.00							P		
Vaccinium myrtillus ssp. oreophilum		BLUEBERRY	0.00	33.33	0.00	0.00	0.00							P		
TOTAL NATIVE PERENNIAL FORBS			**13.0**	**100.0**	**35.1**	**15.3**	**30.7**	**10(1)**	**---**	**---**	**21**	**---**	**---**	**8(5)**	**(1)**	**---**
INTRODUCED PERENNIAL FORBS																
Breea arvensis	CIRSIUM ARVENSE	CANADA THISTLE	1.00	66.67	2.70	1.33	2.22	3(1)						P		
Taraxacum officinale		COMMON DANDELION	0.00	100.00	0.00	0.00	0.00	P			P			P		
TOTAL INTRO. PERENNIAL FORBS			**1.0**	**100.0**	**2.7**	**1.3**	**2.7**	**3(1)**	**---**	**---**	**P**	**---**	**---**	**P**	**---**	**---**
NATIVE PERENNIAL GRASSES (cool)																
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	0.00	33.33	0.00	0.00	0.00							P		
Carex spp.		SEDGE	1.00 {1.33}	100.00	2.70 {3.23}	2.00	3.33	(1)			1(1)	1		2		
Festuca brachyphylla ssp. coloradensis	FESTUCA OVINA VAR. BRACHYPHYLLA	SHEEP FESCUE	0.00	33.33	0.00	0.33	0.56				(1)					
Poa agassizensis		AGASSIZ BLUEGRASS	0.00	33.33	0.00	0.00	0.00	P								
Poa fendleriana		MUTTON BLUEGRASS	0.00	33.33	0.00	0.00	0.00	P								
TOTAL NATIVE PERENNIAL GRASSES (c)			**1.0 {1.3}**	**100.0**	**2.7 {3.2}**	**2.3**	**4.7**	**(1)**	**---**	**---**	**1(2)**	**1**	**---**	**2**	**---**	**---**
NATIVE SHRUBS																
Acer glabrum		ROCKY MOUNTAIN MAPLE	0.00	33.33	0.00	0.00	0.00				P					
Arctostaphylos uva-ursi		KINNIKINNICK	0.00	33.33	0.00	0.00	0.00							P		
Ceanothus fendleri		BUCKBRUSH	3.67 {4.67}	100.00	9.91 {11.29}	6.00	10.00	2(2)	1(1)		9	2		(1)		
Padus virginiana ssp. melanocarpa	PRUNUS VIRGINIANA SSP. MELANOCARPA	CHOKECHERRY	0.00	33.33	0.00	0.00	0.00							P		
Physocarpus monogynus		NINEBARK	1.33	33.33	3.60	2.00	3.33	4(2)								
Ribes cereum		WAX CURRANT	0.00	33.33	0.00	0.00	0.00							P		
Rosa arkansana		ARKANSAS ROSE	0.67	33.33	1.80	0.67	1.11				2					
Rosa woodsii		WOOD'S ROSE	0.00	33.33	0.00	0.00	0.00							P		
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	1.00	100.00	2.70	1.00	1.67	3			P			P		
Symphoricarpos rotundifolius	SYMPHORICARPOS OREOPHILUS	MOUNTAIN SNOWBERRY	0.33	66.67	0.90	0.33	0.56	P						1		
TOTAL NATIVE SHRUBS			**7.0 {8.0}**	**100.0**	**18.9 {19.4}**	**10.0**	**20.0**	**9(4)**	**1(1)**	**---**	**11**	**2**	**---**	**1(1)**	**---**	**---**
NATIVE TREES																
Populus tremuloides	POPULUS TREMULA	QUAKING ASPEN	4.00 {4.33}	100.00	10.81 {10.48}	4.67	7.78	3			2(1)	1		7		
Populus tremuloides (dead)		ASPEN (DEAD)	0.33	33.33		0.33	0.56	[1]								
Pseudotsuga menziesii (dead)		DOUGLAS FIR	8.33 {0.00}	100.00		8.33	13.89			[9]			[9]			[7]
Sabina scopulorum (dead)	JUNIPERUS SCOPULORUM	ROCKY MOUNTAIN JUNIPER	1.33 {0.00}	33.33		1.33	2.22									[4]
TOTAL NATIVE TREES			**4.0 {4.3}**	**100.0**	**10.8 {10.5}**	**4.7**	**9.3**	**3**	**---**	**---**	**2(1)**	**1**	**---**	**7**	**---**	**---**
Standing dead		STANDING DEAD	0.33 {0.00}	33.33		0.33		1								
Litter		LITTER	11.33 {12.33}	100.00		12.33		12	1		8	1		14	1	
Bare soil		BARE SOIL	36.67 {40.00}	100.00		40.00		35	2		40	2		35	6	
Rock		ROCK	5.00 {6.00}	100.00		6.00		8	2		6	1		1		
TOTALS			90.3 {100.0}			118.7		91			91			89		
TOTALS (LAYER)								91	9	0	91	9	0	89	11	0
TOTAL VEGETATION COVER (LAYER)								35(11)	4(1)	0	37(3)	5(1)	0	39(9)	4(1)	0
TOTAL VEGETATION COVER			37.0 {41.7}		100.0 {100.8}	60.0 (s=0.0)	100.0	35(16)			37(9)			39(14)		
			Std.Dev.= 2.0													
GROUND COVER (Litter+Rock+Veg+St.Dead)			53.7 {60.0}			78.7 { 69.0}		56(11)	7(1)	0	51(3)	7(1)	0	54(9)	5(1)	0
SPECIES DENSITY (# of species/100 sq.m.)								32			31			48		
(AVERAGE= 37.0 Std.Dev.= 9.5)																
SPECIES DENSITY (LAYER)								31	4	0	31	4	0	48	4	0
(#) = second hit																
[#] = dead value not included in live vegetation totals																
{#} = cover value if tree canopy is excluded																

Group B Summary

DATA FROM FILE Grpb																									
Walker Ranch 2002 - Group B																									
PLANT SPECIES			AVERAGE		RELATIVE VEGETATION	AVERAGE	RELATIVE VEGETATION																		
Scientific Name	Synonym	Common Name	COVER (%)	FREQUENCY (%)	COVER (%)	COVER-ALL (%)	COVER-ALL (%)	01D	01DWU	01U	06D	06DWU	06U	08D	08DWU	08U	09D	09DWU	09U	10D	10DWU	10U	16D	16DWU	16U
NATIVE ANNUAL & BIENNIAL FORBS																									
Acrolasia dispersa	MENTZELIA		0.00	33.33	0.00	0.00	0.00													P			P		
Androsace septentrionalis		PYGMYFLOWER ROCKJASMINE	0.17	83.33	0.63	0.17	0.43	P			1			P			P						P		
Boechera fendleri	ARABIS FENDLERI	FENDLER'S FALSE ARABIS	0.00	16.67	0.00	0.00	0.00							P											
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	0.17	66.67	0.63	0.17	0.43							P			P			1			P		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	0.50	83.33	1.89	0.50	1.30	P			P			P			1			2					
Dracocephalum parviflorum	MOLDAVICA PARVIFLORA	DRAGONHEAD	0.00	16.67	0.00	0.00	0.00										P								
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.67	83.33	2.52	0.83	2.16				P			P			P			P			4(1)		
Frasera speciosa		GREEN GENTIAN	0.00	33.33	0.00	0.00	0.00	P						P											
Gaura mollis	GAURA PARVIFLORA	BUTTERFLY WEED	0.00	16.67	0.00	0.00	0.00	P																	
Grindelia squarrosa		GUMWEED	0.00	16.67	0.00	0.17	0.43																(1)		
Helianthus annuus		COMMON SUNFLOWER	0.17	50.00	0.63	0.17	0.43	P						1			P								
Polygonum douglasii	POLYGONUM SAVATCHENSE,POLYGONUM MONTANUM	DOUGLAS KNOTWEED	0.00	16.67	0.00	0.00	0.00	P																	
Pterogonum alatum	ERIOGONUM ALATUM	WINGED BUCKWHEAT	0.00	16.67	0.00	0.00	0.00																P		
Silene antirrhina		SLEEPY CATCHFLY	0.00	50.00	0.00	0.00	0.00	P						P						P					
TOTAL NATIVE ANN. & BIEN. FORBS			**1.7**	**100.0**	**6.3**	**2.0**	**6.7**	**P**	---	---	**1**	---	---	**1**	---	---	**1**	---	---	**3**	---	---	**4(2)**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS																									
Acosta diffusa	CENTAUREA DIFFUSA	TUMBLE KNAPWEED	0.00	16.67	0.00	0.00	0.00										P								
Alyssum minus		ALYSSUM	0.00	16.67	0.00	0.00	0.00							P											
Bassia sieversiana	KOCHIA SCOPARIA,K. SIEVERSIANA	BURNING-BUSH	0.00	16.67	0.00	0.00	0.00				P														
Carduus nutans ssp. macrolepis		MUSK THISTLE	0.00	66.67	0.00	0.17	0.43	P						P			P						(1)		
Conyza canadensis		HORSEWEED	0.00	33.33	0.00	0.00	0.00				P			P											
Lactuca serriola		PRICKLY LETTUCE	0.00	83.33	0.00	0.00	0.00	P			P			P			P						P		
Melilotus officinale	MELILOTUS OFFICINALIS	YELLOW SWEETCLOVER	0.00	16.67	0.00	0.00	0.00	P																	
Noccaea montana	THLASPI MONTANA	MOUNTAIN CANDYTUFT	0.00	16.67	0.00	0.00	0.00							P											
Podospermum laciniatum	SCORZONERA LACINIATIUM	FALSE SALSIFY	0.00	16.67	0.00	0.00	0.00	P																	
Sisymbrium altissimum		JIM HILL MUSTARD	0.33	50.00	1.26	0.33	0.87	2			P									P					
Solanum triflorum		NIGHTSHADE	0.00	16.67	0.00	0.00	0.00																P		
Tithymalus peplus		SPURGE	0.00	16.67	0.00	0.00	0.00													P					
Tragopogon dubius ssp. major		YELLOW SALSIFY	0.00	16.67	0.00	0.00	0.00	P																	
Verbascum thapsus		MULLEIN	0.50	100.00	1.89	0.50	1.30	2			1			P			P			P			P		
TOTAL INTRO. ANN. & BIEN. FORBS			**0.8**	**100.0**	**3.1**	**1.0**	**3.4**	**4**	---	---	**1**	---	---	**P**	---	---	**P**	---	---	**P**	---	---	**(1)**	---	---
INTRODUCED ANNUAL GRASSES																									
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	0.17 (0.33)	66.67	0.63 (1.21)	0.33	0.87	1				1		P									P		
Triticum aestivum		VHEAT	0.00	16.67	0.00	0.00	0.00				P														
TOTAL INTRO. ANN. GRASSES			**0.2 (0.3)**	**66.7**	**0.6 (1.2)**	**0.3**	**1.1**	**1**	---	---	**P**	**1**	---	**P**	---	---	---	---	---	---	---	---	**P**	---	---
NATIVE PERENNIAL FORBS																									
Achillea lanulosa		WESTERN YARROV	0.00	66.67	0.00	0.00	0.00	P						P						P			P		
Aletes acaulis		STEMLESS INDIAN PARSLEY	0.33	50.00	1.26	0.33	0.87							P			1						1		
Allium cernuum		NODDING ONION	0.00	16.67	0.00	0.00	0.00																P		
Apocynum androsaemifolium		SPREADING DOGBANE	0.00	16.67	0.00	0.00	0.00				P														
Artemisia frigida		FRINGED SAGE	0.00	33.33	0.00	0.00	0.00	P															P		
Artemisia ludoviciana		PASTURE SAGE	0.50	66.67	1.89	0.83	2.16				P			1			P						2(2)		
Aster porteri		PORTER'S ASTER	0.00	66.67	0.00	0.00	0.00	P			P									P			P		
Astragalus agrestis		FIELD MILKVETCH	0.00	16.67	0.00	0.00	0.00																P		
Astragalus laxmannii	ASTRAGALUS ADSURGENS VAR.ROBUSTIER	LAXMANN'S MILKVETCH	0.17	50.00	0.63	0.17	0.43	1			P			P											
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	0.33	83.33	1.26	0.33	0.87	P						P			P			1			1		
Astragalus spp.		MILK VETCH	0.00	33.33	0.00	0.00	0.00										P						P		
Campanula rotundifolia		HAREBELL	0.50	83.33	1.89	0.50	1.30	P						P			P			1			2		
Corydalis aurea		GOLDEN SMOKE	0.83	83.33	3.14	1.00	2.60	P			2			P			2(1)			1					
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.17	83.33	0.63	0.17	0.43	P			P						P			1			P		
Eriogonum umbellatum var. umbellatum		WILD BUCKWHEAT	0.00	33.33	0.00	0.00	0.00							P									P		
Erysimum capitatum		COAST WALLFLOWER	0.17	83.33	0.63	0.17	0.43				P			P			P			P			1		
Gaillardia aristata		BLANKET-FLOWER	0.00	16.67	0.00	0.00	0.00													P					
Galium septentrionale	GALIUM BOREALE	NORTHERN BEDSTRAW	0.00	16.67	0.00	0.00	0.00	P																	
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	0.00	83.33	0.00	0.00	0.00	P			P						P			P			P		
Harbouria trachypleura		WHISKBROOM PARSLEY	0.00	33.33	0.00	0.00	0.00							P						P					
Helianthus pumilus		SUNFLOWER	0.00	50.00	0.00	0.00	0.00				P			P			P								
Heterotheca foliosa		GOLDENASTER	0.00	16.67	0.00	0.00	0.00										P								
Heterotheca villosa	HETEROTHECA HORRIDA,CHRYSOPSIS VILLOSA	HAIRY GOLDEN ASTER	0.00	33.33	0.00	0.00	0.00	P												P					
Liatris punctata		GAYFEATHER	0.00	16.67	0.00	0.00	0.00																P		
Mertensia lanceolata		LANCELEAF BLUEBELLS	0.00	66.67	0.00	0.00	0.00	P						P						P			P		
Oenothera caespitosa ssp. caespitosa		EVENING PRIMROSE	0.00	16.67	0.00	0.00	0.00	P																	
Oligosporus dracunculus ssp. glaucus	ARTEMISIA DRACUNCULUS SSP. GLAUCUS	WILD TARRAGON	0.00	16.67	0.00	0.00	0.00	P																	
Packera fendleri	SENECIO FENDLERI	FENDLER'S RAGWORT	0.00	16.67	0.00	0.00	0.00																P		
Penstemon glaber	PENSTEMON ALPINUS	BEARD TONGUE	0.00	16.67	0.00	0.00	0.00	P																	
Penstemon virens		GREEN BEARD-TONGUE	1.33	100.00	5.03	1.33	3.46	P			1			2			2			1			2		
Phacelia heterophylla		VARILEAF SCORPIONWEED	4.67	66.67	17.61	4.67	12.12				7			2			7						12		
Potentilla hippiana		HORSE CINQUEFOIL	0.00	33.33	0.00	0.00	0.00				P						P								

Group B Summary (concluded).

Pulsatilla ludoviciana	P. PATENS SSP. MULTIFIDA	PASQUEFLOWER	0.00	83.33	0.00	0.00	0.00	P			P						P			P			P		
Scutellaria brittonii		SKULLCAP	0.00	16.67	0.00	0.00	0.00													P					
Senecio integerrimus		LAMBSTONGUE GROUNDSEL	0.00	16.67	0.00	0.00	0.00							P											
Solidago simplex var. simplex	SOLIDAGO SPATHULATA VAR. NEOMEXICANA	MT. ALBERT GOLDENROD	0.00	66.67	0.00	0.00	0.00	P			P			P			P								
Urtica gracilis ssp. gracilis	URTICA DIOICA	STINGING NETTLE	0.00	16.67	0.00	0.00	0.00				P														
TOTAL NATIVE PERENNIAL FORBS			**9.0**	**100.0**	**34.0**	**9.5**	**32.0**	**1**	---	---	**10**	---	---	**5**	---	---	**12(1)**	---	---	**5**	---	---	**21(2)**	---	---
INTRODUCED PERENNIAL FORBS																									
Breea arvensis	CIRSIUM ARVENSE	CANADA THISTLE	0.17	50.00	0.63	0.17	0.43				1			P						P					
Taraxacum officinale		COMMON DANDELION	0.00 {0.17}	33.33	0.00 {0.61}	0.17	0.43	P	1					P											
Verbena bracteata		VERVAIN	0.00	16.67	0.00	0.00	0.00	P																	
TOTAL INTRO. PERENNIAL FORBS			**0.2 {0.3}**	**66.7**	**0.6 {1.2}**	**0.3**	**1.1**	**P**	**1**	---	**1**	---	---	**P**	---	---	---	---	---	**P**	---	---	---	---	---
NATIVE PERENNIAL GRASSES (cool)																									
Achnatherum nelsonii	STIPA NELSONII	NELSON NEEDLEGRASS	0.00	16.67	0.00	0.00	0.00																P		
Agrostis scabra		TICKLEGRASS	0.00	16.67	0.00	0.00	0.00	P																	
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	0.33	66.67	1.26	0.33	0.87				1			1			P						P		
Carex sp. 1		SEDGE	0.00	16.67	0.00	0.00	0.00										P								
Carex spp.		SEDGE	0.17	33.33	0.63	0.33	0.87	1(1)												P					
Elymus elymoides	SITANION HYSTRIX	BOTTLEBRUSH SQUIRRELTAIL	0.33	33.33	1.26	0.33	0.87	2															P		
Elymus lanceolatus fm. albicans	AGROPYRON DASYSTACHYUM,A. ALBICANS,AGROPYRON RIPARIUM	MONTANA WHEATGRASS	0.00	16.67	0.00	0.00	0.00							P											
Elymus spp.			0.00	16.67	0.00	0.00	0.00													P					
Elymus trachycaulus	AGROPYRON TRACHYCAULUM	SLENDER WHEATGRASS	5.33 {5.83}	83.33	20.13 {21.21}	6.00	15.58	11	2		5	1		8(1)			3			5					
Elymus virginicus		VIRGINIA WILDRYE	0.00	16.67	0.00	0.00	0.00							P											
Koeleria macrantha	KOELERIA CRISTATA,K. PYRAMIDATA,K.GRACILIS	JUNEGRASS	0.00	50.00	0.00	0.00	0.00	P			P												P		
Leucopoa kingii		SPIKE FESCUE	0.00	66.67	0.00	0.00	0.00	P			P			P									P		
Poa agassizensis		AGASSIZ BLUEGRASS	0.17	50.00	0.63	0.17	0.43	1												P			P		
Schedonnardus paniculatus		TUMBLEGRASS	0.00	16.67	0.00	0.00	0.00							P											
TOTAL NATIVE PERENNIAL GRASSES (c)			**6.3 {6.8}**	**100.0**	**23.9 {24.8}**	**7.2**	**24.2**	**15(1)**	**2**	---	**6**	**1**	---	**9(1)**	---	---	**3**	---	---	**5**	---	---	**P**	---	---
INTRODUCED PERENNIAL GRASSES (cool)																									
Ceratochloa carinata	CERATOCHLOA MARGINATA,BROMUS MARGINATUS	MOUNTAIN BROME	5.33 {5.50}	83.33	20.13 {20.00}	5.83	15.15	7	1(1)		P			10(1)			7			8					
Dactylis glomerata		ORCHARD GRASS	0.00	16.67	0.00	0.00	0.00													P					
Poa compressa		CANADA BLUEGRASS	0.17	16.67	0.63	0.17	0.43	1																	
Triticum aestivum x elytrigia elongata		REGREEN	1.00	83.33	3.77	1.17	3.03	1(1)			3			P			P			2					
TOTAL INTRO. PERENNIAL GRASSES (c)			**6.5 {6.7}**	**83.3**	**24.5 {24.2}**	**7.2**	**24.2**	**9(1)**	**1(1)**	---	**3**	---	---	**10(1)**	---	---	**7**	---	---	**10**	---	---	---	---	---
NATIVE PERENNIAL GRASSES (warm)																									
Chondrosum gracile	BOUTELOUA GRACILIS	BLUE GRAMA GRASS	0.83	83.33	3.14 {3.03}	1.17	3.03	2	(1)		P			3			P			(1)					
Sporobolus cryptandrus		SAND DROPSEED	0.00	16.67	0.00	0.00	0.00							P											
TOTAL NATIVE PERENNIAL GRASSES (w)			**0.8**	**83.3**	**3.1**	**1.2**	**3.9**	**2**	**(1)**	---	**P**	---	---	**3**	---	---	**P**	---	---	**(1)**	---	---	---	---	---
NATIVE SHRUBS																									
Arctostaphylos uva-ursi		KINNIKINNICK	0.17	33.33	0.63	0.17	0.43	1												P					
Ceanothus fendleri		BUCKBRUSH	0.33	100.00	1.26	0.33	0.87	P			P			P			P			2			P		
Oreobatus deliciosus	RUBUS DELICIOSUS	BOULDER RASPBERRY	0.00	16.67	0.00	0.00	0.00										P								
Physocarpus monogynus		NINEBARK	0.00	33.33	0.00	0.00	0.00				P						P								
Ribes cereum		WAX CURRANT	0.17	83.33	0.63	0.17	0.43	P						1			P			P			P		
Rosa arkansana		ARKANSAS ROSE	0.17	16.67	0.63	0.17	0.43										1								
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	0.00	66.67	0.00	0.00	0.00				P			P			P						P		
TOTAL NATIVE SHRUBS			**0.8**	**100.0**	**3.1**	**0.8**	**2.8**	**1**	---	---	**P**	---	---	**1**	---	---	**1**	---	---	**2**	---	---	**P**	---	---
NATIVE TREES																									
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	4.83 {0.50}	83.33	18.24 {1.82}	5.33	13.85			[1]		[1]	[8]		[2]	[8]			[9]						[3]
Populus tremuloides	POPULUS TREMULA	QUAKING ASPEN	0.17	16.67	0.63	0.17	0.43										1								
Populus tremuloides (dead)		ASPEN (DEAD)	0.17 {0.00}	16.67		0.17	0.43												[1]						
Pseudotsuga menziesii (dead)		DOUGLAS FIR	3.33 {0.00}	66.67		3.33	8.66			[8]			[2]									[4]			[6]
TOTAL NATIVE TREES			**0.2**	**16.7**	**0.6**	**0.2**	**0.6**	---	---	---	---	---	---	---	---	---	**1**	---	---	---	---	---	---	---	---
Standing dead		STANDING DEAD	0.83 {0.00}	50.00		1.00		1	1								1			3					
Litter		LITTER	20.33 {21.67}	100.00		21.67		41	2		19			15	1		16	1		14	1		17	3	
Bare soil		BARE SOIL	40.67 {45.50}	100.00		45.50		16	2		43	6		39	5		44	7		54	3		48	6	
Rock		ROCK	3.33 {3.83}	66.67		3.83					6	1		9			4	2					1		
TOTALS			91.7 {99.0}			110.5		91			90			92			90			96			91		
TOTALS (LAYER)								91	9	0	90	9	0	92	6	0	90	10	0	96	4	0	91	9	0
TOTAL VEGETATION COVER (LAYER)								33(2)	4(2)	0	22	2	0	29(2)	0	0	25(1)	0	0	25(1)	0	0	25(5)	0	0
TOTAL VEGETATION COVER			26.5 {28.0}		100.0 {101.8}	38.5 (s=6.2)	100.0	33(8)			22(2)			29(2)			25(1)			25(1)			25(5)		
			Std.Dev.= 3.9																						
GROUND COVER (Litter+Rock+Veg+St.Dead)			51.0 {54.0}			65.0 { 56.7}		75(2)	7(2)	0	47	3	0	53(2)	1	0	46(1)	3	0	42(1)	1	0	43(5)	3	0
SPECIES DENSITY (# of species/100 sq.m.)								49			36			46			39			35			40		
(AVERAGE= 40.8 Std.Dev.= 5.6)																									
SPECIES DENSITY (LAYER)								49	4	0	35	2	0	46	0	0	39	0	0	35	0	0	40	0	0
(#) = second hit																									
[#] = dead value not included in live vegetation totals																									
{#} = cover value if tree canopy is excluded																									

Group C Summary.

DATA FROM FILE Grpc																						
Walker Ranch 2002 - Group C					RELATIVE		RELATIVE															
PLANT SPECIES			AVERAGE		VEGETATION	AVERAGE	VEGETATION															
			COVER	FREQUENCY	COVER	COVER-ALL	COVER-ALL															
Scientific Name	Synonym	Common Name	(%)	(%)	(%)	(%)	(%)	02D	02DWU	02U	04D	04DWU	04U	05D	05DWU	05U	07D	07DWU	07U	11D	11DWU	11U
NATIVE ANNUAL & BIENNIAL FORBS																						
Acrolasia dispersa	MENTZELIA		0.00	20.00	0.00	0.00	0.00	P														
Bahia dissecta		CUTLEAF	0.00	20.00	0.00	0.00	0.00				P											
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	0.40	100.00	1.32	0.40	0.87	1			1			P			P			P		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	0.20	60.00	0.66	0.20	0.43				P			P						1		
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.20	60.00	0.66	0.20	0.43	P			1			P								
Grindelia squarrosa		GUMWEED	1.40	60.00	4.61	1.60	3.48	1									3			3(1)		
Oreocarya virgata	CRYPTANTHA VIRGATA	MINER'S CANDLE	0.00	20.00	0.00	0.00	0.00	P														
Polygonum douglasii	POLYGONUM SAVATCHENSE,POLYGONUM MONTANUM	DOUGLAS KNOTWEED	0.00	40.00	0.00	0.00	0.00				P			P								
Silene antirrhina		SLEEPY CATCHFLY	0.00	40.00	0.00	0.00	0.00	P						P								
TOTAL NATIVE ANN. & BIEN. FORBS			**2.2**	**100.0**	**7.2**	**2.4**	**6.9**	**2**	---	---	**2**	---	---	**P**	---	---	**3**	---	---	**4(1)**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS																						
Acosta diffusa	CENTAUREA DIFFUSA	TUMBLE KNAPWEED	0.00	20.00	0.00	0.00	0.00													P		
Alyssum minus		ALYSSUM	1.20 (1.40)	60.00	3.95 (4.32)	1.60	3.48	P			5(1)									1	1	
Bassia sieversiana	KOCHIA SCOPARIA,K. SIEVERSIANA	BURNING-BUSH	0.00	60.00	0.00	0.00	0.00	P			P			P								
Camelina microcarpa		LITTLEPOD FALSEFLAX	0.00	40.00	0.00	0.00	0.00	P												P		
Carduus nutans ssp. macrolepis		MUSK THISTLE	0.00	20.00	0.00	0.00	0.00													P		
Lactuca serriola		PRICKLY LETTUCE	0.00	40.00	0.00	0.00	0.00				P			P								
Lappula redowskii		EARLY STICKSEED	0.20	60.00	0.66	0.20	0.43	P			1						P					
Nicotiana attenuata		TOBACCO	0.00	40.00	0.00	0.00	0.00				P			P								
Sisymbrium altissimum		JIM HILL MUSTARD	4.20 (5.00)	80.00	13.82 (15.43)	5.00	10.87	1			3			16	4					1		
Teloxys botrys	CHENOPODIUM BOTRYS	VORMSEED,JERUSALEM OAK	0.00	20.00	0.00	0.00	0.00							P								
Verbascum thapsus		MULLEIN	0.40	100.00	1.32	0.40	0.87	P			P			P			P			2		
TOTAL INTRO. ANN. & BIEN. FORBS			**6.0 {7.0}**	**100.0**	**19.7 {21.6}**	**7.2**	**20.6**	**1**	---	---	**9(1)**	---	---	**16**	**4**	---	**P**	---	---	**4**	**1**	---
INTRODUCED ANNUAL GRASSES																						
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	2.80	100.00	9.21 (8.64)	3.00	6.52	1			7			6	(1)		P			P		
Bromus japonicus		JAPANESE BROME	0.00	20.00	0.00	0.00	0.00													P		
Cylindropyrum cylindricum	AEGILOPS CYLINDRICA	GOAT GRASS	0.00	40.00	0.00	0.00	0.00	P						P								
TOTAL INTRO. ANN. GRASSES			**2.8**	**100.0**	**9.2**	**3.0**	**8.6**	**1**	---	---	**7**	---	---	**6**	**(1)**	---	**P**	---	---	**P**	---	---
NATIVE PERENNIAL FORBS																						
Achillea lanulosa		WESTERN YARROW	0.20	60.00	0.66	0.20	0.43				1			P			P					
Aletes acaulis		STEMLESS INDIAN PARSLEY	0.00	20.00	0.00	0.00	0.00							P								
Apocynum androsaemifolium		SPREADING DOGBANE	0.00	20.00	0.00	0.00	0.00							P								
Artemisia frigida		FRINGED SAGE	2.20	60.00	7.24	2.40	5.22	7			P						4(1)					
Artemisia ludoviciana		PASTURE SAGE	0.60	100.00	1.97	0.80	1.74	1			P			1(1)			1			P		
Aster porteri		PORTER'S ASTER	0.40	80.00	1.32	0.40	0.87	P			1			P			1					
Astragalus agrestis		FIELD MILKVETCH	0.20	20.00	0.66	0.20	0.43										1					
Astragalus laxmannii	ASTRAGALUS ADSURGENS VAR.ROBUSTIOR	LAXMANN'S MILKVETCH I	0.20	20.00	0.66	0.20	0.43										1					
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	0.20	60.00	0.66	0.20	0.43	1									P			P		
Astragalus shortianus		MILK VETCH	0.00	20.00	0.00	0.00	0.00										P					
Campanula rotundifolia		HAREBELL	0.20	60.00	0.66	0.20	0.43	P						P			1					
Cirsium ochrocentrum	CIRSIUM MEGACEPHALUM	THISTLE	0.00	40.00	0.00	0.20	0.43	P												(1)		
Corydalis aurea		GOLDEN SMOKE	0.20	20.00	0.66	0.20	0.43				1											
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.00	80.00	0.00	0.00	0.00	P			P						P			P		
Eriogonum umbellatum var. umbellatum		WILD BUCKWHEAT	0.00	80.00	0.00	0.00	0.00	P			P						P			P		
Erysimum capitatum		COAST WALLFLOWER	0.20	80.00	0.66	0.20	0.43	P			P						1			P		
Euphorbia spp.		WILLOWHERB	0.00	40.00	0.00	0.00	0.00	P									P					
Gaillardia aristata		BLANKET-FLOWER	0.20	100.00	0.66	0.20	0.43	1			P			P			P			P		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	1.40	100.00	4.61	1.40	3.04	4			P			P			3			P		
Harbouria trachypleura		WHISKBROOM PARSLEY	0.20	60.00	0.66	0.20	0.43							1			P			P		
Helianthus pumilus		SUNFLOWER	0.20	60.00	0.66	0.20	0.43	P									1			P		
Heterotheca foliosa		GOLDENASTER	1.00	40.00	3.29	1.00	2.17				5						P					
Heterotheca villosa	HETEROTHECA HORRIDA,CHRYSOPSIS VILLOSA	HAIRY GOLDEN ASTER	1.20	80.00	3.95	1.20	2.61	3			1						1			1		
Liatris punctata		GAYFEATHER	0.20	20.00	0.66	0.20	0.43	1														
Mertensia lanceolata		LANCELEAF BLUEBELLS	0.00	60.00	0.00	0.00	0.00	P						P			P					
Monarda fistulosa var. menthifolia		HORSEMINT	0.00	20.00	0.00	0.00	0.00													P		
Oenothera caespitosa ssp. caespitosa		EVENING PRIMROSE	0.20	80.00	0.66	0.20	0.43	1			P						P			P		
Oxybaphus hirsutus	MIRABILIS HIRSUTA	UMBRELLAWORT	0.00	20.00	0.00	0.00	0.00				P											
Oxytropis lambertii		LOCOWEED	0.20	40.00	0.66	0.20	0.43	1												P		
Packera fendleri	SENECIO FENDLERI	FENDLER'S RAGWORT	0.00	20.00	0.00	0.00	0.00										P					
Penstemon virens		GREEN BEARD-TONGUE	0.20	80.00	0.66	0.20	0.43				P			P			P			1		
Phacelia heterophylla		VARILEAF SCORPIONWEED	0.60	100.00	1.97	0.60	1.30	P			P			1			2			P		
Pulsatilla ludoviciana	P. PATENS SSP. MULTIFIDA	PASQUEFLOWER	0.00	40.00	0.00	0.00	0.00				P			P								
Rumex triangulivalvis	RUMEX SALICIFOLIUS	WILLOW DOCK	0.00	20.00	0.00	0.00	0.00													P		
Scutellaria brittonii		SKULLCAP	0.00 (0.20)	100.00	0.00 (0.62)	0.20	0.43	P			P			P				1		P		
Solidago simplex var. simplex	SOLIDAGO SPATHULATA VAR. NEOMEXICANA	MT. ALBERT GOLDENROD	0.60	40.00	1.97	0.80	1.74				(1)			3								
TOTAL NATIVE PERENNIAL FORBS			**10.8 {11.0}**	**100.0**	**35.5 {34.0}**	**11.8**	**33.7**	**20**	---	---	**9(1)**	---	---	**6(1)**	---	---	**17(1)**	**1**	---	**2(1)**	---	---
INTRODUCED PERENNIAL FORBS																						
Breea arvensis	CIRSIUM ARVENSE	CANADA THISTLE	0.00	20.00	0.00	0.00	0.00													P		
Verbena bracteata		VERVAIN	0.20	20.00	0.66	0.20	0.43													1		
TOTAL INTRO. PERENNIAL FORBS			**0.2**	**20.0**	**0.7**	**0.2**	**0.6**	---	---	---	---	---	---	---	---	---	---	---	---	**1**	---	---

Group C Summary (concluded).

NATIVE PERENNIAL GRASSES (cool)																						
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	5.00 {5.40}	100.00	16.45 {16.67}	6.00	13.04	4	1(1)		10			1			6			4(2)	1	
Carex spp.		SEDGE	0.20	40.00	0.66	0.20	0.43	P												1		
Elymus elymoides	SITANION HYSTRIX	BOTTLEBRUSH SQUIRRELTAIL	0.20	80.00	0.66	0.20	0.43	P			P						1			P		
Elymus lanceolatus fm. albicans	AGROPYRON DASYSTACHYUM,A. ALBICANS,AGROPYRON RIPARIUM	MONTANA WHEATGRASS	0.80	60.00	2.63	0.80	1.74	P						1			3					
Elymus trachycaulus	AGROPYRON TRACHYCAULUM	SLENDER WHEATGRASS	0.40 {0.60}	20.00	1.32 {1.85}	0.60	1.30													2	1	
Hesperostipa comata	STIPA COMATA	NEEDLE-AND-THREAD GRASS	0.00	40.00	0.00	0.00	0.00				P									P		
Koeleria macrantha	KOELERIA CRISTATA,K. PYRAMIDATA,K.GRACILIS	JUNEGRASS	0.00	40.00	0.00	0.00	0.00				P						P					
Leucopoa kingii		SPIKE FESCUE	0.20	80.00	0.66	0.20	0.43				P			P			1			P		
TOTAL NATIVE PERENNIAL GRASSES (c)			**6.8 {7.4}**	**100.0**	**22.4 {22.8}**	**8.0**	**22.9**	**4**	**1(1)**	---	**10**	---	---	**2**	---	---	**11**	---	---	**7(2)**	**2**	---
INTRODUCED PERENNIAL GRASSES (cool)																						
Ceratochloa carinata	CERATOCHLOA MARGINATA,BROMUS MARGINATUS	MOUNTAIN BROME	0.20 {0.40}	20.00	0.66 {1.23}	0.40	0.87													1	1	
Poa compressa		CANADA BLUEGRASS	0.20	20.00	0.66	0.20	0.43										1					
Triticum aestivum x elytrigia elongata		REGREEN	0.20	100.00	0.66	0.20	0.43	P			P			1			P			P		
TOTAL INTRO. PERENNIAL GRASSES (c)			**0.6 {0.8}**	**100.0**	**2.0 {2.5}**	**0.8**	**2.3**	**P**	---	---	**P**	---	---	**1**	---	---	**1**	---	---	**1**	**1**	---
NATIVE PERENNIAL GRASSES (warm)																						
Chondrosum gracile	BOUTELOUA GRACILIS	BLUE GRAMA GRASS	0.20	40.00	0.66	0.20	0.43				P									1		
Muhlenbergia montana		MOUNTAIN MUHLY	0.00	20.00	0.00	0.00	0.00				P											
Sporobolus cryptandrus		SAND DROPSEED	0.00	20.00	0.00	0.00	0.00							P								
TOTAL NATIVE PERENNIAL GRASSES (w)			**0.2**	**60.0**	**0.7**	**0.2**	**0.6**	---	---	---	**P**	---	---	**P**	---	---	---	---	---	**1**	---	---
NATIVE SHRUBS																						
Ceanothus fendleri		BUCKBRUSH	0.80	100.00	2.63	1.20	2.61	1			1			P			1(1)			1(1)		
Cercocarpus montanus		BIRCHLEAF MOUNTAIN MAHOGANY	0.00	60.00	0.00	0.20	0.43				P			P						(1)		
Oreobatus deliciosus	RUBUS DELICIOSUS	BOULDER RASPBERRY	0.00	20.00	0.00	0.00	0.00				P											
Physocarpus monogynus		NINEBARK	0.00	40.00	0.00	0.00	0.00				P						P					
Ribes cereum		WAX CURRANT	0.00	40.00	0.00	0.00	0.00	P												P		
Rosa arkansana		ARKANSAS ROSE	0.00	60.00	0.00	0.00	0.00	P						P						P		
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	0.00	40.00	0.00	0.00	0.00	P			P											
TOTAL NATIVE SHRUBS			**0.8**	**100.0**	**2.6**	**1.4**	**4.0**	**1**	---	---	**1**	---	---	**P**	---	---	**1(1)**	---	---	**1(2)**	---	---
NATIVE TREES																						
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	10.60 {0.20}	80.00	34.87 {0.62}	10.80	23.48			[12]						[7]			[6]		[1]	[28]
Sabina scopulorum (dead)	JUNIPERUS SCOPULORUM	ROCKY MOUNTAIN JUNIPER	0.20 {0.00}	40.00		0.20	0.43						[1]	P								
TOTAL NATIVE TREES			**0.0**		**0.0**	**0.0**	**0.0**															
FERNS																						
Cystopteris fragilis		BRITTLEFERN	0.00	20.00	0.00	0.00	0.00				P											
TOTAL FERNS			**0.0**	**20.0**	**0.0**	**0.0**	**0.0**	---	---	---	**P**	---	---	---	---	---	---	---	---	---	---	---
Standing dead		STANDING DEAD	1.20 {0.00}	60.00		1.20		1			2			3								
Litter		LITTER	22.40 {22.80}	100.00		22.80		18	1		26			30			20			18	1	
Bare soil		BARE SOIL	33.40 {41.40}	100.00		41.40		39	10		28	1		29	2		38	5		33	22	
Rock		ROCK	1.80 {2.00}	80.00		2.00		1			5				1		3					
TOTALS			89.2 {98.8}			113.4		88			99			93			94			72		
TOTALS (LAYER)								88	12	0	99	1	0	93	7	0	94	6	0	72	27	0
TOTAL VEGETATION COVER (LAYER)								29	1(1)	0	38(2)	0	0	31(1)	4(1)	0	33(2)	1	0	21(6)	4	0
TOTAL VEGETATION COVER			30.4 {32.6}		100.0 {100.6}	46.0 (s=3.9)	100.0	29(2)			38(2)			31(6)			33(3)			21(10)		
			Std.Dev.= 6.2																			
GROUND COVER (Litter+Rock+Veg+St.Dead)			55.8 {58.4}			72.0 { 61.2}		49	2(1)	0	71(2)	0	0	64(1)	5(1)	0	56(2)	1	0	39(6)	5	0
SPECIES DENSITY (# of species/100 sq.m.)								43			46			36			39			44		
(AVERAGE= 41.6 Std.Dev.= 4.0)																						
SPECIES DENSITY (LAYER)								43	1	0	46	0	0	36	2	0	38	1	0	44	4	0
(#) = second hit																						
[#] = dead value not included in live vegetation totals																						
{#} = cover value if tree canopy is excluded																						

Group D Summary.

DATA FROM FILE Grpd																		
Walker Ranch 2002 - Group D					RELATIVE		RELATIVE											
PLANT SPECIES			AVERAGE		VEGETATION	AVERAGE	VEGETATION											
			COVER	FREQUENCY	COVER	COVER-ALL	COVER-ALL											
Scientific Name	Synonym	Common Name	(%)	(%)	(%)	(%)	(%)	03D	03DWU	03U	15D	15DWU	15U	17D	17DWU	17U
NATIVE ANNUAL & BIENNIAL FORBS																		
Acrolasia dispersa	MENTZELIA		0.00	66.67	0.00	0.00	0.00				P			P		
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	0.00	66.67	0.00	0.00	0.00	P			P					
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	0.00	100.00	0.00	0.00	0.00	P			P			P		
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.00	33.33	0.00	0.00	0.00				P					
Gaura mollis	GAURA PARVIFLORA	BUTTERFLY WEED	0.00	33.33	0.00	0.00	0.00				P					
Grindelia squarrosa		GUMWEED	0.67	66.67	2.20	0.67	1.57	1						1		
Machaeranthera bigelovii		BIGELOW ASTER	0.33	33.33	1.10	0.33	0.79							1		
Polygonum douglasii	POLYGONUM SAWATCHENSE,POLYGONUM MONTANUM	DOUGLAS KNOTWEED	0.00	33.33	0.00	0.00	0.00				P					
Silene antirrhina		SLEEPY CATCHFLY	0.00 (0.33)	66.67	0.00 (1.05)	0.33	0.79	P			P	1				
TOTAL NATIVE ANN. & BIEN. FORBS			**1.0 (1.3)**	**100.0**	**3.3 (4.2)**	**1.3**	**3.8**	**1**	---	---	**P**	**1**	---	**2**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS																
Alyssum minus		ALYSSUM	0.00	33.33	0.00	0.00	0.00	P								
Bassia sieversiana	KOCHIA SCOPARIA,K. SIEVERSIANA	BURNING-BUSH	0.00 (0.33)	33.33	0.00 (1.05)	0.33	0.79		1							
Carduus nutans ssp. macrolepis		MUSK THISTLE	0.33	33.33	1.10	0.33	0.79				1					
Cirsium vulgare		BULL THISTLE	0.33	33.33	1.10	0.33	0.79				1					
Lactuca serriola		PRICKLY LETTUCE	0.00	66.67	0.00	0.00	0.00	P			P					
Sisymbrium altissimum		JIM HILL MUSTARD	0.00	33.33	0.00	0.00	0.00	P								
Solanum spp.		NIGHTSHADE	0.00	33.33	0.00	0.00	0.00				P					
Tragopogon dubius ssp. major		YELLOW SALSIFY	0.00	66.67	0.00	0.00	0.00	P			P					
Verbascum thapsus		MULLEIN	5.33	100.00	17.58	6.33	14.96	8(1)			7(2)			1		
TOTAL INTRO. ANN. & BIEN. FORBS			**6.0 (6.3)**	**100.0**	**19.8 (20.0)**	**7.3**	**21.0**	**8(1)**	**1**	---	**9(2)**	---	---	**1**	---	---
INTRODUCED ANNUAL GRASSES																
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	0.00	100.00	0.00	0.00	0.00	P			P			P		
Bromus japonicus		JAPANESE BROME	0.00	33.33	0.00	0.00	0.00				P					
TOTAL INTRO. ANN. GRASSES			**0.0**	**100.0**	**0.0**	**0.0**	**0.0**	**P**	---	---	**P**	---	---	**P**	---	---
NATIVE PERENNIAL FORBS																
Achillea lanulosa		WESTERN YARROW	0.00	66.67	0.00	0.00	0.00	P			P					
Aletes acaulis		STEMLESS INDIAN PARSLEY	0.00	33.33	0.00	0.00	0.00							P		
Allium cernuum		NODDING ONION	0.00	66.67	0.00	0.00	0.00	P						P		
Amerosedum lanceolatum	SEDUM LANCEOLATUM	YELLOW STONECROP	0.00	33.33	0.00	0.00	0.00							P		
Artemisia frigida		FRINGED SAGE	0.00	66.67	0.00	0.00	0.00	P			P					
Artemisia ludoviciana		PASTURE SAGE	1.00	100.00	3.30	1.00	2.36	P			P			3		
Asclepias stenophylla		SLIMLEAF MILKWEED	0.00	33.33	0.00	0.00	0.00				P					
Asclepias viridiflora		MILKWEED	0.00	33.33	0.00	0.00	0.00				P					
Aster porteri		PORTER'S ASTER	0.00	100.00	0.00	0.00	0.00	P			P			P		
Astragalus drummondii		DRUMMOND MILKVETCH	0.00	33.33	0.00	0.00	0.00				P					
Astragalus laxmannii	ASTRAGALUS ADSURGENS VAR.ROBUSTIER	LAXMANN'S MILKVETCH	0.00	33.33	0.00	0.00	0.00							P		
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	0.00	66.67	0.00	0.00	0.00	P			P					
Astragalus shortianus		MILK VETCH	0.00	66.67	0.00	0.00	0.00	P						P		
Campanula rotundifolia		HAREBELL	0.33	66.67	1.10	0.33	0.79	P			1					
Cerastium strictum	CERASTIUM ARVENSE	MOUSE-EAR	0.00	33.33	0.00	0.00	0.00				P					
Cirsium ochrocentrum	CIRSIUM MEGACEPHALUM	THISTLE	0.33	33.33	1.10	0.33	0.79	1								
Corydalis aurea		GOLDEN SMOKE	0.00	33.33	0.00	0.00	0.00				P					
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.00	33.33	0.00	0.00	0.00				P					
Erigeron speciosus		SHOWY FLEABANE	0.00	33.33	0.00	0.00	0.00				P					
Eriogonum umbellatum var. umbellatum		WILD BUCKWHEAT	0.00	33.33	0.00	0.00	0.00							P		
Erysimum capitatum		COAST WALLFLOWER	0.33	100.00	1.10	0.33	0.79	P			P			1		
Gaillardia aristata		BLANKET-FLOWER	0.00	66.67	0.00	0.00	0.00	P			P					
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	0.00	100.00	0.00	0.00	0.00	P			P			P		
Harbouria trachypleura		WHISKBROOM PARSLEY	0.00	33.33	0.00	0.00	0.00	P								
Helianthus pumilus		SUNFLOWER	1.33	100.00	4.40	1.33	3.15	P			4			P		
Heterotheca foliosa		GOLDENASTER	0.00	33.33	0.00	0.00	0.00							P		
Heterotheca villosa	HETEROTHECA HORRIDA,CHRYSOPSIS VILLOSA	HAIRY GOLDEN ASTER	0.00	66.67	0.00	0.00	0.00	P			P					
Heuchera spp.		ALUM-ROOT	0.00	33.33	0.00	0.00	0.00				P					
Lesquerella montana		BLADDERPOD	0.00	100.00	0.00	0.00	0.00	P			P			P		
Liatris punctata		GAYFEATHER	0.00	33.33	0.00	0.00	0.00							P		
Mertensia lanceolata		LANCELEAF BLUEBELLS	0.00	66.67	0.00	0.00	0.00	P			P					
Oenothera caespitosa ssp. caespitosa		EVENING PRIMROSE	0.00	33.33	0.00	0.00	0.00	P								
Packera fendleri	SENECIO FENDLERI	FENDLER'S RAGWORT	0.00	33.33	0.00	0.00	0.00							P		
Paronychia jamesii		NAILWORT	0.00	33.33	0.00	0.00	0.00							P		
Penstemon spp.		BEARD-TONGUE	0.00	33.33	0.00	0.00	0.00							P		
Penstemon virens		GREEN BEARD-TONGUE	0.67	100.00	2.20	1.00	2.36	P			P			2(1)		

Group D Summary (concluded).

Phacelia heterophylla		VARILEAF SCORPIONWEED	2.00 {2.33}	100.00	6.59 {7.37}	2.67	6.30	1	(1)		5	1		P		
Physaria vitulifera		DOUBLE BLADDERPOD	0.00	66.67	0.00	0.00	0.00				P			P		
Potentilla hippiana		HORSE CINQUEFOIL	0.00	33.33	0.00	0.00	0.00				P					
Pulsatilla ludoviciana	P. PATENS SSP. MULTIFIDA	PASQUEFLOWER	0.33	66.67	1.10	0.33	0.79	P			1					
Scutellaria brittonii		SKULLCAP	0.00	66.67	0.00	0.00	0.00				P			P		
Solidago simplex var. simplex	SOLIDAGO SPATHULATA VAR. NEOMEXICANA	MT. ALBERT GOLDENROD	0.33	33.33	1.10	0.33	0.79				1					
TOTAL NATIVE PERENNIAL FORBS			**6.7 {7.0}**	**100.0**	**22.0 {22.1}**	**7.7**	**21.9**	**2**	**(1)**	**---**	**12**	**1**	**---**	**6(1)**	**---**	**---**
INTRODUCED PERENNIAL FORBS																
Breea arvensis	CIRSIUM ARVENSE	CANADA THISTLE	2.00	33.33	6.59	2.00	4.72	6								
Taraxacum officinale		COMMON DANDELION	0.00	66.67	0.00	0.00	0.00	P			P					
TOTAL INTRO. PERENNIAL FORBS			**2.0**	**66.7**	**6.6**	**2.0**	**5.7**	**6**	**---**	**---**	**P**	**---**	**---**	**---**	**---**	**---**
NATIVE PERENNIAL GRASSES (cool)																
Bromopsis lanatipes	BROMUS LANATIPES	WOOLY BROME	0.00	66.67	0.00	0.00	0.00	P						P		
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	6.00	100.00	19.78	6.67	15.75	5			11(2)			2		
Carex spp.		SEDGE	0.00	33.33	0.00	0.00	0.00				P					
Elymus elymoides	SITANION HYSTRIX	BOTTLEBRUSH SQUIRRELTAIL	0.33	66.67	1.10	0.33	0.79	1			P					
Elymus lanceolatus fm. albicans	AGROPYRON DASYSTACHYUM,A. ALBICANS,AGROPYRON RIPARIUM	MONTANA WHEATGRASS	0.67	100.00	2.20	0.67	1.57	1			P			1		
Hesperostipa comata	STIPA COMATA	NEEDLE-AND-THREAD GRASS	0.33	66.67	1.10	0.33	0.79	P			1					
Koeleria macrantha	KOELERIA CRISTATA,K. PYRAMIDATA,K.GRACILIS	JUNEGRASS	0.00	33.33	0.00	0.00	0.00	P								
Leucopoa kingii		SPIKE FESCUE	1.33	100.00	4.40	1.33	3.15	P			1			3		
Poa agassizensis		AGASSIZ BLUEGRASS	0.00	33.33	0.00	0.00	0.00	P								
TOTAL NATIVE PERENNIAL GRASSES (c)			**8.7**	**100.0**	**28.6**	**9.3**	**26.7**	**7**	**---**	**---**	**13(2)**	**---**	**---**	**6**	**---**	**---**
INTRODUCED PERENNIAL GRASSES (cool)																
Triticum aestivum x elytrigia elongata		REGREEN	0.00	33.33	0.00	0.00	0.00	P								
TOTAL INTRO. PERENNIAL GRASSES (c)			**0.0**	**33.3**	**0.0**	**0.0**	**0.0**	**P**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**
NATIVE PERENNIAL GRASSES (warm)																
Chondrosum gracile	BOUTELOUA GRACILIS	BLUE GRAMA GRASS	0.33	33.33	1.10	0.33	0.79				1					
Muhlenbergia montana		MOUNTAIN MUHLY	1.00	33.33	3.30	1.00	2.36							3		
Schizachyrium scoparium	ANDROPOGON SCOPARIUM	LITTLE BLUESTEM	0.00	33.33	0.00	0.00	0.00							P		
TOTAL NATIVE PERENNIAL GRASSES (w)			**1.3**	**66.7**	**4.4**	**1.3**	**3.8**	**---**	**---**	**---**	**1**	**---**	**---**	**3**	**---**	**---**
NATIVE SHRUBS																
Acer glabrum		ROCKY MOUNTAIN MAPLE	0.00	33.33	0.00	0.00	0.00				P					
Ceanothus fendleri		BUCKBRUSH	2.67 {3.00}	100.00	8.79 {9.47}	4.00	9.45	2(1)	1(1)		4			2(1)		
Cercocarpus montanus		BIRCHLEAF MOUNTAIN MAHOGANY	1.33	33.33	4.40	1.33	3.15							4		
Oreobatus deliciosus	RUBUS DELICIOSUS	BOULDER RASPBERRY	0.00	66.67	0.00	0.00	0.00				P			P		
Physocarpus monogynus		NINEBARK	0.33	100.00	1.10	0.33	0.79	P			P			1		
Ribes cereum		WAX CURRANT	0.33	100.00	1.10	0.33	0.79	P			P			1		
Rosa arkansana		ARKANSAS ROSE	0.00	33.33	0.00	0.00	0.00				P					
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	0.00	33.33	0.00	0.00	0.00	P								
Yucca glauca		SPANISH BAYONET	0.00	33.33	0.00	0.00	0.00							P		
TOTAL NATIVE SHRUBS			**4.7 {5.0}**	**100.0**	**15.4 {15.8}**	**6.0**	**17.1**	**2(1)**	**1(1)**	**---**	**4**	**---**	**---**	**8(1)**	**---**	**---**
NATIVE TREES																
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	4.00 {0.00}	66.67		4.00	9.45			[5]			[7]			
Pseudotsuga menziesii (dead)		DOUGLAS FIR	1.67 {0.00}	66.67		1.67	3.94						[4]			[1]
Sabina scopulorum (dead)	JUNIPERUS SCOPULORUM	ROCKY MOUNTAIN JUNIPER	1.33 {0.33}	33.33	4.40 {1.05}	1.67	3.94					[1]	[4]			
TOTAL NATIVE TREES			**0.0**		**0.0**	**0.0**	**0.0**									
Standing dead		STANDING DEAD	2.67 {0.00}	100.00		3.00		4			2	1		2		
Litter		LITTER	23.67 {25.00}	100.00		25.00		30			13	3		28	1	
Bare soil		BARE SOIL	31.33 {33.67}	100.00		33.67		34	3		27	4		33		
Rock		ROCK	5.00 {6.33}	100.00		6.33		1			4	4		10		
TOTALS			93.0 {97.0}			110.3		95			85			99		
TOTALS (LAYER)								95	5	0	85	14	0	99	1	0
TOTAL VEGETATION COVER (LAYER)								26(2)	2(2)	0	39(4)	2	0	26(2)	0	0
TOTAL VEGETATION COVER			30.3 {32.0}		100.0 {101.1}	42.3 (s=18.5)	100.0	26(6)			39(6)			26(2)		
			Std.Dev.= 7.5													
GROUND COVER (Litter+Rock+Veg+St.Dead)			61.7 {66.0}			76.7 { 69.7}		61(2)	2(2)	0	58(4)	10	0	66(2)	1	0
SPECIES DENSITY (# of species/100 sq.m.)								47			57			39		
(AVERAGE= 47.7 Std.Dev.= 9.0)																
SPECIES DENSITY (LAYER)								46	3	0	57	2	0	39	0	0
(#) = second hit																
[#] = dead value not included in live vegetation totals																
{#} = cover value if tree canopy is excluded																

Sample 1

DATA FROM FILE wr01									
Walker Ranch 2002 - Sample 1				**RELATIVE**		**RELATIVE**			
PLANT SPECIES			**AVERAGE**	**VEGETATION**	**AVERAGE**	**VEGETATION**			
			COVER	**COVER**	**COVER-ALL**	**COVER-ALL**			
Scientific Name	**Synonym**	**Common Name**	**(%)**	**(%)**	**(%)**	**(%)**	**01D**	**01DWU**	**01U**
NATIVE ANNUAL & BIENNIAL FORBS									
Androsace septentrionalis		PYGMYFLOWER ROCKJASMINE	0.00	0.00	0.00	0.00	P		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Frasera speciosa		GREEN GENTIAN	0.00	0.00	0.00	0.00	P		
Gaura mollis	GAURA PARVIFLORA	BUTTERFLY WEED	0.00	0.00	0.00	0.00	P		
Helianthus annuus		COMMON SUNFLOWER	0.00	0.00	0.00	0.00	P		
Polygonum douglasii	POLYGONUM SAWATCHENSE,POLYGONUM MONTANUM	DOUGLAS KNOTWEED	0.00	0.00	0.00	0.00	P		
Silene antirrhina		SLEEPY CATCHFLY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE ANN. & BIEN. FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Carduus nutans ssp. macrolepis		MUSK THISTLE	0.00	0.00	0.00	0.00	P		
Lactuca serriola		PRICKLY LETTUCE	0.00	0.00	0.00	0.00	P		
Melilotus officinale	MELILOTUS OFFICINALIS	YELLOW SWEETCLOVER	0.00	0.00	0.00	0.00	P		
Podospermum laciniatum	SCORZONERA LACINIATIUM	FALSE SALSIFY	0.00	0.00	0.00	0.00	P		
Sisymbrium altissimum		JIM HILL MUSTARD	2.00	6.06	2.00	4.00	2		
Tragopogon dubius ssp. major		YELLOW SALSIFY	0.00	0.00	0.00	0.00	P		
Verbascum thapsus		MULLEIN	2.00	6.06	2.00	4.00	2		
TOTAL INTRO. ANN. & BIEN. FORBS			**4.0**	**12.1**	**4.0**	**9.8**	**4**	---	---
INTRODUCED ANNUAL GRASSES									
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	1.00	3.03	1.00	2.00	1		
TOTAL INTRO. ANN. GRASSES			**1.0**	**3.0**	**1.0**	**2.4**	**1**	---	---
NATIVE PERENNIAL FORBS									
Achillea lanulosa		WESTERN YARROW	0.00	0.00	0.00	0.00	P		
Artemisia frigida		FRINGED SAGE	0.00	0.00	0.00	0.00	P		
Aster porteri		PORTER'S ASTER	0.00	0.00	0.00	0.00	P		
Astragalus laxmannii	ASTRAGALUS ADSURGENS VAR.ROBUSTIER	LAXMANN'S MILKVETCH	1.00	3.03	1.00	2.00	1		
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	0.00	0.00	0.00	0.00	P		
Campanula rotundifolia		HAREBELL	0.00	0.00	0.00	0.00	P		
Corydalis aurea		GOLDEN SMOKE	0.00	0.00	0.00	0.00	P		
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.00	0.00	0.00	0.00	P		
Galium septentrionale	GALIUM BOREALE	NORTHERN BEDSTRAW	0.00	0.00	0.00	0.00	P		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	0.00	0.00	0.00	0.00	P		
Heterotheca villosa	HETEROTHECA HORRIDA,CHRYSOPSIS VILLOSA	HAIRY GOLDEN ASTER	0.00	0.00	0.00	0.00	P		
Mertensia lanceolata		LANCELEAF BLUEBELLS	0.00	0.00	0.00	0.00	P		
Oenothera caespitosa ssp. caespitosa		EVENING PRIMROSE	0.00	0.00	0.00	0.00	P		
Oligosporus dracunculus ssp. glaucus	ARTEMISIA DRACUNCULUS SSP. GLAUCUS	WILD TARRAGON	0.00	0.00	0.00	0.00	P		
Penstemon glaber	PENSTEMON ALPINUS	BEARD TONGUE	0.00	0.00	0.00	0.00	P		
Penstemon virens		GREEN BEARD-TONGUE	0.00	0.00	0.00	0.00	P		
Pulsatilla ludoviciana	P. PATENS SSP. MULTIFIDA	PASQUEFLOWER	0.00	0.00	0.00	0.00	P		
Solidago simplex var. simplex	SOLIDAGO SPATHULATA VAR. NEOMEXICANA	MT. ALBERT GOLDENROD	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL FORBS			**1.0**	**3.0**	**1.0**	**2.4**	**1**	---	---
INTRODUCED PERENNIAL FORBS									
Taraxacum officinale		COMMON DANDELION	0.00 {1.00}	0.00 {2.70}	1.00	2.00	P	1	
Verbena bracteata		VERVAIN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL FORBS			**0.0 {1.0}**	**0.0 {2.7}**	**1.0**	**2.4**	**P**	**1**	---
NATIVE PERENNIAL GRASSES (cool)									
Agrostis scabra		TICKLEGRASS	0.00	0.00	0.00	0.00	P		
Carex spp.		SEDGE	1.00	3.03	2.00	4.00	1(1)		
Elymus elymoides	SITANION HYSTRIX	BOTTLEBRUSH SQUIRRELTAIL	2.00	6.06	2.00	4.00	2		
Elymus trachycaulus	AGROPYRON TRACHYCAULUM	SLENDER WHEATGRASS	11.00 {13.00}	33.33 {35.14}	13.00	26.00	11	2	
Koeleria macrantha	KOELERIA CRISTATA,K. PYRAMIDATA,K.GRACILIS	JUNEGRASS	0.00	0.00	0.00	0.00	P		
Leucopoa kingii		SPIKE FESCUE	0.00	0.00	0.00	0.00	P		
Poa agassizensis		AGASSIZ BLUEGRASS	1.00	3.03	1.00	2.00	1		
TOTAL NATIVE PERENNIAL GRASSES (c)			**15.0 {17.0}**	**45.5 {45.9}**	**18.0**	**43.9**	**15(1)**	**2**	---
INTRODUCED PERENNIAL GRASSES (cool)									
Ceratochloa carinata	CERATOCHLOA MARGINATA,BROMUS MARGINATUS	MOUNTAIN BROME	7.00 {8.00}	21.21 {21.62}	9.00	18.00	7	1(1)	
Poa compressa		CANADA BLUEGRASS	1.00	3.03	1.00	2.00	1		
Triticum aestivum x elytrigia elongata		REGREEN	1.00	3.03	2.00	4.00	1(1)		
TOTAL INTRO. PERENNIAL GRASSES (c)			**9.0 {10.0}**	**27.3 {27.0}**	**12.0**	**29.3**	**9(1)**	**1(1)**	---
NATIVE PERENNIAL GRASSES (warm)									
Chondrosum gracile	BOUTELOUA GRACILIS	BLUE GRAMA GRASS	2.00	6.06 {5.41}	3.00	6.00	2	(1)	
TOTAL NATIVE PERENNIAL GRASSES (w)			**2.0**	**6.1**	**3.0**	**7.3**	**2**	**(1)**	---
NATIVE SHRUBS									
Arctostaphylos uva-ursi		KINNIKINNICK	1.00	3.03	1.00	2.00	1		
Ceanothus fendleri		BUCKBRUSH	0.00	0.00	0.00	0.00	P		
Ribes cereum		WAX CURRANT	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**1.0**	**3.0**	**1.0**	**2.4**	**1**	---	---
NATIVE TREES									
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	1.00 {0.00}		1.00	2.00			[1]
Pseudotsuga menziesii (dead)		DOUGLAS FIR	8.00 {0.00}		8.00	16.00			[8]
TOTAL NATIVE TREES			**0.0**	**0.0**	**0.0**	**0.0**			
Standing dead		STANDING DEAD	1.00 {0.00}		2.00		1	1	
Litter		LITTER	41.00 {43.00}		43.00		41	2	
Bare soil		BARE SOIL	16.00 {18.00}		18.00		16	2	
TOTALS			91.0 {98.0}		113.0		91		
TOTALS (LAYER)							91	9	0
TOTAL VEGETATION COVER (LAYER)							33(2)	4(2)	0
TOTAL VEGETATION COVER			33.0 {37.0}	100.0 {100.0}	50.0 (s=0.0)	100.0	33(8)		
			Std.Dev.= 0.0						
GROUND COVER (Litter+Rock+Veg+St.Dead)			75.0 {82.0}		95.0 { 86.0}		75(2)	7(2)	0
SPECIES DENSITY (# of species/100 sq.m.)							49		
(AVERAGE= 49.0 Std.Dev.= 0.0)									
SPECIES DENSITY (LAYER)							49	4	0

Sample 2

DATA FROM FILE wr02									
Walker Ranch 2002 - Sample 2				**RELATIVE**		**RELATIVE**			
PLANT SPECIES			**AVERAGE**	**VEGETATION**	**AVERAGE**	**VEGETATION**			
			COVER	**COVER**	**COVER-ALL**	**COVER-ALL**			
Scientific Name	**Synonym**	**Common Name**	**(%)**	**(%)**	**(%)**	**(%)**	**02D**	**02DWU**	**02U**
NATIVE ANNUAL & BIENNIAL FORBS									
Acrolasia dispersa	MENTZELIA		0.00	0.00	0.00	0.00	P		
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	1.00	3.45	1.00	2.33	1		
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.00	0.00	0.00	0.00	P		
Grindelia squarrosa		GUMWEED	1.00	3.45	1.00	2.33	1		
Oreocarya virgata	CRYPTANTHA VIRGATA	MINER'S CANDLE	0.00	0.00	0.00	0.00	P		
Silene antirrhina		SLEEPY CATCHFLY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE ANN. & BIEN. FORBS			**2.0**	**6.9**	**2.0**	**6.5**	**2**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Alyssum minus		ALYSSUM	0.00	0.00	0.00	0.00	P		
Bassia sieversiana	KOCHIA SCOPARIA,K. SIEVERSIANA	BURNING-BUSH	0.00	0.00	0.00	0.00	P		
Camelina microcarpa		LITTLEPOD FALSEFLAX	0.00	0.00	0.00	0.00	P		
Lappula redowskii		EARLY STICKSEED	0.00	0.00	0.00	0.00	P		
Sisymbrium altissimum		JIM HILL MUSTARD	1.00	3.45	1.00	2.33	1		
Verbascum thapsus		MULLEIN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. & BIEN. FORBS			**1.0**	**3.4**	**1.0**	**3.2**	**1**	---	---
INTRODUCED ANNUAL GRASSES									
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	1.00	3.45	1.00	2.33	1		
Cylindropyrum cylindricum	AEGILOPS CYLINDRICA	GOAT GRASS	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. GRASSES			**1.0**	**3.4**	**1.0**	**3.2**	**1**	---	---
NATIVE PERENNIAL FORBS									
Artemisia frigida		FRINGED SAGE	7.00	24.14	7.00	16.28	7		
Artemisia ludoviciana		PASTURE SAGE	1.00	3.45	1.00	2.33	1		
Aster porteri		PORTER'S ASTER	0.00	0.00	0.00	0.00	P		
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	1.00	3.45	1.00	2.33	1		
Campanula rotundifolia		HAREBELL	0.00	0.00	0.00	0.00	P		
Cirsium ochrocentrum	CIRSIUM MEGACEPHALUM	THISTLE	0.00	0.00	0.00	0.00	P		
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.00	0.00	0.00	0.00	P		
Eriogonum umbellatum var. umbellatum		WILD BUCKWHEAT	0.00	0.00	0.00	0.00	P		
Erysimum capitatum		COAST WALLFLOWER	0.00	0.00	0.00	0.00	P		
Euphorbia spp.		WILLOWHERB	0.00	0.00	0.00	0.00	P		
Gaillardia aristata		BLANKET-FLOWER	1.00	3.45	1.00	2.33	1		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	4.00	13.79	4.00	9.30	4		
Helianthus pumilus		SUNFLOWER	0.00	0.00	0.00	0.00	P		
Heterotheca villosa	HETEROTHECA HORRIDA,CHRYSOPSIS VILLOSA	HAIRY GOLDEN ASTER	3.00	10.34	3.00	6.98	3		
Liatris punctata		GAYFEATHER	1.00	3.45	1.00	2.33	1		
Mertensia lanceolata		LANCELEAF BLUEBELLS	0.00	0.00	0.00	0.00	P		
Oenothera caespitosa ssp. caespitosa		EVENING PRIMROSE	1.00	3.45	1.00	2.33	1		
Oxytropis lambertii		LOCOWEED	1.00	3.45	1.00	2.33	1		
Phacelia heterophylla		VARILEAF SCORPIONWEED	0.00	0.00	0.00	0.00	P		
Scutellaria brittonii		SKULLCAP	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL FORBS			**20.0**	**69.0**	**20.0**	**64.5**	**20**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	4.00 {5.00}	13.79 {16.67}	6.00	13.95	4	1(1)	
Carex spp.		SEDGE	0.00	0.00	0.00	0.00	P		
Elymus elymoides	SITANION HYSTRIX	BOTTLEBRUSH SQUIRRELTAIL	0.00	0.00	0.00	0.00	P		
Elymus lanceolatus fm. albicans	AGROPYRON DASYSTACHYUM,A. ALBICANS,AGROPYRON RIPARIUM	MONTANA WHEATGRASS	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (c)			**4.0 {5.0}**	**13.8 {16.7}**	**6.0**	**19.4**	**4**	**1(1)**	---
INTRODUCED PERENNIAL GRASSES (cool)									
Triticum aestivum x elytrigia elongata		REGREEN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL GRASSES (c)			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE SHRUBS									
Ceanothus fendleri		BUCKBRUSH	1.00	3.45	1.00	2.33	1		
Ribes cereum		WAX CURRANT	0.00	0.00	0.00	0.00	P		
Rosa arkansana		ARKANSAS ROSE	0.00	0.00	0.00	0.00	P		
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**1.0**	**3.4**	**1.0**	**3.2**	**1**	---	---
NATIVE TREES									
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	12.00 {0.00}		12.00	27.91			[12]
TOTAL NATIVE TREES			**0.0**	**0.0**	**0.0**	**0.0**			
Standing dead		STANDING DEAD	1.00 {0.00}		1.00		1		
Litter		LITTER	18.00 {19.00}		19.00		18	1	
Bare soil		BARE SOIL	39.00 {49.00}		49.00		39	10	
Rock		ROCK	1.00		1.00		1		
TOTALS			88.0 {99.0}		113.0		88		
TOTALS (LAYER)							88	12	0
TOTAL VEGETATION COVER (LAYER)							29	1(1)	0
TOTAL VEGETATION COVER			29.0 {30.0}	100.0 {100.0}	43	100.0	29(2)		
GROUND COVER (Litter+Rock+Veg+St.Dead)			49.0 {51.0}		64.0 { 52.0}		49	2(1)	0
SPECIES DENSITY (# of species/100 sq.m.)							43		
SPECIES DENSITY (LAYER)							43	1	0

(#) = second hit
[#] = dead value not included in live vegetation totals
{#} = cover value if tree canopy is excluded

Sample 3

DATA FROM FILE wr03

Walker Ranch 2002 - Sample 3 PLANT SPECIES			AVERAGE COVER	RELATIVE VEGETATION COVER	AVERAGE COVER-ALL	RELATIVE VEGETATION COVER-ALL			
Scientific Name	**Synonym**	**Common Name**	**(%)**	**(%)**	**(%)**	**(%)**	**03D**	**03DWU**	**03U**
NATIVE ANNUAL & BIENNIAL FORBS									
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Grindelia squarrosa		GUMWEED	1.00	3.85	1.00	2.70	1		
Silene antirrhina		SLEEPY CATCHFLY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE ANN. & BIEN. FORBS			**1.0**	**3.8**	**1.0**	**3.1**	**1**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Alyssum minus		ALYSSUM	0.00	0.00	0.00	0.00	P		
Bassia sieversiana	KOCHIA SCOPARIA,K. SIEVERSIANA	BURNING-BUSH	0.00 {1.00}	0.00 {3.57}	1.00	2.70		1	
Lactuca serriola		PRICKLY LETTUCE	0.00	0.00	0.00	0.00	P		
Sisymbrium altissimum		JIM HILL MUSTARD	0.00	0.00	0.00	0.00	P		
Tragopogon dubius ssp. major		YELLOW SALSIFY	0.00	0.00	0.00	0.00	P		
Verbascum thapsus		MULLEIN	8.00	30.77	9.00	24.32	8(1)		
TOTAL INTRO. ANN. & BIEN. FORBS			**8.0 {9.0}**	**30.8 {32.1}**	**10.0**	**31.3**	**8(1)**	**1**	---
INTRODUCED ANNUAL GRASSES									
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. GRASSES			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL FORBS									
Achillea lanulosa		WESTERN YARROW	0.00	0.00	0.00	0.00	P		
Allium cernuum		NODDING ONION	0.00	0.00	0.00	0.00	P		
Artemisia frigida		FRINGED SAGE	0.00	0.00	0.00	0.00	P		
Artemisia ludoviciana		PASTURE SAGE	0.00	0.00	0.00	0.00	P		
Aster porteri		PORTER'S ASTER	0.00	0.00	0.00	0.00	P		
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	0.00	0.00	0.00	0.00	P		
Astragalus shortianus		MILK VETCH	0.00	0.00	0.00	0.00	P		
Campanula rotundifolia		HAREBELL	0.00	0.00	0.00	0.00	P		
Cirsium ochrocentrum	CIRSIUM MEGACEPHALUM	THISTLE	1.00	3.85	1.00	2.70	1		
Erysimum capitatum		COAST WALLFLOWER	0.00	0.00	0.00	0.00	P		
Gaillardia aristata		BLANKET-FLOWER	0.00	0.00	0.00	0.00	P		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	0.00	0.00	0.00	0.00	P		
Harbouria trachypleura		WHISKBROOM PARSLEY	0.00	0.00	0.00	0.00	P		
Helianthus pumilus		SUNFLOWER	0.00	0.00	0.00	0.00	P		
Heterotheca villosa	HETEROTHECA HORRIDA,CHRYSOPSIS VILLOSA	HAIRY GOLDEN ASTER	0.00	0.00	0.00	0.00	P		
Lesquerella montana		BLADDERPOD	0.00	0.00	0.00	0.00	P		
Mertensia lanceolata		LANCELEAF BLUEBELLS	0.00	0.00	0.00	0.00	P		
Oenothera caespitosa ssp. caespitosa		EVENING PRIMROSE	0.00	0.00	0.00	0.00	P		
Penstemon virens		GREEN BEARD-TONGUE	0.00	0.00	0.00	0.00	P		
Phacelia heterophylla		VARILEAF SCORPIONWEED	1.00	3.85 {3.57}	2.00	5.41	1	(1)	
Pulsatilla ludoviciana	P. PATENS SSP. MULTIFIDA	PASQUEFLOWER	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL FORBS			**2.0**	**7.7**	**3.0**	**9.4**	**2**	**(1)**	---
INTRODUCED PERENNIAL FORBS									
Breea arvensis	CIRSIUM ARVENSE	CANADA THISTLE	6.00	23.08	6.00	16.22	6		
Taraxacum officinale		COMMON DANDELION	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL FORBS			**6.0**	**23.1**	**6.0**	**18.8**	**6**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Bromopsis lanatipes	BROMUS LANATIPES	WOOLY BROME	0.00	0.00	0.00	0.00	P		
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	5.00	19.23	5.00	13.51	5		
Elymus elymoides	SITANION HYSTRIX	BOTTLEBRUSH SQUIRRELTAIL	1.00	3.85	1.00	2.70	1		
Elymus lanceolatus fm. albicans	AGROPYRON DASYSTACHYUM,A. ALBICANS,AGROPYRON RIPARIUM	MONTANA WHEATGRASS	1.00	3.85	1.00	2.70	1		
Hesperostipa comata	STIPA COMATA	NEEDLE-AND-THREAD GRASS	0.00	0.00	0.00	0.00	P		
Koeleria macrantha	KOELERIA CRISTATA,K. PYRAMIDATA,K.GRACILIS	JUNEGRASS	0.00	0.00	0.00	0.00	P		
Leucopoa kingii		SPIKE FESCUE	0.00	0.00	0.00	0.00	P		
Poa agassizensis		AGASSIZ BLUEGRASS	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (c)			**7.0**	**26.9**	**7.0**	**21.9**	**7**	---	---
INTRODUCED PERENNIAL GRASSES (cool)									
Triticum aestivum x elytrigia elongata		REGREEN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL GRASSES (c)			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE SHRUBS									
Ceanothus fendleri		BUCKBRUSH	2.00 {3.00}	7.69 {10.71}	5.00	13.51	2(1)	1(1)	
Physocarpus monogynus		NINEBARK	0.00	0.00	0.00	0.00	P		
Ribes cereum		WAX CURRANT	0.00	0.00	0.00	0.00	P		
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**2.0 {3.0}**	**7.7 {10.7}**	**5.0**	**15.6**	**2(1)**	**1(1)**	---
NATIVE TREES									
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	5.00 {0.00}		5.00	13.51			[5]
TOTAL NATIVE TREES			**0.0**	**0.0**	**0.0**	**0.0**			
Standing dead		STANDING DEAD	4.00 {0.00}		4.00		4		
Litter		LITTER	30.00		30.00		30		
Bare soil		BARE SOIL	34.00 {37.00}		37.00		34	3	
Rock		ROCK	1.00		1.00		1		
TOTALS			95.0 {96.0}		109.0		95		
TOTALS (LAYER)							95	5	0
TOTAL VEGETATION COVER (LAYER)							26(2)	2(2)	0
TOTAL VEGETATION COVER			26.0 {28.0}	100.0 {100.0}	37	100.0	26(6)		
GROUND COVER (Litter+Rock+Veg+St.Dead)			61.0 {63.0}		72.0 { 67.0}		61(2)	2(2)	0
SPECIES DENSITY (# of species/100 sq.m.)							47		
SPECIES DENSITY (LAYER)							46	3	0

(#) = second hit
[#] = dead value not included in live vegetation totals
{#} = cover value if tree canopy is excluded

Sample 4

DATA FROM FILE wr04									
Walker Ranch 2002 - Sample 4				**RELATIVE**		**RELATIVE**			
PLANT SPECIES			**AVERAGE**	**VEGETATION**	**AVERAGE**	**VEGETATION**			
			COVER	**COVER**	**COVER-ALL**	**COVER-ALL**			
Scientific Name	**Synonym**	**Common Name**	**(%)**	**(%)**	**(%)**	**(%)**	**04D**	**04DWU**	**04U**
NATIVE ANNUAL & BIENNIAL FORBS									
Bahia dissecta		CUTLEAF	0.00	0.00	0.00	0.00	P		
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	1.00	2.63	1.00	2.44	1		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	1.00	2.63	1.00	2.44	1		
Polygonum douglasii	POLYGONUM SAWATCHENSE,POLYGONUM MONTANUM	DOUGLAS KNOTWEED	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE ANN. & BIEN. FORBS			**2.0**	**5.3**	**2.0**	**5.0**	**2**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Alyssum minus		ALYSSUM	5.00	13.16	6.00	14.63	5(1)		
Bassia sieversiana	KOCHIA SCOPARIA,K. SIEVERSIANA	BURNING-BUSH	0.00	0.00	0.00	0.00	P		
Lactuca serriola		PRICKLY LETTUCE	0.00	0.00	0.00	0.00	P		
Lappula redowskii		EARLY STICKSEED	1.00	2.63	1.00	2.44	1		
Nicotiana attenuata		TOBACCO	0.00	0.00	0.00	0.00	P		
Sisymbrium altissimum		JIM HILL MUSTARD	3.00	7.89	3.00	7.32	3		
Verbascum thapsus		MULLEIN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. & BIEN. FORBS			**9.0**	**23.7**	**10.0**	**25.0**	**9(1)**	---	---
INTRODUCED ANNUAL GRASSES									
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	7.00	18.42	7.00	17.07	7		
TOTAL INTRO. ANN. GRASSES			**7.0**	**18.4**	**7.0**	**17.5**	**7**	---	---
NATIVE PERENNIAL FORBS									
Achillea lanulosa		WESTERN YARROW	1.00	2.63	1.00	2.44	1		
Artemisia frigida		FRINGED SAGE	0.00	0.00	0.00	0.00	P		
Artemisia ludoviciana		PASTURE SAGE	0.00	0.00	0.00	0.00	P		
Aster porteri		PORTER'S ASTER	1.00	2.63	1.00	2.44	1		
Corydalis aurea		GOLDEN SMOKE	1.00	2.63	1.00	2.44	1		
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.00	0.00	0.00	0.00	P		
Eriogonum umbellatum var. umbellatum		WILD BUCKWHEAT	0.00	0.00	0.00	0.00	P		
Erysimum capitatum		COAST WALLFLOWER	0.00	0.00	0.00	0.00	P		
Gaillardia aristata		BLANKET-FLOWER	0.00	0.00	0.00	0.00	P		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	0.00	0.00	0.00	0.00	P		
Heterotheca foliosa		GOLDENASTER	5.00	13.16	5.00	12.20	5		
Heterotheca villosa	HETEROTHECA HORRIDA,CHRYSOPSIS VILLOSA	HAIRY GOLDEN ASTER	1.00	2.63	1.00	2.44	1		
Oenothera caespitosa ssp. caespitosa		EVENING PRIMROSE	0.00	0.00	0.00	0.00	P		
Oxybaphus hirsutus	MIRABILIS HIRSUTA	UMBRELLAWORT	0.00	0.00	0.00	0.00	P		
Penstemon virens		GREEN BEARD-TONGUE	0.00	0.00	0.00	0.00	P		
Phacelia heterophylla		VARILEAF SCORPIONWEED	0.00	0.00	0.00	0.00	P		
Pulsatilla ludoviciana	P. PATENS SSP. MULTIFIDA	PASQUEFLOWER	0.00	0.00	0.00	0.00	P		
Scutellaria brittonii		SKULLCAP	0.00	0.00	0.00	0.00	P		
Solidago simplex var. simplex	SOLIDAGO SPATHULATA VAR. NEOMEXICANA	MT. ALBERT GOLDENROD	0.00	0.00	1.00	2.44	(1)		
TOTAL NATIVE PERENNIAL FORBS			**9.0**	**23.7**	**10.0**	**25.0**	**9(1)**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	10.00	26.32	10.00	24.39	10		
Elymus elymoides	SITANION HYSTRIX	BOTTLEBRUSH SQUIRRELTAIL	0.00	0.00	0.00	0.00	P		
Hesperostipa comata	STIPA COMATA	NEEDLE-AND-THREAD GRASS	0.00	0.00	0.00	0.00	P		
Koeleria macrantha	KOELERIA CRISTATA,K. PYRAMIDATA,K.GRACILIS	JUNEGRASS	0.00	0.00	0.00	0.00	P		
Leucopoa kingii		SPIKE FESCUE	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (c)			**10.0**	**26.3**	**10.0**	**25.0**	**10**	---	---
INTRODUCED PERENNIAL GRASSES (cool)									
Triticum aestivum x elytrigia elongata		REGREEN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL GRASSES (c)			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL GRASSES (warm)									
Chondrosum gracile	BOUTELOUA GRACILIS	BLUE GRAMA GRASS	0.00	0.00	0.00	0.00	P		
Muhlenbergia montana		MOUNTAIN MUHLY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (w)			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE SHRUBS									
Ceanothus fendleri		BUCKBRUSH	1.00	2.63	1.00	2.44	1		
Cercocarpus montanus		BIRCHLEAF MOUNTAIN MAHOGANY	0.00	0.00	0.00	0.00	P		
Oreobatus deliciosus	RUBUS DELICIOSUS	BOULDER RASPBERRY	0.00	0.00	0.00	0.00	P		
Physocarpus monogynus		NINEBARK	0.00	0.00	0.00	0.00	P		
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**1.0**	**2.6**	**1.0**	**2.5**	**1**	---	---
NATIVE TREES									
Sabina scopulorum (dead)	JUNIPERUS SCOPULORUM	ROCKY MOUNTAIN JUNIPER	1.00 {0.00}		1.00	2.44			[1]
TOTAL NATIVE TREES			**0.0**	**0.0**	**0.0**	**0.0**			
FERNS									
Cystopteris fragilis		BRITTLEFERN	0.00	0.00	0.00	0.00	P		
TOTAL FERNS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
Standing dead		STANDING DEAD	2.00 {0.00}		2.00		2		
Litter		LITTER	26.00		26.00		26		
Bare soil		BARE SOIL	28.00 {29.00}		29.00		28	1	
Rock		ROCK	5.00		5.00		5		
TOTALS			99.0 {98.0}		103.0		99		
TOTALS (LAYER)							99	1	0
TOTAL VEGETATION COVER (LAYER)							38(2)	0	0
TOTAL VEGETATION COVER			38.0 {38.0}	100.0 {100.0}	41	100.0	38(2)		
GROUND COVER (Litter+Rock+Veg+St.Dead)			71.0 {71.0}		74.0 { 73.0}		71(2)	0	0
SPECIES DENSITY (# of species/100 sq.m.)							46		
SPECIES DENSITY (LAYER)							46	0	0

(#) = second hit
[#] = dead value not included in live vegetation totals
{#} = cover value if tree canopy is excluded

Sample 5

DATA FROM FILE wr05									
Walker Ranch 2002 - Sample 5				**RELATIVE**		**RELATIVE**			
PLANT SPECIES			**AVERAGE**	**VEGETATION**	**AVERAGE**	**VEGETATION**			
			COVER	**COVER**	**COVER-ALL**	**COVER-ALL**			
Scientific Name	**Synonym**	**Common Name**	**(%)**	**(%)**	**(%)**	**(%)**	**05D**	**05DWU**	**05U**
NATIVE ANNUAL & BIENNIAL FORBS									
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.00	0.00	0.00	0.00	P		
Polygonum douglasii	POLYGONUM SAWATCHENSE,POLYGONUM MONTANUM	DOUGLAS KNOTWEED	0.00	0.00	0.00	0.00	P		
Silene antirrhina		SLEEPY CATCHFLY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE ANN. & BIEN. FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Bassia sieversiana	KOCHIA SCOPARIA,K. SIEVERSIANA	BURNING-BUSH	0.00	0.00	0.00	0.00	P		
Lactuca serriola		PRICKLY LETTUCE	0.00	0.00	0.00	0.00	P		
Nicotiana attenuata		TOBACCO	0.00	0.00	0.00	0.00	P		
Sisymbrium altissimum		JIM HILL MUSTARD	16.00 {20.00}	51.61 {57.14}	20.00	45.45	16	4	
Teloxys botrys	CHENOPODIUM BOTRYS	WORMSEED,JERUSALEM OAK	0.00	0.00	0.00	0.00	P		
Verbascum thapsus		MULLEIN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. & BIEN. FORBS			**16.0 {20.0}**	**51.6 {57.1}**	**20.0**	**54.1**	**16**	**4**	---
INTRODUCED ANNUAL GRASSES									
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	6.00	19.35 {17.14}	7.00	15.91	6	(1)	
Cylindropyrum cylindricum	AEGILOPS CYLINDRICA	GOAT GRASS	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. GRASSES			**6.0**	**19.4**	**7.0**	**18.9**	**6**	**(1)**	---
NATIVE PERENNIAL FORBS									
Achillea lanulosa		WESTERN YARROW	0.00	0.00	0.00	0.00	P		
Aletes acaulis		STEMLESS INDIAN PARSLEY	0.00	0.00	0.00	0.00	P		
Apocynum androsaemifolium		SPREADING DOGBANE	0.00	0.00	0.00	0.00	P		
Artemisia ludoviciana		PASTURE SAGE	1.00	3.23	2.00	4.55	1(1)		
Aster porteri		PORTER'S ASTER	0.00	0.00	0.00	0.00	P		
Campanula rotundifolia		HAREBELL	0.00	0.00	0.00	0.00	P		
Gaillardia aristata		BLANKET-FLOWER	0.00	0.00	0.00	0.00	P		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	0.00	0.00	0.00	0.00	P		
Harbouria trachypleura		WHISKBROOM PARSLEY	1.00	3.23	1.00	2.27	1		
Mertensia lanceolata		LANCELEAF BLUEBELLS	0.00	0.00	0.00	0.00	P		
Penstemon virens		GREEN BEARD-TONGUE	0.00	0.00	0.00	0.00	P		
Phacelia heterophylla		VARILEAF SCORPIONWEED	1.00	3.23	1.00	2.27	1		
Pulsatilla ludoviciana	P. PATENS SSP. MULTIFIDA	PASQUEFLOWER	0.00	0.00	0.00	0.00	P		
Scutellaria brittonii		SKULLCAP	0.00	0.00	0.00	0.00	P		
Solidago simplex var. simplex	SOLIDAGO SPATHULATA VAR. NEOMEXICANA	MT. ALBERT GOLDENROD	3.00	9.68	3.00	6.82	3		
TOTAL NATIVE PERENNIAL FORBS			**6.0**	**19.4**	**7.0**	**18.9**	**6(1)**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	1.00	3.23	1.00	2.27	1		
Elymus lanceolatus fm. albicans	AGROPYRON DASYSTACHYUM,A. ALBICANS,AGROPYRON RIPARIUM	MONTANA WHEATGRASS	1.00	3.23	1.00	2.27	1		
Leucopoa kingii		SPIKE FESCUE	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (c)			**2.0**	**6.5**	**2.0**	**5.4**	**2**	---	---
INTRODUCED PERENNIAL GRASSES (cool)									
Triticum aestivum x elytrigia elongata		REGREEN	1.00	3.23	1.00	2.27	1		
TOTAL INTRO. PERENNIAL GRASSES (c)			**1.0**	**3.2**	**1.0**	**2.7**	**1**	---	---
NATIVE PERENNIAL GRASSES (warm)									
Sporobolus cryptandrus		SAND DROPSEED	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (w)			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE SHRUBS									
Ceanothus fendleri		BUCKBRUSH	0.00	0.00	0.00	0.00	P		
Cercocarpus montanus		BIRCHLEAF MOUNTAIN MAHOGANY	0.00	0.00	0.00	0.00	P		
Rosa arkansana		ARKANSAS ROSE	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE TREES									
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	7.00 {0.00}		7.00	15.91			[7]
Sabina scopulorum (dead)	JUNIPERUS SCOPULORUM	ROCKY MOUNTAIN JUNIPER	0.00		0.00	0.00	P		
TOTAL NATIVE TREES			**0.0**	**0.0**	**0.0**	**0.0**			
Standing dead		STANDING DEAD	3.00 {0.00}		3.00		3		
Litter		LITTER	30.00		30.00		30		
Bare soil		BARE SOIL	29.00 {31.00}		31.00		29	2	
Rock		ROCK	0.00 {1.00}		1.00			1	
TOTALS			93.0 {97.0}		109.0		93		
TOTALS (LAYER)							93	7	0
TOTAL VEGETATION COVER (LAYER)							31(1)	4(1)	0
TOTAL VEGETATION COVER			31.0 {35.0}	100.0 {100.0}	44	100.0	31(6)		
GROUND COVER (Litter+Rock+Veg+St.Dead)			64.0 {69.0}		78.0 { 71.0}		64(1)	5(1)	0
SPECIES DENSITY (# of species/100 sq.m.)							36		
SPECIES DENSITY (LAYER)							36	2	0
{#} = second hit									
[#] = dead value not included in live vegetation totals									
{#} = cover value if tree canopy is excluded									

Sample 6

DATA FROM FILE wr06

Walker Ranch 2002 - Sample 6									
PLANT SPECIES			AVERAGE COVER	RELATIVE VEGETATION COVER	AVERAGE COVER-ALL	RELATIVE VEGETATION COVER-ALL			
Scientific Name	Synonym	Common Name	(%)	(%)	(%)	(%)	06D	06DWU	06U
NATIVE ANNUAL & BIENNIAL FORBS									
Androsace septentrionalis		PYGMYFLOWER ROCKJASMINE	1.00	4.55	1.00	2.86	1		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE ANN. & BIEN. FORBS			**1.0**	**4.5**	**1.0**	**4.2**	**1**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Bassia sieversiana	KOCHIA SCOPARIA,K. SIEVERSIANA	BURNING-BUSH	0.00	0.00	0.00	0.00	P		
Conyza canadensis		HORSEWEED	0.00	0.00	0.00	0.00	P		
Lactuca serriola		PRICKLY LETTUCE	0.00	0.00	0.00	0.00	P		
Sisymbrium altissimum		JIM HILL MUSTARD	0.00	0.00	0.00	0.00	P		
Verbascum thapsus		MULLEIN	1.00	4.55	1.00	2.86	1		
TOTAL INTRO. ANN. & BIEN. FORBS			**1.0**	**4.5**	**1.0**	**4.2**	**1**	---	---
INTRODUCED ANNUAL GRASSES									
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	0.00 {1.00}	0.00 {4.17}	1.00	2.86		1	
Triticum aestivum		WHEAT	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. GRASSES			**0.0 {1.0}**	**0.0 {4.2}**	**1.0**	**4.2**	**P**	**1**	---
NATIVE PERENNIAL FORBS									
Apocynum androsaemifolium		SPREADING DOGBANE	0.00	0.00	0.00	0.00	P		
Artemisia ludoviciana		PASTURE SAGE	0.00	0.00	0.00	0.00	P		
Aster porteri		PORTER'S ASTER	0.00	0.00	0.00	0.00	P		
Astragalus laxmannii	ASTRAGALUS ADSURGENS VAR.ROBUSTIER	LAXMANN'S MILKVETCH	0.00	0.00	0.00	0.00	P		
Corydalis aurea		GOLDEN SMOKE	2.00	9.09	2.00	5.71	2		
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.00	0.00	0.00	0.00	P		
Erysimum capitatum		COAST WALLFLOWER	0.00	0.00	0.00	0.00	P		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	0.00	0.00	0.00	0.00	P		
Helianthus pumilus		SUNFLOWER	0.00	0.00	0.00	0.00	P		
Penstemon virens		GREEN BEARD-TONGUE	1.00	4.55	1.00	2.86	1		
Phacelia heterophylla		VARILEAF SCORPIONWEED	7.00	31.82	7.00	20.00	7		
Potentilla hippiana		HORSE CINQUEFOIL	0.00	0.00	0.00	0.00	P		
Pulsatilla ludoviciana	P. PATENS SSP. MULTIFIDA	PASQUEFLOWER	0.00	0.00	0.00	0.00	P		
Solidago simplex var. simplex	SOLIDAGO SPATHULATA VAR. NEOMEXICANA	MT. ALBERT GOLDENROD	0.00	0.00	0.00	0.00	P		
Urtica gracilis ssp. gracilis	URTICA DIOICA	STINGING NETTLE	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL FORBS			**10.0**	**45.5**	**10.0**	**41.7**	**10**	---	---
INTRODUCED PERENNIAL FORBS									
Breea arvensis	CIRSIUM ARVENSE	CANADA THISTLE	1.00	4.55	1.00	2.86	1		
TOTAL INTRO. PERENNIAL FORBS			**1.0**	**4.5**	**1.0**	**4.2**	**1**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	1.00	4.55	1.00	2.86	1		
Elymus trachycaulus	AGROPYRON TRACHYCAULUM	SLENDER WHEATGRASS	5.00 {6.00}	22.73 {25.00}	6.00	17.14	5	1	
Koeleria macrantha	KOELERIA CRISTATA,K. PYRAMIDATA,K.GRACILIS	JUNEGRASS	0.00	0.00	0.00	0.00	P		
Leucopoa kingii		SPIKE FESCUE	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (c)			**6.0 {7.0}**	**27.3 {29.2}**	**7.0**	**29.2**	**6**	**1**	---
INTRODUCED PERENNIAL GRASSES (cool)									
Ceratochloa carinata	CERATOCHLOA MARGINATA,BROMUS MARGINATUS	MOUNTAIN BROME	0.00	0.00	0.00	0.00	P		
Triticum aestivum x elytrigia elongata		REGREEN	3.00	13.64	3.00	8.57	3		
TOTAL INTRO. PERENNIAL GRASSES (c)			**3.0**	**13.6**	**3.0**	**12.5**	**3**	---	---
NATIVE PERENNIAL GRASSES (warm)									
Chondrosum gracile	BOUTELOUA GRACILIS	BLUE GRAMA GRASS	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (w)			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE SHRUBS									
Ceanothus fendleri		BUCKBRUSH	0.00	0.00	0.00	0.00	P		
Physocarpus monogynus		NINEBARK	0.00	0.00	0.00	0.00	P		
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE TREES									
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	8.00 {1.00}	36.36 {4.17}	9.00	25.71		[1]	[8]
Pseudotsuga menziesii (dead)		DOUGLAS FIR	2.00 {0.00}		2.00	5.71			[2]
TOTAL NATIVE TREES			**0.0**	**0.0**	**0.0**	**0.0**			
Litter		LITTER	19.00		19.00		19		
Bare soil		BARE SOIL	43.00 {49.00}		49.00		43	6	
Rock		ROCK	6.00 {7.00}		7.00		6	1	
TOTALS			90.0 {100.0}		110.0		90		
TOTALS (LAYER)							90	9	0
TOTAL VEGETATION COVER (LAYER)							22	2	0
TOTAL VEGETATION COVER			22.0 {25.0}	100.0 {104.2}	35.0 (s=0.0)	100.0	22(2)		
			Std.Dev.= 0.0						
GROUND COVER (Litter+Rock+Veg+St.Dead)			47.0 {50.0}		61.0 { 51.0}		47	3	0
SPECIES DENSITY (# of species/100 sq.m.)							36		
(AVERAGE= 36.0 Std.Dev.= 0.0)									
SPECIES DENSITY (LAYER)							35	2	0

[#] = dead value not included in live vegetation totals
{#} = cover value if tree canopy is excluded

Sample 7

DATA FROM FILE wr07								
Walker Ranch 2002 - Sample 7				**RELATIVE**		**RELATIVE**		
PLANT SPECIES			**AVERAGE**	**VEGETATION**	**AVERAGE**	**VEGETATION**		
			COVER	**COVER**	**COVER-ALL**	**COVER-ALL**		
Scientific Name	**Synonym**	**Common Name**	**(%)**	**(%)**	**(%)**	**(%)**	**07D**	**07DWU**
NATIVE ANNUAL & BIENNIAL FORBS								
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P	
Grindelia squarrosa		GUMWEED	3.00	9.09	3.00	7.14	3	
TOTAL NATIVE ANN. & BIEN. FORBS			**3.0**	**9.1**	**3.0**	**8.3**	**3**	---
INTRODUCED ANNUAL & BIENNIAL FORBS								
Lappula redowskii		EARLY STICKSEED	0.00	0.00	0.00	0.00	P	
Verbascum thapsus		MULLEIN	0.00	0.00	0.00	0.00	P	
TOTAL INTRO. ANN. & BIEN. FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---
INTRODUCED ANNUAL GRASSES								
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	0.00	0.00	0.00	0.00	P	
TOTAL INTRO. ANN. GRASSES			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---
NATIVE PERENNIAL FORBS								
Achillea lanulosa		WESTERN YARROW	0.00	0.00	0.00	0.00	P	
Artemisia frigida		FRINGED SAGE	4.00	12.12	5.00	11.90	4(1)	
Artemisia ludoviciana		PASTURE SAGE	1.00	3.03	1.00	2.38	1	
Aster porteri		PORTER'S ASTER	1.00	3.03	1.00	2.38	1	
Astragalus agrestis		FIELD MILKVETCH	1.00	3.03	1.00	2.38	1	
Astragalus laxmannii	ASTRAGALUS ADSURGENS VAR.ROBUSTIER	LAXMANN'S MILKVETCH	1.00	3.03	1.00	2.38	1	
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	0.00	0.00	0.00	0.00	P	
Astragalus shortianus		MILK VETCH	0.00	0.00	0.00	0.00	P	
Campanula rotundifolia		HAREBELL	1.00	3.03	1.00	2.38	1	
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.00	0.00	0.00	0.00	P	
Eriogonum umbellatum var. umbellatum		WILD BUCKWHEAT	0.00	0.00	0.00	0.00	P	
Erysimum capitatum		COAST WALLFLOWER	1.00	3.03	1.00	2.38	1	
Euphorbia spp.		WILLOWHERB	0.00	0.00	0.00	0.00	P	
Gaillardia aristata		BLANKET-FLOWER	0.00	0.00	0.00	0.00	P	
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	3.00	9.09	3.00	7.14	3	
Harbouria trachypleura		WHISKBROOM PARSLEY	0.00	0.00	0.00	0.00	P	
Helianthus pumilus		SUNFLOWER	1.00	3.03	1.00	2.38	1	
Heterotheca foliosa		GOLDENASTER	0.00	0.00	0.00	0.00	P	
Heterotheca villosa	HETEROTHECA HORRIDA,CHRYSOPSIS VILLOSA	HAIRY GOLDEN ASTER	1.00	3.03	1.00	2.38	1	
Mertensia lanceolata		LANCELEAF BLUEBELLS	0.00	0.00	0.00	0.00	P	
Oenothera caespitosa ssp. caespitosa		EVENING PRIMROSE	0.00	0.00	0.00	0.00	P	
Packera fendleri	SENECIO FENDLERI	FENDLER'S RAGWORT	0.00	0.00	0.00	0.00	P	
Penstemon virens		GREEN BEARD-TONGUE	0.00	0.00	0.00	0.00	P	
Phacelia heterophylla		VARILEAF SCORPIONWEED	2.00	6.06	2.00	4.76	2	
Scutellaria brittonii		SKULLCAP	0.00 {1.00}	0.00 {2.94}	1.00	2.38		1
TOTAL NATIVE PERENNIAL FORBS			**17.0 {18.0}**	**51.5 {52.9}**	**19.0**	**52.8**	**17(1)**	**1**
NATIVE PERENNIAL GRASSES (cool)								
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	6.00	18.18	6.00	14.29	6	
Elymus elymoides	SITANION HYSTRIX	BOTTLEBRUSH SQUIRRELTAIL	1.00	3.03	1.00	2.38	1	
Elymus lanceolatus fm. albicans	AGROPYRON DASYSTACHYUM,A. ALBICANS,AGROPYRON RIPARIUM	MONTANA WHEATGRASS	3.00	9.09	3.00	7.14	3	
Koeleria macrantha	KOELERIA CRISTATA,K. PYRAMIDATA,K.GRACILIS	JUNEGRASS	0.00	0.00	0.00	0.00	P	
Leucopoa kingii		SPIKE FESCUE	1.00	3.03	1.00	2.38	1	
TOTAL NATIVE PERENNIAL GRASSES (c)			**11.0**	**33.3**	**11.0**	**30.6**	**11**	---
INTRODUCED PERENNIAL GRASSES (cool)								
Poa compressa		CANADA BLUEGRASS	1.00	3.03	1.00	2.38	1	
Triticum aestivum x elytrigia elongata		REGREEN	0.00	0.00	0.00	0.00	P	
TOTAL INTRO. PERENNIAL GRASSES (c)			**1.0**	**3.0**	**1.0**	**2.8**	**1**	---
NATIVE SHRUBS								
Ceanothus fendleri		BUCKBRUSH	1.00	3.03	2.00	4.76	1(1)	
Physocarpus monogynus		NINEBARK	0.00	0.00	0.00	0.00	P	
TOTAL NATIVE SHRUBS			**1.0**	**3.0**	**2.0**	**5.6**	**1(1)**	---
NATIVE TREES								
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	6.00 {0.00}		6.00	14.29		
TOTAL NATIVE TREES			**0.0**	**0.0**	**0.0**	**0.0**		
Litter		LITTER	20.00		20.00		20	
Bare soil		BARE SOIL	38.00 {43.00}		43.00		38	5
Rock		ROCK	3.00		3.00		3	
TOTALS			94.0 {100.0}		108.0		94	
TOTALS (LAYER)							94	6
TOTAL VEGETATION COVER (LAYER)							33(2)	1
TOTAL VEGETATION COVER			33.0 {34.0}	100.0 {100.0}	42	100.0	33(3)	
GROUND COVER (Litter+Rock+Veg+St.Dead)			56.0 {57.0}		65.0 { 59.0}		56(2)	1
SPECIES DENSITY (# of species/100 sq.m.)							39	
SPECIES DENSITY (LAYER)							38	1

(#) = second hit
[#] = dead value not included in live vegetation totals
{#} = cover value if tree canopy is excluded

Sample 8

DATA FROM FILE wr08

Walker Ranch 2002 - Sample 8

PLANT SPECIES

Scientific Name	Synonym	Common Name	AVERAGE COVER (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	08D	08DWU	08U
NATIVE ANNUAL & BIENNIAL FORBS									
Androsace septentrionalis		PYGMYFLOWER ROCKJASMINE	0.00	0.00	0.00	0.00	P		
Boechera fendleri	ARABIS FENDLERI	FENDLER'S FALSE ARABIS	0.00	0.00	0.00	0.00	P		
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.00	0.00	0.00	0.00	P		
Frasera speciosa		GREEN GENTIAN	0.00	0.00	0.00	0.00	P		
Helianthus annuus		COMMON SUNFLOWER	1.00	3.45	1.00	2.44	1		
Silene antirrhina		SLEEPY CATCHFLY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE ANN. & BIEN. FORBS			**1.0**	**3.4**	**1.0**	**3.2**	**1**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Alyssum minus		ALYSSUM	0.00	0.00	0.00	0.00	P		
Carduus nutans ssp. macrolepis		MUSK THISTLE	0.00	0.00	0.00	0.00	P		
Conyza canadensis		HORSEWEED	0.00	0.00	0.00	0.00	P		
Lactuca serriola		PRICKLY LETTUCE	0.00	0.00	0.00	0.00	P		
Noccaea montana	THLASPI MONTANA	MOUNTAIN CANDYTUFT	0.00	0.00	0.00	0.00	P		
Verbascum thapsus		MULLEIN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. & BIEN. FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
INTRODUCED ANNUAL GRASSES									
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. GRASSES			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL FORBS									
Achillea lanulosa		WESTERN YARROW	0.00	0.00	0.00	0.00	P		
Aletes acaulis		STEMLESS INDIAN PARSLEY	0.00	0.00	0.00	0.00	P		
Artemisia ludoviciana		PASTURE SAGE	1.00	3.45	1.00	2.44	1		
Astragalus laxmannii	ASTRAGALUS ADSURGENS VAR.ROBUSTIER	LAXMANN'S MILKVETCH	0.00	0.00	0.00	0.00	P		
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	0.00	0.00	0.00	0.00	P		
Campanula rotundifolia		HAREBELL	0.00	0.00	0.00	0.00	P		
Corydalis aurea		GOLDEN SMOKE	0.00	0.00	0.00	0.00	P		
Eriogonum umbellatum var. umbellatum		WILD BUCKWHEAT	0.00	0.00	0.00	0.00	P		
Erysimum capitatum		COAST WALLFLOWER	0.00	0.00	0.00	0.00	P		
Harbouria trachypleura		WHISKBROOM PARSLEY	0.00	0.00	0.00	0.00	P		
Helianthus pumilus		SUNFLOWER	0.00	0.00	0.00	0.00	P		
Mertensia lanceolata		LANCELEAF BLUEBELLS	0.00	0.00	0.00	0.00	P		
Penstemon virens		GREEN BEARD-TONGUE	2.00	6.90	2.00	4.88	2		
Phacelia heterophylla		VARILEAF SCORPIONWEED	2.00	6.90	2.00	4.88	2		
Senecio integerrimus		LAMBSTONGUE GROUNDSEL	0.00	0.00	0.00	0.00	P		
Solidago simplex var. simplex	SOLIDAGO SPATHULATA VAR. NEOMEXICANA	MT. ALBERT GOLDENROD	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL FORBS			**5.0**	**17.2**	**5.0**	**16.1**	**5**	---	---
INTRODUCED PERENNIAL FORBS									
Breea arvensis	CIRSIUM ARVENSE	CANADA THISTLE	0.00	0.00	0.00	0.00	P		
Taraxacum officinale		COMMON DANDELION	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	1.00	3.45	1.00	2.44	1		
Elymus lanceolatus fm. albicans	AGROPYRON DASYSTACHYUM,A. ALBICANS,AGROPYRON RIPARIUM	MONTANA WHEATGRASS	0.00	0.00	0.00	0.00	P		
Elymus trachycaulus	AGROPYRON TRACHYCAULUM	SLENDER WHEATGRASS	8.00	27.59	9.00	21.95	8(1)		
Elymus virginicus		VIRGINIA WILDRYE	0.00	0.00	0.00	0.00	P		
Leucopoa kingii		SPIKE FESCUE	0.00	0.00	0.00	0.00	P		
Schedonnardus paniculatus		TUMBLEGRASS	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (c)			**9.0**	**31.0**	**10.0**	**32.3**	**9(1)**	---	---
INTRODUCED PERENNIAL GRASSES (cool)									
Ceratochloa carinata	CERATOCHLOA MARGINATA,BROMUS MARGINATUS	MOUNTAIN BROME	10.00	34.48	11.00	26.83	10(1)		
Triticum aestivum x elytrigia elongata		REGREEN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL GRASSES (c)			**10.0**	**34.5**	**11.0**	**35.5**	**10(1)**	---	---
NATIVE PERENNIAL GRASSES (warm)									
Chondrosum gracile	BOUTELOUA GRACILIS	BLUE GRAMA GRASS	3.00	10.34	3.00	7.32	3		
Sporobolus cryptandrus		SAND DROPSEED	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (w)			**3.0**	**10.3**	**3.0**	**9.7**	**3**	---	---
NATIVE SHRUBS									
Ceanothus fendleri		BUCKBRUSH	0.00	0.00	0.00	0.00	P		
Ribes cereum		WAX CURRANT	1.00	3.45	1.00	2.44	1		
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**1.0**	**3.4**	**1.0**	**3.2**	**1**	---	---
NATIVE TREES									
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	8.00 {2.00}	27.59 {6.90}	10.00	24.39		[2]	[8]
TOTAL NATIVE TREES			0.0	0.0	0.0	0.0			
Litter		LITTER	15.00 {16.00}		16.00		15	1	
Bare soil		BARE SOIL	39.00 {44.00}		44.00		39	5	
Rock		ROCK	9.00		9.00		9		
TOTALS			92.0 {100.0}		110.0		92		
TOTALS (LAYER)							92	6	0
TOTAL VEGETATION COVER (LAYER)							29(2)	0	0
TOTAL VEGETATION COVER			29.0 {31.0}	100.0 {106.9}	41.0 (s=0.0)	100.0	29(2)		
			Std.Dev.= 0.0						
GROUND COVER (Litter+Rock+Veg+St.Dead)			53.0 {54.0}		66.0 { 58.0}		53(2)	1	0
SPECIES DENSITY (# of species/100 sq.m.)							46		
(AVERAGE= 46.0 Std.Dev.= 0.0)									
SPECIES DENSITY (LAYER)							46	0	0

[#] = dead value not included in live vegetation totals

{#} = cover value if tree canopy is excluded

Sample 9

DATA FROM FILE wr09									
Walker Ranch 2002 - Sample 9				**RELATIVE**		**RELATIVE**			
PLANT SPECIES			**AVERAGE**	**VEGETATION**	**AVERAGE**	**VEGETATION**			
			COVER	**COVER**	**COVER-ALL**	**COVER-ALL**			
Scientific Name	**Synonym**	**Common Name**	**(%)**	**(%)**	**(%)**	**(%)**	**09D**	**09DWU**	**09U**
NATIVE ANNUAL & BIENNIAL FORBS									
Androsace septentrionalis		PYGMYFLOWER ROCKJASMINE	0.00	0.00	0.00	0.00	P		
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	1.00	4.00	1.00	2.78	1		
Dracocephalum parviflorum	MOLDAVICA PARVIFLORA	DRAGONHEAD	0.00	0.00	0.00	0.00	P		
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.00	0.00	0.00	0.00	P		
Helianthus annuus		COMMON SUNFLOWER	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE ANN. & BIEN. FORBS			**1.0**	**4.0**	**1.0**	**3.8**	**1**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Acosta diffusa	CENTAUREA DIFFUSA	TUMBLE KNAPWEED	0.00	0.00	0.00	0.00	P		
Carduus nutans ssp. macrolepis		MUSK THISTLE	0.00	0.00	0.00	0.00	P		
Lactuca serriola		PRICKLY LETTUCE	0.00	0.00	0.00	0.00	P		
Verbascum thapsus		MULLEIN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. & BIEN. FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL FORBS									
Aletes acaulis		STEMLESS INDIAN PARSLEY	1.00	4.00	1.00	2.78	1		
Artemisia ludoviciana		PASTURE SAGE	0.00	0.00	0.00	0.00	P		
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	0.00	0.00	0.00	0.00	P		
Astragalus spp.		MILK VETCH	0.00	0.00	0.00	0.00	P		
Campanula rotundifolia		HAREBELL	0.00	0.00	0.00	0.00	P		
Corydalis aurea		GOLDEN SMOKE	2.00	8.00	3.00	8.33	2(1)		
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.00	0.00	0.00	0.00	P		
Erysimum capitatum		COAST WALLFLOWER	0.00	0.00	0.00	0.00	P		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	0.00	0.00	0.00	0.00	P		
Helianthus pumilus		SUNFLOWER	0.00	0.00	0.00	0.00	P		
Heterotheca foliosa		GOLDENASTER	0.00	0.00	0.00	0.00	P		
Penstemon virens		GREEN BEARD-TONGUE	2.00	8.00	2.00	5.56	2		
Phacelia heterophylla		VARILEAF SCORPIONWEED	7.00	28.00	7.00	19.44	7		
Potentilla hippiana		HORSE CINQUEFOIL	0.00	0.00	0.00	0.00	P		
Pulsatilla ludoviciana	P. PATENS SSP. MULTIFIDA	PASQUEFLOWER	0.00	0.00	0.00	0.00	P		
Solidago simplex var. simplex	SOLIDAGO SPATHULATA VAR. NEOMEXICANA	MT. ALBERT GOLDENROD	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL FORBS			**12.0**	**48.0**	**13.0**	**50.0**	**12(1)**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	0.00	0.00	0.00	0.00	P		
Carex sp. 1		SEDGE	0.00	0.00	0.00	0.00	P		
Elymus trachycaulus	AGROPYRON TRACHYCAULUM	SLENDER WHEATGRASS	3.00	12.00	3.00	8.33	3		
TOTAL NATIVE PERENNIAL GRASSES (c)			**3.0**	**12.0**	**3.0**	**11.5**	**3**	---	---
INTRODUCED PERENNIAL GRASSES (cool)									
Ceratochloa carinata	CERATOCHLOA MARGINATA,BROMUS MARGINATUS	MOUNTAIN BROME	7.00	28.00	7.00	19.44	7		
Triticum aestivum x elytrigia elongata		REGREEN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL GRASSES (c)			**7.0**	**28.0**	**7.0**	**26.9**	**7**	---	---
NATIVE PERENNIAL GRASSES (warm)									
Chondrosum gracile	BOUTELOUA GRACILIS	BLUE GRAMA GRASS	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (w)			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE SHRUBS									
Ceanothus fendleri		BUCKBRUSH	0.00	0.00	0.00	0.00	P		
Oreobatus deliciosus	RUBUS DELICIOSUS	BOULDER RASPBERRY	0.00	0.00	0.00	0.00	P		
Physocarpus monogynus		NINEBARK	0.00	0.00	0.00	0.00	P		
Ribes cereum		WAX CURRANT	0.00	0.00	0.00	0.00	P		
Rosa arkansana		ARKANSAS ROSE	1.00	4.00	1.00	2.78	1		
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**1.0**	**4.0**	**1.0**	**3.8**	**1**	---	---
NATIVE TREES									
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	9.00 {0.00}		9.00	25.00			[9]
Populus tremuloides	POPULUS TREMULA	QUAKING ASPEN	1.00	4.00	1.00	2.78	1		
Populus tremuloides (dead)		ASPEN (DEAD)	1.00 {0.00}		1.00	2.78			[1]
TOTAL NATIVE TREES			**1.0**	**4.0**	**1.0**	**3.8**	**1**	---	---
Standing dead		STANDING DEAD	1.00 {0.00}		1.00		1		
Litter		LITTER	16.00 {17.00}		17.00		16	1	
Bare soil		BARE SOIL	44.00 {51.00}		51.00		44	7	
Rock		ROCK	4.00 {6.00}		6.00		4	2	
TOTALS			90.0 {99.0}		111.0		90		
TOTALS (LAYER)							90	10	0
TOTAL VEGETATION COVER (LAYER)							25(1)	0	0
TOTAL VEGETATION COVER			25.0 {25.0}	100.0 {100.0}	36.0 (s=0.0)	100.0	25(1)		
			Std.Dev.= 0.0						
GROUND COVER (Litter+Rock+Veg+St.Dead)			46.0 {49.0}		60.0 { 50.0}		46(1)	3	0
SPECIES DENSITY (# of species/100 sq.m.)							39		
(AVERAGE= 39.0 Std.Dev.= 0.0)									
SPECIES DENSITY (LAYER)							39	0	0
[#] = dead value not included in live vegetation totals									
{#} = cover value if tree canopy is excluded									

Sample 10

DATA FROM FILE wr10									
Walker Ranch 2002 - Sample 10				**RELATIVE**		**RELATIVE**			
PLANT SPECIES			**AVERAGE**	**VEGETATION**	**AVERAGE**	**VEGETATION**			
			COVER	**COVER**	**COVER-ALL**	**COVER-ALL**			
Scientific Name	**Synonym**	**Common Name**	**(%)**	**(%)**	**(%)**	**(%)**	**10D**	**10DWU**	**10U**
NATIVE ANNUAL & BIENNIAL FORBS									
Acrolasia dispersa	MENTZELIA		0.00	0.00	0.00	0.00	P		
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	1.00	4.00	1.00	3.33	1		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	2.00	8.00	2.00	6.67	2		
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.00	0.00	0.00	0.00	P		
Silene antirrhina		SLEEPY CATCHFLY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE ANN. & BIEN. FORBS			**3.0**	**12.0**	**3.0**	**11.5**	**3**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Sisymbrium altissimum		JIM HILL MUSTARD	0.00	0.00	0.00	0.00	P		
Tithymalus peplus		SPURGE	0.00	0.00	0.00	0.00	P		
Verbascum thapsus		MULLEIN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. & BIEN. FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL FORBS									
Achillea lanulosa		WESTERN YARROW	0.00	0.00	0.00	0.00	P		
Aster porteri		PORTER'S ASTER	0.00	0.00	0.00	0.00	P		
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	1.00	4.00	1.00	3.33	1		
Campanula rotundifolia		HAREBELL	1.00	4.00	1.00	3.33	1		
Corydalis aurea		GOLDEN SMOKE	1.00	4.00	1.00	3.33	1		
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	1.00	4.00	1.00	3.33	1		
Erysimum capitatum		COAST WALLFLOWER	0.00	0.00	0.00	0.00	P		
Gaillardia aristata		BLANKET-FLOWER	0.00	0.00	0.00	0.00	P		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	0.00	0.00	0.00	0.00	P		
Harbouria trachypleura		WHISKBROOM PARSLEY	0.00	0.00	0.00	0.00	P		
Heterotheca villosa	HETEROTHECA HORRIDA,CHRYSOPSIS VILLOSA	HAIRY GOLDEN ASTER	0.00	0.00	0.00	0.00	P		
Mertensia lanceolata		LANCELEAF BLUEBELLS	0.00	0.00	0.00	0.00	P		
Penstemon virens		GREEN BEARD-TONGUE	1.00	4.00	1.00	3.33	1		
Pulsatilla ludoviciana	P. PATENS SSP. MULTIFIDA	PASQUEFLOWER	0.00	0.00	0.00	0.00	P		
Scutellaria brittonii		SKULLCAP	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL FORBS			**5.0**	**20.0**	**5.0**	**19.2**	**5**	---	---
INTRODUCED PERENNIAL FORBS									
Breea arvensis	CIRSIUM ARVENSE	CANADA THISTLE	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Carex spp.		SEDGE	0.00	0.00	0.00	0.00	P		
Elymus spp.			0.00	0.00	0.00	0.00	P		
Elymus trachycaulus	AGROPYRON TRACHYCAULUM	SLENDER WHEATGRASS	5.00	20.00	5.00	16.67	5		
Poa agassizensis		AGASSIZ BLUEGRASS	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (c)			**5.0**	**20.0**	**5.0**	**19.2**	**5**	---	---
INTRODUCED PERENNIAL GRASSES (cool)									
Ceratochloa carinata	CERATOCHLOA MARGINATA,BROMUS MARGINATUS	MOUNTAIN BROME	8.00	32.00	8.00	26.67	8		
Dactylis glomerata		ORCHARD GRASS	0.00	0.00	0.00	0.00	P		
Triticum aestivum x elytrigia elongata		REGREEN	2.00	8.00	2.00	6.67	2		
TOTAL INTRO. PERENNIAL GRASSES (c)			**10.0**	**40.0**	**10.0**	**38.5**	**10**	---	---
NATIVE PERENNIAL GRASSES (warm)									
Chondrosum gracile	BOUTELOUA GRACILIS	BLUE GRAMA GRASS	0.00	0.00	1.00	3.33	(1)		
TOTAL NATIVE PERENNIAL GRASSES (w)			**0.0**	**0.0**	**1.0**	**3.8**	**(1)**	---	---
NATIVE SHRUBS									
Arctostaphylos uva-ursi		KINNIKINNICK	0.00	0.00	0.00	0.00	P		
Ceanothus fendleri		BUCKBRUSH	2.00	8.00	2.00	6.67	2		
Ribes cereum		WAX CURRANT	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**2.0**	**8.0**	**2.0**	**7.7**	**2**	---	---
NATIVE TREES									
Pseudotsuga menziesii (dead)		DOUGLAS FIR	4.00 {0.00}		4.00	13.33			[4]
TOTAL NATIVE TREES			**0.0**	**0.0**	**0.0**	**0.0**			
Standing dead		STANDING DEAD	3.00 {0.00}		3.00		3		
Litter		LITTER	14.00 {15.00}		15.00		14	1	
Bare soil		BARE SOIL	54.00 {57.00}		57.00		54	3	
TOTALS			96.0 {97.0}		105.0		96		
TOTALS (LAYER)							96	4	0
TOTAL VEGETATION COVER (LAYER)							25(1)	0	0
TOTAL VEGETATION COVER			25.0 {25.0}	100.0 {100.0}	30.0 (s=0.0)	100.0	25(1)		
			Std.Dev.= 0.0						
GROUND COVER (Litter+Rock+Veg+St.Dead)			42.0 {43.0}		48.0 { 44.0}		42(1)	1	0
SPECIES DENSITY (# of species/100 sq.m.)							35		
(AVERAGE= 35.0 Std.Dev.= 0.0)									
SPECIES DENSITY (LAYER)							35	0	0
[#] = dead value not included in live vegetation totals									
{#} = cover value if tree canopy is excluded									

Sample 11

DATA FROM FILE wr11

Walker Ranch 2002 - Sample 11

PLANT SPECIES

Scientific Name	Synonym	Common Name	AVERAGE COVER (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	11D	11DWU	11U
NATIVE ANNUAL & BIENNIAL FORBS									
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERIMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	1.00	4.76	1.00	1.67	1		
Grindelia squarrosa		GUMWEED	3.00	14.29	4.00	6.67	3(1)		
TOTAL NATIVE ANN. & BIEN. FORBS			**4.0**	**19.0**	**5.0**	**16.1**	**4(1)**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Acosta diffusa	CENTAUREA DIFFUSA	TUMBLE KNAPWEED	0.00	0.00	0.00	0.00	P		
Alyssum minus		ALYSSUM	1.00 {2.00}	4.76 {8.00}	2.00	3.33	1	1	
Camelina microcarpa		LITTLEPOD FALSEFLAX	0.00	0.00	0.00	0.00	P		
Carduus nutans ssp. macrolepis		MUSK THISTLE	0.00	0.00	0.00	0.00	P		
Sisymbrium altissimum		JIM HILL MUSTARD	1.00	4.76	1.00	1.67	1		
Verbascum thapsus		MULLEIN	2.00	9.52	2.00	3.33	2		
TOTAL INTRO. ANN. & BIEN. FORBS			**4.0 {5.0}**	**19.0 {20.0}**	**5.0**	**16.1**	**4**	**1**	---
INTRODUCED ANNUAL GRASSES									
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	0.00	0.00	0.00	0.00	P		
Bromus japonicus		JAPANESE BROME	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. GRASSES			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL FORBS									
Artemisia ludoviciana		PASTURE SAGE	0.00	0.00	0.00	0.00	P		
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	0.00	0.00	0.00	0.00	P		
Cirsium ochrocentrum	CIRSIUM MEGACEPHALUM	THISTLE	0.00	0.00	1.00	1.67	(1)		
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.00	0.00	0.00	0.00	P		
Eriogonum umbellatum var. umbellatum		WILD BUCKWHEAT	0.00	0.00	0.00	0.00	P		
Erysimum capitatum		COAST WALLFLOWER	0.00	0.00	0.00	0.00	P		
Gaillardia aristata		BLANKET-FLOWER	0.00	0.00	0.00	0.00	P		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	0.00	0.00	0.00	0.00	P		
Harbouria trachypleura		WHISKBROOM PARSLEY	0.00	0.00	0.00	0.00	P		
Helianthus pumilus		SUNFLOWER	0.00	0.00	0.00	0.00	P		
Heterotheca villosa	HETEROTHECA HORRIDA,CHRYSOPSIS VILLOSA	HAIRY GOLDEN ASTER	1.00	4.76	1.00	1.67	1		
Monarda fistulosa var. menthifolia		HORSEMINT	0.00	0.00	0.00	0.00	P		
Oenothera caespitosa ssp. caespitosa		EVENING PRIMROSE	0.00	0.00	0.00	0.00	P		
Oxytropis lambertii		LOCOWEED	0.00	0.00	0.00	0.00	P		
Penstemon virens		GREEN BEARD-TONGUE	1.00	4.76	1.00	1.67	1		
Phacelia heterophylla		VARILEAF SCORPIONWEED	0.00	0.00	0.00	0.00	P		
Rumex triangulivalvis	RUMEX SALICIFOLIUS	WILLOW DOCK	0.00	0.00	0.00	0.00	P		
Scutellaria brittonii		SKULLCAP	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL FORBS			**2.0**	**9.5**	**3.0**	**9.7**	**2(1)**	---	---
INTRODUCED PERENNIAL FORBS									
Breea arvensis	CIRSIUM ARVENSE	CANADA THISTLE	0.00	0.00	0.00	0.00	P		
Verbena bracteata		VERVAIN	1.00	4.76	1.00	1.67	1		
TOTAL INTRO. PERENNIAL FORBS			**1.0**	**4.8**	**1.0**	**3.2**	**1**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	4.00 {5.00}	19.05 {20.00}	7.00	11.67	4(2)	1	
Carex spp.		SEDGE	1.00	4.76	1.00	1.67	1		
Elymus elymoides	SITANION HYSTRIX	BOTTLEBRUSH SQUIRRELTAIL	0.00	0.00	0.00	0.00	P		
Elymus trachycaulus	AGROPYRON TRACHYCAULUM	SLENDER WHEATGRASS	2.00 {3.00}	9.52 {12.00}	3.00	5.00	2	1	
Hesperostipa comata	STIPA COMATA	NEEDLE-AND-THREAD GRASS	0.00	0.00	0.00	0.00	P		
Leucopoa kingii		SPIKE FESCUE	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (c)			**7.0 {9.0}**	**33.3 {36.0}**	**11.0**	**35.5**	**7(2)**	**2**	---
INTRODUCED PERENNIAL GRASSES (cool)									
Ceratochloa carinata	CERATOCHLOA MARGINATA,BROMUS MARGINATUS	MOUNTAIN BROME	1.00 {2.00}	4.76 {8.00}	2.00	3.33	1	1	
Triticum aestivum x elytrigia elongata		REGREEN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL GRASSES (c)			**1.0 {2.0}**	**4.8 {8.0}**	**2.0**	**6.5**	**1**	**1**	---
NATIVE PERENNIAL GRASSES (warm)									
Chondrosum gracile	BOUTELOUA GRACILIS	BLUE GRAMA GRASS	1.00	4.76	1.00	1.67	1		
TOTAL NATIVE PERENNIAL GRASSES (w)			**1.0**	**4.8**	**1.0**	**3.2**	**1**	---	---
NATIVE SHRUBS									
Ceanothus fendleri		BUCKBRUSH	1.00	4.76	2.00	3.33	1(1)		
Cercocarpus montanus		BIRCHLEAF MOUNTAIN MAHOGANY	0.00	0.00	1.00	1.67	(1)		
Ribes cereum		WAX CURRANT	0.00	0.00	0.00	0.00	P		
Rosa arkansana		ARKANSAS ROSE	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**1.0**	**4.8**	**3.0**	**9.7**	**1(2)**	---	---
NATIVE TREES									
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	28.00 {1.00}	133.33 {4.00}	29.00	48.33		[1]	[28]
TOTAL NATIVE TREES			**0.0**	**0.0**	**0.0**	**0.0**			
Litter		LITTER	18.00 {19.00}		19.00		18	1	
Bare soil		BARE SOIL	33.00 {55.00}		55.00		33	22	
TOTALS			72.0 {100.0}		134.0		72		
TOTALS (LAYER)							72	27	0
TOTAL VEGETATION COVER (LAYER)							21(6)	4	0
TOTAL VEGETATION COVER			21.0 {26.0}	100.0 {104.0}	60.0 (s=0.0)	100.0	21(10)		
			Std.Dev.= 0.0						
GROUND COVER (Litter+Rock+Veg+St.Dead)			39.0 {44.0}		79.0 { 51.0}		39(6)	5	0
SPECIES DENSITY (# of species/100 sq.m.)							44		
(AVERAGE= 44.0 Std.Dev.= 0.0)									
SPECIES DENSITY (LAYER)							44	4	0

[#] = dead value not included in live vegetation totals

{#} = cover value if tree canopy is excluded

Sample 12

DATA FROM FILE wr12									
Walker Ranch 2002 - Sample 12				**RELATIVE**		**RELATIVE**			
PLANT SPECIES			**AVERAGE**	**VEGETATION**	**AVERAGE**	**VEGETATION**			
			COVER	**COVER**	**COVER-ALL**	**COVER-ALL**			
Scientific Name	**Synonym**	**Common Name**	**(%)**	**(%)**	**(%)**	**(%)**	**12D**	**12DWU**	**12U**
NATIVE ANNUAL & BIENNIAL FORBS									
Androsace septentrionalis		PYGMYFLOWER ROCKJASMINE	0.00	0.00	0.00	0.00	P		
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	0.00 {1.00}	0.00 {2.56}	1.00	1.64		1	
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	4.00 {5.00}	11.43 {12.82}	6.00	9.84	4(1)	1	
Collomia linearis		LINEARLEAF COLLOMIA	0.00	0.00	0.00	0.00	P		
Dracocephalum parviflorum	MOLDAVICA PARVIFLORA	DRAGONHEAD	2.00	5.71	4.00	6.56	2(2)		
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.00	0.00	0.00	0.00	P		
Grindelia squarrosa		GUMWEED	0.00	0.00	0.00	0.00	P		
Silene antirrhina		SLEEPY CATCHFLY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE ANN. & BIEN. FORBS			**6.0 {8.0}**	**17.1 {20.5}**	**11.0**	**21.6**	**6(3)**	**2**	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Conyza canadensis		HORSEWEED	0.00	0.00	0.00	0.00	P		
Lactuca serriola		PRICKLY LETTUCE	1.00 {2.00}	2.86 {5.13}	3.00	4.92	1(1)	1	
Sisymbrium altissimum		JIM HILL MUSTARD	1.00	2.86	1.00	1.64	1		
Verbascum thapsus		MULLEIN	2.00	5.71	2.00	3.28	2		
TOTAL INTRO. ANN. & BIEN. FORBS			**4.0 {5.0}**	**11.4 {12.8}**	**6.0**	**11.8**	**4(1)**	**1**	---
NATIVE PERENNIAL FORBS									
Achillea lanulosa		WESTERN YARROW	0.00	0.00	0.00	0.00	P		
Apocynum androsaemifolium		SPREADING DOGBANE	7.00	20.00	8.00	13.11	7(1)		
Arnica fulgens		ARNICA	0.00	0.00	0.00	0.00	P		
Artemisia frigida		FRINGED SAGE	0.00	0.00	0.00	0.00	P		
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	0.00	0.00	0.00	0.00	P		
Campanula rotundifolia		HAREBELL	1.00	2.86	1.00	1.64	1		
Corydalis aurea		GOLDEN SMOKE	1.00	2.86	1.00	1.64	1		
Helianthus pumilus		SUNFLOWER	1.00	2.86	1.00	1.64	1		
Penstemon glaber	PENSTEMON ALPINUS	BEARD TONGUE	0.00	0.00	0.00	0.00	P		
Penstemon virens		GREEN BEARD-TONGUE	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL FORBS			**10.0**	**28.6**	**11.0**	**21.6**	**10(1)**	---	---
INTRODUCED PERENNIAL FORBS									
Breea arvensis	CIRSIUM ARVENSE	CANADA THISTLE	3.00	8.57	4.00	6.56	3(1)		
Taraxacum officinale		COMMON DANDELION	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL FORBS			**3.0**	**8.6**	**4.0**	**7.8**	**3(1)**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Carex spp.		SEDGE	0.00	0.00	1.00	1.64	(1)		
Poa agassizensis		AGASSIZ BLUEGRASS	0.00	0.00	0.00	0.00	P		
Poa fendleriana		MUTTON BLUEGRASS	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (c)			**0.0**	**0.0**	**1.0**	**2.0**	**(1)**	---	---
NATIVE SHRUBS									
Ceanothus fendleri		BUCKBRUSH	2.00 {3.00}	5.71 {7.69}	6.00	9.84	2(2)	1(1)	
Physocarpus monogynus		NINEBARK	4.00	11.43	6.00	9.84	4(2)		
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	3.00	8.57	3.00	4.92	3		
Symphoricarpos rotundifolius	SYMPHORICARPOS OREOPHILUS	MOUNTAIN SNOWBERRY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**9.0 {10.0}**	**25.7 {25.6}**	**15.0**	**29.4**	**9(4)**	**1(1)**	---
NATIVE TREES									
Populus tremuloides	POPULUS TREMULA	QUAKING ASPEN	3.00	8.57	3.00	4.92	3		
Populus tremuloides (dead)		ASPEN (DEAD)	1.00		1.00	1.64	[1]		
Pseudotsuga menziesii dead		DOUGLAS FIR	9.00 {0.00}		9.00	14.75			[9]
TOTAL NATIVE TREES			**3.0**	**8.6**	**3.0**	**5.9**	**3**	---	---
Standing dead		STANDING DEAD	1.00 {0.00}		1.00		1		
Litter		LITTER	12.00 {13.00}		13.00		12	1	
Bare soil		BARE SOIL	35.00 {37.00}		37.00		35	2	
Rock		ROCK	8.00 {10.00}		10.00		8	2	
TOTALS			91.0 {100.0}		122.0		91		
TOTALS (LAYER)							91	9	0
TOTAL VEGETATION COVER (LAYER)							35(11)	4(1)	0
TOTAL VEGETATION COVER			35.0 {40.0}	100.0 {102.6}	61	100.0	35(16)		
GROUND COVER (Litter+Rock+Veg+St.Dead)			56.0 {63.0}		85.0 { 76.0}		56(11)	7(1)	0
SPECIES DENSITY (# of species/100 sq.m.)							32		
SPECIES DENSITY (LAYER)							31	4	0
(#) = second hit									
[#] = dead value not included in live vegetation totals									
{#} = cover value if tree canopy is excluded									

Sample 13

DATA FROM FILE wr13									
Walker Ranch 2002 - Sample 13				**RELATIVE**		**RELATIVE**			
PLANT SPECIES			**AVERAGE**	**VEGETATION**	**AVERAGE**	**VEGETATION**			
			COVER	**COVER**	**COVER-ALL**	**COVER-ALL**			
Scientific Name	**Synonym**	**Common Name**	**(%)**	**(%)**	**(%)**	**(%)**	**13D**	**13DWU**	**13U**
NATIVE ANNUAL & BIENNIAL FORBS									
Androsace septentrionalis		PYGMYFLOWER ROCKJASMINE	0.00	0.00	0.00	0.00	P		
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	2.00 {3.00}	5.41 {7.14}	4.00	7.27	2	1(1)	
Dracocephalum parviflorum	MOLDAVICA PARVIFLORA	DRAGONHEAD	0.00	0.00	0.00	0.00	P		
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE ANN. & BIEN. FORBS			**2.0 {3.0}**	**5.4 {7.1}**	**4.0**	**8.7**	**2**	**1(1)**	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Lactuca serriola		PRICKLY LETTUCE	0.00	0.00	0.00	0.00	P		
Nicotiana attenuata		TOBACCO	0.00	0.00	0.00	0.00	P		
Sisymbrium altissimum		JIM HILL MUSTARD	0.00	0.00	0.00	0.00	P		
Verbascum thapsus		MULLEIN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. & BIEN. FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL FORBS									
Aletes acaulis		STEMLESS INDIAN PARSLEY	0.00	0.00	0.00	0.00	P		
Apocynum androsaemifolium		SPREADING DOGBANE	11.00	29.73	11.00	20.00	11		
Arnica fulgens		ARNICA	0.00	0.00	0.00	0.00	P		
Astragalus laxmannii	ASTRAGALUS ADSURGENS VAR.ROBUSTIER	LAXMANN'S MILKVETCH	0.00	0.00	0.00	0.00	P		
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	2.00	5.41	2.00	3.64	2		
Campanula rotundifolia		HAREBELL	0.00	0.00	0.00	0.00	P		
Corydalis aurea		GOLDEN SMOKE	4.00	10.81	4.00	7.27	4		
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	1.00	2.70	1.00	1.82	1		
Galium septentrionale	GALIUM BOREALE	NORTHERN BEDSTRAW	0.00	0.00	0.00	0.00	P		
Helianthus pumilus		SUNFLOWER	0.00	0.00	0.00	0.00	P		
Heterotheca foliosa		GOLDENASTER	0.00	0.00	0.00	0.00	P		
Lupinus argenteus		SILVER LUPINE	0.00	0.00	0.00	0.00	P		
Penstemon glaber	PENSTEMON ALPINUS	BEARD TONGUE	0.00	0.00	0.00	0.00	P		
Phacelia heterophylla		VARILEAF SCORPIONWEED	3.00	8.11	3.00	5.45	3		
TOTAL NATIVE PERENNIAL FORBS			**21.0**	**56.8**	**21.0**	**45.7**	**21**	---	---
INTRODUCED PERENNIAL FORBS									
Taraxacum officinale		COMMON DANDELION	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Carex spp.		SEDGE	1.00 {2.00}	2.70 {4.76}	3.00	5.45	1(1)	1	
Festuca brachyphylla ssp. coloradensis	FESTUCA OVINA VAR. BRACHYPHYLLA	SHEEP FESCUE	0.00	0.00	1.00	1.82	(1)		
TOTAL NATIVE PERENNIAL GRASSES (c)			**1.0 {2.0}**	**2.7 {4.8}**	**4.0**	**8.7**	**1(2)**	**1**	---
NATIVE SHRUBS									
Acer glabrum		ROCKY MOUNTAIN MAPLE	0.00	0.00	0.00	0.00	P		
Ceanothus fendleri		BUCKBRUSH	9.00 {11.00}	24.32 {26.19}	11.00	20.00	9	2	
Rosa arkansana		ARKANSAS ROSE	2.00	5.41	2.00	3.64	2		
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**11.0 {13.0}**	**29.7 {31.0}**	**13.0**	**28.3**	**11**	**2**	---
NATIVE TREES									
Populus tremuloides	POPULUS TREMULA	QUAKING ASPEN	2.00 {3.00}	5.41 {7.14}	4.00	7.27	2(1)	1	
Pseudotsuga menziesii dead		DOUGLAS FIR	9.00 {0.00}		9.00	16.36			[9]
TOTAL NATIVE TREES			**2.0 {3.0}**	**5.4 {7.1}**	**4.0**	**8.7**	**2(1)**	**1**	---
Litter		LITTER	8.00 {9.00}		9.00		8	1	
Bare soil		BARE SOIL	40.00 {42.00}		42.00		40	2	
Rock		ROCK	6.00 {7.00}		7.00		6	1	
TOTALS			91.0 {100.0}		113.0		91		
TOTALS (LAYER)							91	9	0
TOTAL VEGETATION COVER (LAYER)							37(3)	5(1)	0
TOTAL VEGETATION COVER			37.0 {42.0}	100.0 {100.0}	55	100.0	37(9)		
GROUND COVER (Litter+Rock+Veg+St.Dead)			51.0 {58.0}		71.0 { 62.0}		51(3)	7(1)	0
SPECIES DENSITY (# of species/100 sq.m.)							31		
SPECIES DENSITY (LAYER)							31	4	0
(#) = second hit									
[#] = dead value not included in live vegetation totals									
{#} = cover value if tree canopy is excluded									

Sample 14

DATA FROM FILE wr14									
Walker Ranch 2002 - Sample 14				**RELATIVE**		**RELATIVE**			
PLANT SPECIES			**AVERAGE**	**VEGETATION**	**AVERAGE**	**VEGETATION**			
			COVER	**COVER**	**COVER-ALL**	**COVER-ALL**			
Scientific Name	**Synonym**	**Common Name**	**(%)**	**(%)**	**(%)**	**(%)**	**14D**	**14DWU**	**14U**
NATIVE ANNUAL & BIENNIAL FORBS									
Acrolasia dispersa	MENTZELIA		1.00 {2.00}	2.56 {4.65}	2.00	3.13	1	1	
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	3.00	7.69	3.00	4.69	3		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	8.00 {10.00}	20.51 {23.26}	10.00	15.63	8	2	
Collinsia parviflora		BABY BLUE-EYES	0.00	0.00	0.00	0.00	P		
Collomia linearis		LINEARLEAF COLLOMIA	0.00	0.00	0.00	0.00	P		
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.00	0.00	0.00	0.00	P		
Grindelia squarrosa		GUMWEED	0.00	0.00	0.00	0.00	P		
Helianthus annuus		COMMON SUNFLOWER	1.00	2.56	1.00	1.56	1		
Polygonum douglasii	POLYGONUM SAWATCHENSE,POLYGONUM MONTANUM	DOUGLAS KNOTWEED	0.00	0.00	0.00	0.00	P		
Silene antirrhina		SLEEPY CATCHFLY	2.00	5.13	2.00	3.13	2		
TOTAL NATIVE ANN. & BIEN. FORBS			**15.0 {18.0}**	**38.5 {41.9}**	**18.0**	**34.0**	**15**	**3**	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Carduus nutans ssp. macrolepis		MUSK THISTLE	0.00	0.00	0.00	0.00	P		
Chenopodium foliosum		LEAFY GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Lactuca serriola		PRICKLY LETTUCE	0.00 {1.00}	0.00 {2.33}	1.00	1.56	P	1	
Lepidium densiflorum		DENSEFLOWER PEPPERWEED	0.00	0.00	0.00	0.00	P		
Melilotus albus	MELILOTUS ALBA	WHITE SWEET-CLOVER	0.00	0.00	0.00	0.00	P		
Sisymbrium altissimum		JIM HILL MUSTARD	3.00	7.69	3.00	4.69	3		
Verbascum thapsus		MULLEIN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. & BIEN. FORBS			**3.0 {4.0}**	**7.7 {9.3}**	**4.0**	**7.5**	**3**	**1**	---
INTRODUCED ANNUAL GRASSES									
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	3.00	7.69	6.00	9.38	3(3)		
TOTAL INTRO. ANN. GRASSES			**3.0**	**7.7**	**6.0**	**11.3**	**3(3)**	---	---
NATIVE PERENNIAL FORBS									
Artemisia ludoviciana		PASTURE SAGE	0.00	0.00	0.00	0.00	P		
Astragalus laxmannii	ASTRAGALUS ADSURGENS VAR.ROBUSTIER	LAXMANN'S MILKVETCH	0.00	0.00	0.00	0.00	P		
Campanula rotundifolia		HAREBELL	0.00	0.00	1.00	1.56	(1)		
Cerastium strictum	CERASTIUM ARVENSE	MOUSE-EAR	0.00	0.00	0.00	0.00	P		
Corydalis aurea		GOLDEN SMOKE	0.00	0.00	0.00	0.00	P		
Gaillardia aristata		BLANKET-FLOWER	1.00	2.56	2.00	3.13	1(1)		
Galium septentrionale	GALIUM BOREALE	NORTHERN BEDSTRAW	0.00	0.00	0.00	0.00	P		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	3.00	7.69	4.00	6.25	3(1)		
Helianthus pumilus		SUNFLOWER	1.00	2.56	1.00	1.56	1		
Lupinus argenteus		SILVER LUPINE	0.00	0.00	0.00	0.00	P		
Monarda fistulosa var. menthifolia		HORSEMINT	0.00	0.00	1.00	1.56	(1)		
Oenothera caespitosa ssp. caespitosa		EVENING PRIMROSE	1.00	2.56	1.00	1.56	1		
Penstemon virens		GREEN BEARD-TONGUE	0.00	0.00	0.00	0.00	P		
Phacelia heterophylla		VARILEAF SCORPIONWEED	2.00	5.13 {4.65}	4.00	6.25	2(1)	(1)	
Scutellaria brittonii		SKULLCAP	0.00	0.00	0.00	0.00	P		
Solidago missouriensis		MISSOURI GOLDENROD	0.00	0.00	0.00	0.00	P		
Solidago simplex var. simplex	SOLIDAGO SPATHULATA VAR. NEOMEXICANA	MT. ALBERT GOLDENROD	0.00	0.00	0.00	0.00	P		
Vaccinium myrtillus ssp. oreophilum		BLUEBERRY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL FORBS			**8.0**	**20.5**	**14.0**	**26.4**	**8(5)**	**(1)**	---
INTRODUCED PERENNIAL FORBS									
Breea arvensis	CIRSIUM ARVENSE	CANADA THISTLE	0.00	0.00	0.00	0.00	P		
Taraxacum officinale		COMMON DANDELION	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	0.00	0.00	0.00	0.00	P		
Carex spp.		SEDGE	2.00	5.13	2.00	3.13	2		
TOTAL NATIVE PERENNIAL GRASSES (c)			**2.0**	**5.1**	**2.0**	**3.8**	**2**	---	---
NATIVE SHRUBS									
Arctostaphylos uva-ursi		KINNIKINNICK	0.00	0.00	0.00	0.00	P		
Ceanothus fendleri		BUCKBRUSH	0.00	0.00	1.00	1.56	(1)		
Padus virginiana ssp. melanocarpa	PRUNUS VIRGINIANA SSP. MELANOCARPA	CHOKECHERRY	0.00	0.00	0.00	0.00	P		
Ribes cereum		WAX CURRANT	0.00	0.00	0.00	0.00	P		
Rosa woodsii		WOOD'S ROSE	0.00	0.00	0.00	0.00	P		
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	0.00	0.00	0.00	0.00	P		
Symphoricarpos rotundifolius	SYMPHORICARPOS OREOPHILUS	MOUNTAIN SNOWBERRY	1.00	2.56	1.00	1.56	1		
TOTAL NATIVE SHRUBS			**1.0**	**2.6**	**2.0**	**3.8**	**1(1)**	---	---
NATIVE TREES									
Populus tremuloides	POPULUS TREMULA	QUAKING ASPEN	7.00	17.95	7.00	10.94	7		
Pseudotsuga menziesii dead		DOUGLAS FIR	7.00 {0.00}		7.00	10.94			[7]
Sabina scopulorum dead	JUNIPERUS SCOPULORUM	ROCKY MOUNTAIN JUNIPER	4.00 {0.00}		4.00	6.25			[4]
TOTAL NATIVE TREES			**7.0**	**17.9**	**7.0**	**13.2**	**7**	---	---
Litter		LITTER	14.00 {15.00}		15.00		14	1	
Bare soil		BARE SOIL	35.00 {41.00}		41.00		35	6	
Rock		ROCK	1.00		1.00		1		
TOTALS			89.0 {100.0}		121.0		89		
TOTALS (LAYER)							89	11	0
TOTAL VEGETATION COVER (LAYER)							39(9)	4(1)	0
TOTAL VEGETATION COVER			39.0 {43.0}	100.0 {100.0}	64	100.0	39(14)		
GROUND COVER (Litter+Rock+Veg+St.Dead)			54.0 {59.0}		80.0 { 69.0}		54(9)	5(1)	0
SPECIES DENSITY (# of species/100 sq.m.)							48		
SPECIES DENSITY (LAYER)							48	4	0

(#) = second hit
[#] = dead value not included in live vegetation totals
{#} = cover value if tree canopy is excluded

Sample 15

DATA FROM FILE wr15

Walker Ranch 2002 - Sample 15 PLANT SPECIES			AVERAGE COVER	RELATIVE VEGETATION COVER	AVERAGE COVER-ALL	RELATIVE VEGETATION COVER-ALL			
Scientific Name	Synonym	Common Name	(%)	(%)	(%)	(%)	15D	15DWU	15U
NATIVE ANNUAL & BIENNIAL FORBS									
Acrolasia dispersa	MENTZELIA		0.00	0.00	0.00	0.00	P		
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	0.00	0.00	0.00	0.00	P		
Gaura mollis	GAURA PARVIFLORA	BUTTERFLY WEED	0.00	0.00	0.00	0.00	P		
Polygonum douglasii	POLYGONUM SAWATCHENSE,POLYGONUM MONTANUM	DOUGLAS KNOTWEED	0.00	0.00	0.00	0.00	P		
Silene antirrhina		SLEEPY CATCHFLY	0.00 {1.00}	0.00 {2.44}	1.00	1.64	P	1	
TOTAL NATIVE ANN. & BIEN. FORBS			**0.0 {1.0}**	**0.0 {2.4}**	**1.0**	**2.2**	**P**	**1**	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Carduus nutans ssp. macrolepis		MUSK THISTLE	1.00	2.56	1.00	1.64	1		
Cirsium vulgare		BULL THISTLE	1.00	2.56	1.00	1.64	1		
Lactuca serriola		PRICKLY LETTUCE	0.00	0.00	0.00	0.00	P		
Solanum spp.		NIGHTSHADE	0.00	0.00	0.00	0.00	P		
Tragopogon dubius ssp. major		YELLOW SALSIFY	0.00	0.00	0.00	0.00	P		
Verbascum thapsus		MULLEIN	7.00	17.95	9.00	14.75	7(2)		
TOTAL INTRO. ANN. & BIEN. FORBS			**9.0**	**23.1**	**11.0**	**24.4**	**9(2)**	---	---
INTRODUCED ANNUAL GRASSES									
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	0.00	0.00	0.00	0.00	P		
Bromus japonicus		JAPANESE BROME	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. GRASSES			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL FORBS									
Achillea lanulosa		WESTERN YARROW	0.00	0.00	0.00	0.00	P		
Artemisia frigida		FRINGED SAGE	0.00	0.00	0.00	0.00	P		
Artemisia ludoviciana		PASTURE SAGE	0.00	0.00	0.00	0.00	P		
Asclepias stenophylla		SLIMLEAF MILKWEED	0.00	0.00	0.00	0.00	P		
Asclepias viridiflora		MILKWEED	0.00	0.00	0.00	0.00	P		
Aster porteri		PORTER'S ASTER	0.00	0.00	0.00	0.00	P		
Astragalus drummondii		DRUMMOND MILKVETCH	0.00	0.00	0.00	0.00	P		
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	0.00	0.00	0.00	0.00	P		
Campanula rotundifolia		HAREBELL	1.00	2.56	1.00	1.64	1		
Cerastium strictum	CERASTIUM ARVENSE	MOUSE-EAR	0.00	0.00	0.00	0.00	P		
Corydalis aurea		GOLDEN SMOKE	0.00	0.00	0.00	0.00	P		
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.00	0.00	0.00	0.00	P		
Erigeron speciosus		SHOWY FLEABANE	0.00	0.00	0.00	0.00	P		
Erysimum capitatum		COAST WALLFLOWER	0.00	0.00	0.00	0.00	P		
Gaillardia aristata		BLANKET-FLOWER	0.00	0.00	0.00	0.00	P		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	0.00	0.00	0.00	0.00	P		
Helianthus pumilus		SUNFLOWER	4.00	10.26	4.00	6.56	4		
Heterotheca villosa	HETEROTHECA FONTANA,CHRYSOPSIS VILLOSA	HAIRY GOLDEN ASTER	0.00	0.00	0.00	0.00	P		
Heuchera spp.		ALUM-ROOT	0.00	0.00	0.00	0.00	P		
Lesquerella montana		BLADDERPOD	0.00	0.00	0.00	0.00	P		
Mertensia lanceolata		LANCELEAF BLUEBELLS	0.00	0.00	0.00	0.00	P		
Penstemon virens		GREEN BEARD-TONGUE	0.00	0.00	0.00	0.00	P		
Phacelia heterophylla		VARILEAF SCORPIONWEED	5.00 {6.00}	12.82 {14.63}	6.00	9.84	5	1	
Physaria vitulifera		DOUBLE BLADDERPOD	0.00	0.00	0.00	0.00	P		
Potentilla hippiana		HORSE CINQUEFOIL	0.00	0.00	0.00	0.00	P		
Pulsatilla ludoviciana	P. PATENS SSP. MULTIFIDA	PASQUEFLOWER	1.00	2.56	1.00	1.64	1		
Scutellaria brittonii		SKULLCAP	0.00	0.00	0.00	0.00	P		
Solidago simplex var. simplex	SOLIDAGO SPATHULATA VAR. NEOMEXICANA	MT. ALBERT GOLDENROD	1.00	2.56	1.00	1.64	1		
TOTAL NATIVE PERENNIAL FORBS			**12.0 {13.0}**	**30.8 {31.7}**	**13.0**	**28.9**	**12**	**1**	---
INTRODUCED PERENNIAL FORBS									
Taraxacum officinale		COMMON DANDELION	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	11.00	28.21	13.00	21.31	11(2)		
Carex spp.		SEDGE	0.00	0.00	0.00	0.00	P		
Elymus elymoides	SITANION HYSTRIX	BOTTLEBRUSH SQUIRRELTAIL	0.00	0.00	0.00	0.00	P		
Elymus lanceolatus fm. albicans	AGROPYRON DASYSTACHYUM,A. ALBICANS,AGROPYRON RIPARIUM	MONTANA WHEATGRASS	0.00	0.00	0.00	0.00	P		
Hesperostipa comata	STIPA COMATA	NEEDLE-AND-THREAD GRASS	1.00	2.56	1.00	1.64	1		
Leucopoa kingii		SPIKE FESCUE	1.00	2.56	1.00	1.64	1		
TOTAL NATIVE PERENNIAL GRASSES (c)			**13.0**	**33.3**	**15.0**	**33.3**	**13(2)**	---	---
NATIVE PERENNIAL GRASSES (warm)									
Chondrosum gracile	BOUTELOUA GRACILIS	BLUE GRAMA GRASS	1.00	2.56	1.00	1.64	1		
TOTAL NATIVE PERENNIAL GRASSES (w)			**1.0**	**2.6**	**1.0**	**2.2**	**1**	---	---
NATIVE SHRUBS									
Acer glabrum		ROCKY MOUNTAIN MAPLE	0.00	0.00	0.00	0.00	P		
Ceanothus fendleri		BUCKBRUSH	4.00	10.26	4.00	6.56	4		
Oreobatus deliciosus	RUBUS DELICIOSUS	BOULDER RASPBERRY	0.00	0.00	0.00	0.00	P		
Physocarpus monogynus		NINEBARK	0.00	0.00	0.00	0.00	P		
Ribes cereum		WAX CURRANT	0.00	0.00	0.00	0.00	P		
Rosa arkansana		ARKANSAS ROSE	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**4.0**	**10.3**	**4.0**	**8.9**	**4**	---	---
NATIVE TREES									
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	7.00 {0.00}		7.00	11.48			[7]
Pseudotsuga menziesii (dead)		DOUGLAS FIR	4.00 {0.00}		4.00	6.56			[4]
Sabina scopulorum (dead)	JUNIPERUS SCOPULORUM	ROCKY MOUNTAIN JUNIPER	4.00 {1.00}	10.26 {2.44}	5.00	8.20		[1]	[4]
TOTAL NATIVE TREES			**0.0**	**0.0**	**0.0**	**0.0**			
Standing dead		STANDING DEAD	2.00 {0.00}		3.00		2	1	
Litter		LITTER	13.00 {16.00}		16.00		13	3	
Bare soil		BARE SOIL	27.00 {31.00}		31.00		27	4	
Rock		ROCK	4.00 {8.00}		8.00		4	4	
TOTALS			85.0 {97.0}		119.0		85		
TOTALS (LAYER)							85	14	0
TOTAL VEGETATION COVER (LAYER)							39(4)	2	0
TOTAL VEGETATION COVER			39.0 {42.0}	100.0 {102.4}	61	100.0	39(6)		
GROUND COVER (Litter+Rock+Veg+St.Dead)			58.0 {68.0}		88.0 { 73.0}		58(4)	10	0
SPECIES DENSITY (# of species/100 sq.m.)							57		
SPECIES DENSITY (LAYER)							57	2	0

(#) = second hit
[#] = dead value not included in live vegetation totals
{#} = cover value if tree canopy is excluded

Sample 16

DATA FROM FILE wr16									
Walker Ranch 2002 - Sample 16				**RELATIVE**		**RELATIVE**			
PLANT SPECIES			**AVERAGE**	**VEGETATION**	**AVERAGE**	**VEGETATION**			
			COVER	**COVER**	**COVER-ALL**	**COVER-ALL**			
Scientific Name	**Synonym**	**Common Name**	**(%)**	**(%)**	**(%)**	**(%)**	**16D**	**16DWU**	**16U**
NATIVE ANNUAL & BIENNIAL FORBS									
Acrolasia dispersa	MENTZELIA		0.00	0.00	0.00	0.00	P		
Androsace septentrionalis		PYGMYFLOWER ROCKJASMINE	0.00	0.00	0.00	0.00	P		
Chenopodium leptophyllum		NARROWLEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Epilobium brachycarpum	EPILOBIUM PANICULATUM	BIGFRUIT WILLOWHERB	4.00	16.00	5.00	12.82	4(1)		
Grindelia squarrosa		GUMWEED	0.00	0.00	1.00	2.56	(1)		
Pterogonum alatum	ERIOGONUM ALATUM	WINGED BUCKWHEAT	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE ANN. & BIEN. FORBS			**4.0**	**16.0**	**6.0**	**20.0**	**4(2)**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Carduus nutans ssp. macrolepis		MUSK THISTLE	0.00	0.00	1.00	2.56	(1)		
Lactuca serriola		PRICKLY LETTUCE	0.00	0.00	0.00	0.00	P		
Solanum triflorum		NIGHTSHADE	0.00	0.00	0.00	0.00	P		
Verbascum thapsus		MULLEIN	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. & BIEN. FORBS			**0.0**	**0.0**	**1.0**	**3.3**	**(1)**	---	---
INTRODUCED ANNUAL GRASSES									
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. GRASSES			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL FORBS									
Achillea lanulosa		WESTERN YARROW	0.00	0.00	0.00	0.00	P		
Aletes acaulis		STEMLESS INDIAN PARSLEY	1.00	4.00	1.00	2.56	1		
Allium cernuum		NODDING ONION	0.00	0.00	0.00	0.00	P		
Artemisia frigida		FRINGED SAGE	0.00	0.00	0.00	0.00	P		
Artemisia ludoviciana		PASTURE SAGE	2.00	8.00	4.00	10.26	2(2)		
Aster porteri		PORTER'S ASTER	0.00	0.00	0.00	0.00	P		
Astragalus agrestis		FIELD MILKVETCH	0.00	0.00	0.00	0.00	P		
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	1.00	4.00	1.00	2.56	1		
Astragalus spp.		MILK VETCH	0.00	0.00	0.00	0.00	P		
Campanula rotundifolia		HAREBELL	2.00	8.00	2.00	5.13	2		
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.00	0.00	0.00	0.00	P		
Eriogonum umbellatum var. umbellatum		WILD BUCKWHEAT	0.00	0.00	0.00	0.00	P		
Erysimum capitatum		COAST WALLFLOWER	1.00	4.00	1.00	2.56	1		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	0.00	0.00	0.00	0.00	P		
Liatris punctata		GAYFEATHER	0.00	0.00	0.00	0.00	P		
Mertensia lanceolata		LANCELEAF BLUEBELLS	0.00	0.00	0.00	0.00	P		
Packera fendleri	SENECIO FENDLERI	FENDLER'S RAGWORT	0.00	0.00	0.00	0.00	P		
Penstemon virens		GREEN BEARD-TONGUE	2.00	8.00	2.00	5.13	2		
Phacelia heterophylla		VARILEAF SCORPIONWEED	12.00	48.00	12.00	30.77	12		
Pulsatilla ludoviciana	P. PATENS SSP. MULTIFIDA	PASQUEFLOWER	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL FORBS			**21.0**	**84.0**	**23.0**	**76.7**	**21(2)**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Achnatherum nelsonii	STIPA NELSONII	NELSON NEEDLEGRASS	0.00	0.00	0.00	0.00	P		
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	0.00	0.00	0.00	0.00	P		
Elymus elymoides	SITANION HYSTRIX	BOTTLEBRUSH SQUIRRELTAIL	0.00	0.00	0.00	0.00	P		
Koeleria macrantha	KOELERIA CRISTATA,K. PYRAMIDATA,K.GRACILIS	JUNEGRASS	0.00	0.00	0.00	0.00	P		
Leucopoa kingii		SPIKE FESCUE	0.00	0.00	0.00	0.00	P		
Poa agassizensis		AGASSIZ BLUEGRASS	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (c)			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE SHRUBS									
Ceanothus fendleri		BUCKBRUSH	0.00	0.00	0.00	0.00	P		
Ribes cereum		WAX CURRANT	0.00	0.00	0.00	0.00	P		
Rubus idaeus ssp. melanolasius		AMERICAN RED RASPBERRY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE TREES									
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	3.00 {0.00}		3.00	7.69			[3]
Pseudotsuga menziesii dead		DOUGLAS FIR	6.00 {0.00}		6.00	15.38			[6]
TOTAL NATIVE TREES			**0.0**	**0.0**	**0.0**	**0.0**			
Litter		LITTER	17.00 {20.00}		20.00		17	3	
Bare soil		BARE SOIL	48.00 {54.00}		54.00		48	6	
Rock		ROCK	1.00		1.00		1		
TOTALS			91.0 {100.0}		114.0		91		
TOTALS (LAYER)							91	9	0
TOTAL VEGETATION COVER (LAYER)							25(5)	0	0
TOTAL VEGETATION COVER			25.0 {25.0}	100.0 {100.0}	39	100.0	25(5)		
GROUND COVER (Litter+Rock+Veg+St.Dead)			43.0 {46.0}		60.0 { 51.0}		43(5)	3	0
SPECIES DENSITY (# of species/100 sq.m.)							40		
SPECIES DENSITY (LAYER)							40	0	0
(#) = second hit									
[#] = dead value not included in live vegetation totals									
{#} = cover value if tree canopy is excluded									

Sample 17

DATA FROM FILE wr17									
Walker Ranch 2002 - Sample 17				**RELATIVE**		**RELATIVE**			
PLANT SPECIES			**AVERAGE**	**VEGETATION**	**AVERAGE**	**VEGETATION**			
			COVER	**COVER**	**COVER-ALL**	**COVER-ALL**			
Scientific Name	**Synonym**	**Common Name**	**(%)**	**(%)**	**(%)**	**(%)**	**17D**	**17DWU**	**17U**
NATIVE ANNUAL & BIENNIAL FORBS									
Acrolasia dispersa	MENTZELIA		0.00	0.00	0.00	0.00	P		
Chenopodium simplex	CHENOPODIUM GIGANTOSPERMUM,C. HYBRIDUM VAR. SIMPLEX	MAPLELEAF GOOSEFOOT	0.00	0.00	0.00	0.00	P		
Grindelia squarrosa		GUMWEED	1.00	3.85	1.00	3.45	1		
Machaeranthera bigelovii		BIGELOW ASTER	1.00	3.85	1.00	3.45	1		
TOTAL NATIVE ANN. & BIEN. FORBS			**2.0**	**7.7**	**2.0**	**7.1**	**2**	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Verbascum thapsus		MULLEIN	1.00	3.85	1.00	3.45	1		
TOTAL INTRO. ANN. & BIEN. FORBS			**1.0**	**3.8**	**1.0**	**3.6**	**1**	---	---
INTRODUCED ANNUAL GRASSES									
Anisantha tectorum	BROMUS TECTORUM	CHEATGRASS	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. ANN. GRASSES			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL FORBS									
Aletes acaulis		STEMLESS INDIAN PARSLEY	0.00	0.00	0.00	0.00	P		
Allium cernuum		NODDING ONION	0.00	0.00	0.00	0.00	P		
Amerosedum lanceolatum	SEDUM LANCEOLATUM	YELLOW STONECROP	0.00	0.00	0.00	0.00	P		
Artemisia ludoviciana		PASTURE SAGE	3.00	11.54	3.00	10.34	3		
Aster porteri		PORTER'S ASTER	0.00	0.00	0.00	0.00	P		
Astragalus laxmannii	ASTRAGALUS ADSURGENS VAR.ROBUSTIER	LAXMANN'S MILKVETCH	0.00	0.00	0.00	0.00	P		
Astragalus shortianus		MILK VETCH	0.00	0.00	0.00	0.00	P		
Eriogonum umbellatum var. umbellatum		WILD BUCKWHEAT	0.00	0.00	0.00	0.00	P		
Erysimum capitatum		COAST WALLFLOWER	1.00	3.85	1.00	3.45	1		
Geranium caespitosum ssp. caespitosum		SMALL-LEAF WILD GERANIUM	0.00	0.00	0.00	0.00	P		
Helianthus pumilus		SUNFLOWER	0.00	0.00	0.00	0.00	P		
Heterotheca foliosa		GOLDENASTER	0.00	0.00	0.00	0.00	P		
Lesquerella montana		BLADDERPOD	0.00	0.00	0.00	0.00	P		
Liatris punctata		GAYFEATHER	0.00	0.00	0.00	0.00	P		
Packera fendleri	SENECIO FENDLERI	FENDLER'S RAGWORT	0.00	0.00	0.00	0.00	P		
Paronychia jamesii		NAILWORT	0.00	0.00	0.00	0.00	P		
Penstemon spp.		BEARD-TONGUE	0.00	0.00	0.00	0.00	P		
Penstemon virens		GREEN BEARD-TONGUE	2.00	7.69	3.00	10.34	2(1)		
Phacelia heterophylla		VARILEAF SCORPIONWEED	0.00	0.00	0.00	0.00	P		
Physaria vitulifera		DOUBLE BLADDERPOD	0.00	0.00	0.00	0.00	P		
Scutellaria brittonii		SKULLCAP	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL FORBS			**6.0**	**23.1**	**7.0**	**25.0**	**6(1)**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Bromopsis lanatipes	BROMUS LANATIPES	WOOLY BROME	0.00	0.00	0.00	0.00	P		
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	2.00	7.69	2.00	6.90	2		
Elymus lanceolatus fm. albicans	AGROPYRON DASYSTACHYUM,A. ALBICANS,AGROPYRON RIPARIUM	MONTANA WHEATGRASS	1.00	3.85	1.00	3.45	1		
Leucopoa kingii		SPIKE FESCUE	3.00	11.54	3.00	10.34	3		
TOTAL NATIVE PERENNIAL GRASSES (c)			**6.0**	**23.1**	**6.0**	**21.4**	**6**	---	---
NATIVE PERENNIAL GRASSES (warm)									
Muhlenbergia montana		MOUNTAIN MUHLY	3.00	11.54	3.00	10.34	3		
Schizachyrium scoparium	ANDROPOGON SCOPARIUM	LITTLE BLUESTEM	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (w)			**3.0**	**11.5**	**3.0**	**10.7**	**3**	---	---
NATIVE SHRUBS									
Ceanothus fendleri		BUCKBRUSH	2.00	7.69	3.00	10.34	2(1)		
Cercocarpus montanus		BIRCHLEAF MOUNTAIN MAHOGANY	4.00	15.38	4.00	13.79	4		
Oreobatus deliciosus	RUBUS DELICIOSUS	BOULDER RASPBERRY	0.00	0.00	0.00	0.00	P		
Physocarpus monogynus		NINEBARK	1.00	3.85	1.00	3.45	1		
Ribes cereum		WAX CURRANT	1.00	3.85	1.00	3.45	1		
Yucca glauca		SPANISH BAYONET	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**8.0**	**30.8**	**9.0**	**32.1**	**8(1)**	---	---
NATIVE TREES									
Pseudotsuga menziesii (dead)		DOUGLAS FIR	1.00 {0.00}		1.00	3.45			[1]
TOTAL NATIVE TREES			**0.0**	**0.0**	**0.0**	**0.0**			
Standing dead		STANDING DEAD	2.00 {0.00}		2.00		2		
Litter		LITTER	28.00 {29.00}		29.00		28	1	
Bare soil		BARE SOIL	33.00		33.00		33		
Rock		ROCK	10.00		10.00		10		
TOTALS			99.0 {98.0}		103.0		99		
TOTALS (LAYER)							99	1	0
TOTAL VEGETATION COVER (LAYER)							26(2)	0	0
TOTAL VEGETATION COVER			26.0 {26.0}	100.0 {100.0}	29	100.0	26(2)		
GROUND COVER (Litter+Rock+Veg+St.Dead)			66.0 {67.0}		70.0 { 69.0}		66(2)	1	0
SPECIES DENSITY (# of species/100 sq.m.)							39		
SPECIES DENSITY (LAYER)							39	0	0
(#) = second hit									
[#] = dead value not included in live vegetation totals									
{#} = cover value if tree canopy is excluded									

Sample 18

DATA FROM FILE wr18									
Walker Ranch 2002 - Sample 18				**RELATIVE**		**RELATIVE**			
PLANT SPECIES			**AVERAGE**	**VEGETATION**	**AVERAGE**	**VEGETATION**			
			COVER	**COVER**	**COVER-ALL**	**COVER-ALL**			
Scientific Name	**Synonym**	**Common Name**	**(%)**	**(%)**	**(%)**	**(%)**	**18D**	**18DWU**	**18U**
NATIVE ANNUAL & BIENNIAL FORBS									
Draba spp.		WHITLOWWORT	0.00	0.00	0.00	0.00	P		
Silene antirrhina		SLEEPY CATCHFLY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE ANN. & BIEN. FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL FORBS									
Achillea lanulosa		WESTERN YARROW	0.00	0.00	0.00	0.00	P		
Aletes acaulis		STEMLESS INDIAN PARSLEY	0.00	0.00	0.00	0.00	P		
Amerosedum lanceolatum	SEDUM LANCEOLATUM	YELLOW STONECROP	0.00	0.00	0.00	0.00	P		
Antennaria rosea		ROSE PUSSYTOES	0.00	0.00	0.00	0.00	P		
Artemisia frigida		FRINGED SAGE	0.00	0.00	0.00	0.00	P		
Astragalus miser var. oblongifolius		WEEDY MILKVETCH	0.00	0.00	0.00	0.00	P		
Campanula rotundifolia		HAREBELL	0.00	0.00	0.00	0.00	P		
Drymocallis fissa	POTENTILLA FISSA	BIGFLOWER CINQUEFOIL	0.00	0.00	0.00	0.00	P		
Heterotheca villosa	HETEROTHECA HORRIDA,CHRYSOPSIS VILLOSA	HAIRY GOLDEN ASTER	0.00	0.00	0.00	0.00	P		
Maianthemum stellatum	SMILACINA STELLATA	FEW-FLOWERED FALSE SOLOMON'S SEAL	0.00	0.00	0.00	0.00	P		
Penstemon virens		GREEN BEARD-TONGUE	0.00	0.00	0.00	0.00	P		
Solidago simplex var. simplex	SOLIDAGO SPATHULATA VAR. NEOMEXICANA	MT. ALBERT GOLDENROD	0.00	0.00	0.00	0.00	P		
Unknown forb		UNKNOWN FORB	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
INTRODUCED PERENNIAL FORBS									
Arabis hirsuta		HAIRY ROCKCRESS	0.00	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL FORBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE PERENNIAL GRASSES (cool)									
Carex pensylvanica ssp. heliophila	CAREX HELIOPHILA	SUN SEDGE	2.00 {5.00}	3.17 {29.41}	5.00	6.41	2	3	
Carex spp.		SEDGE	1.00 {6.00}	1.59 {35.29}	6.00	7.69	1	5	
Leucopoa kingii		SPIKE FESCUE	1.00	1.59	1.00	1.28	1		
TOTAL NATIVE PERENNIAL GRASSES (c)			**4.0 {12.0}**	**6.3 {70.6}**	**12.0**	**16.4**	**4**	**8**	---
NATIVE SHRUBS									
Chrysothamnus parryi		PARRY RABBITBRUSH	0.00	0.00	0.00	0.00	P		
Ribes cereum		WAX CURRANT	0.00	0.00	0.00	0.00	P		
Rosa woodsii		WOOD'S ROSE	0.00	0.00	0.00	0.00	P		
Symphoricarpos rotundifolius	SYMPHORICARPOS OREOPHILUS	MOUNTAIN SNOWBERRY	0.00	0.00	0.00	0.00	P		
TOTAL NATIVE SHRUBS			**0.0**	**0.0**	**0.0**	**0.0**	**P**	---	---
NATIVE TREES									
Pinus ponderosa ssp. scopulorum (dead)		PONDEROSA PINE (DEAD)	3.00 {0.00}		3.00	3.85			[3]
Pseudotsuga menziesii		DOUGLAS-FIR	59.00 {3.00}	93.65	59.00	75.64	3		56
Pseudotsuga menziesii (dead)		DOUGLAS FIR	0.00 {2.00}	0.00 {11.76}	2.00	2.56		[2]	
TOTAL NATIVE TREES			**59.0 {3.0}**	**93.7**	**59.0**	**80.8**	**3**	---	**56**
MOSS									
Moss		MOSS	0.00 {2.00}	0.00 {11.76}	2.00	2.56		2	
TOTAL MOSS			**0.0 {2.0}**	**0.0 {11.8}**	**2.0**	**2.7**	---	**2**	---
Litter		LITTER	33.00 {79.00}		79.00		33	46	
Bare soil		BARE SOIL	1.00 {2.00}		2.00		1	1	
TOTALS			97.0 {100.0}		159.0		97		
TOTALS (LAYER)							41	57	56
TOTAL VEGETATION COVER (LAYER)							7	10	56
TOTAL VEGETATION COVER			63.0 {19.0}	100.0 {111.8}	78	100.0	63(10)		
GROUND COVER (Litter+Rock+Veg+St.Dead)			96.0 {96.0}		157.0 { 98.0}		40	56	56
SPECIES DENSITY (# of species/100 sq.m.)							25		
SPECIES DENSITY (LAYER)							24	3	1
(#) = second hit									
[#] = dead value not included in live vegetation totals									
{#} = cover value if tree canopy is excluded									

Appendix 2. All Samples Species Importance based on 18 samples

Scientific Name	Relative Importance (%)	Constancy (%)	Average Cover All Hits (%)
Pinus ponderosa ssp. scopulorum (dead)	100.000	66.67	5.61
****Carex pensylvanica ssp. heliophila*	65.923	77.78	3.17
Ceanothus fendleri	53.278	94.44	2.11
Phacelia heterophylla	53.237	77.78	2.56
Pseudotsuga menziesii (dead)	42.931	55.56	2.89
Verbascum thapsus	36.360	94.44	1.44
Sisymbrium altissimum	28.103	61.11	1.72
Chenopodium simplex	27.658	77.78	1.33
****Anisantha tectorum*	24.716	72.22	1.28
Elymus trachycaulus	19.338	33.33	2.17
*****Ceratochloa carinata*	18.357	33.33	2.06
Penstemon virens	15.923	88.89	0.67
Artemisia ludoviciana	12.937	72.22	0.67
Geranium caespitosum ssp. caespitosum	12.685	77.78	0.61
Carex spp.	11.096	50.00	0.83
Corydalis aurea	9.953	55.56	0.67
Artemisia frigida	8.957	50.00	0.67
Campanula rotundifolia	8.110	77.78	0.39
Chenopodium leptophyllum	8.110	77.78	0.39
Grindelia squarrosa	7.248	44.44	0.61
Triticum aestivum x Elytrigia elongata	7.189	61.11	0.44
Helianthus pumilus	6.952	66.67	0.39
Breea arvensis	6.343	38.89	0.61
Apocynum androsaemifolium	6.297	22.22	1.06
Chondrosum gracile	5.941	44.44	0.50
Epilobium brachycarpum	5.882	66.67	0.33
Leucopoa kingii	5.882	66.67	0.33
Astragalus miser var. oblongifolius	5.407	72.22	0.28
****Populus tremuloides*	4.931	22.22	0.83
Pseudotsuga menziesii	4.876	5.56	3.28
Physocarpus monogynus	4.634	44.44	0.39
Heterotheca villosa	4.412	50.00	0.33
Lactuca serriola	3.922	66.67	0.22
Solidago simplex var. simplex	3.743	50.00	0.28
Elymus lanceolatus fm. albicans	3.431	38.89	0.33
Sabina scopulorum (dead)	3.327	22.22	0.56
Alyssum minus	3.268	27.78	0.44
Erysimum capitatum	3.030	66.67	0.17
Elymus elymoides	2.614	44.44	0.22
Rubus idaeus ssp. melanolasius	2.525	55.56	0.17
Silene antirrhina	2.525	55.56	0.17
Gaillardia aristata	2.273	50.00	0.17
Heterotheca foliosa	2.080	27.78	0.28
Drymocallis fissa	1.961	66.67	0.11
Ribes cereum	1.961	66.67	0.11
Aster porteri	1.797	61.11	0.11
Cercocarpus montanus	1.663	22.22	0.28
Rosa arkansana	1.515	33.33	0.17
Aletes acaulis	1.144	38.89	0.11
Astragalus laxmannii	1.144	38.89	0.11
Carduus nutans ssp. macrolepis	1.144	38.89	0.11
Oenothera caespitosa ssp. caespitosa	1.144	38.89	0.11
Dracocephalum parviflorum	0.981	16.67	0.22
Achillea lanulosa	0.980	61.11	0.06
Acrolasia dispersa	0.980	33.33	0.11
Pulsatilla ludoviciana	0.802	50.00	0.06
Scutellaria brittonii	0.802	50.00	0.06
Helianthus annuus	0.653	22.22	0.11
****Androsace septentrionalis*	0.624	38.89	0.06
Taraxacum officinale	0.624	38.89	0.06
Harbouria trachypleura	0.535	33.33	0.06
Muhlenbergia montana	0.505	11.11	0.17
Cirsium ochrocentrum	0.490	16.67	0.11
Bassia sieversiana	0.446	27.78	0.06
Poa agassizensis	0.446	27.78	0.06
Hesperostipa comata	0.356	22.22	0.06
Poa compressa	0.327	11.11	0.11
Populus tremuloides (dead)	0.327	11.11	0.11
Arctostaphylos uva-ursi	0.267	16.67	0.06
Lappula redowskii	0.267	16.67	0.06

Liatris punctata	0.267	16.67	0.06
Symphoricarpos rotundifolius	0.267	16.67	0.06
Astragalus agrestis	0.178	11.11	0.06
Monarda fistulosa var. menthifolia	0.178	11.11	0.06
Oxytropis lambertii	0.178	11.11	0.06
Verbena bracteata	0.178	11.11	0.06
Moss	0.164	5.56	0.11
Mertensia lanceolata	0.134	50.00	0.01
Eriogonum umbellatum var. umbellatum	0.104	38.89	0.01
Cirsium vulgare	0.089	5.56	0.06
Festuca brachyphylla ssp. coloradensis	0.089	5.56	0.06
Machaeranthera bigelovii	0.089	5.56	0.06
Koeleria macrantha	0.089	33.33	0.01
Polygonum douglasii	0.074	27.78	0.01
Oreobatus deliciosus	0.059	22.22	0.01
Allium cernuum	0.045	16.67	0.01
Astragalus shortianus	0.045	16.67	0.01
Conyza canadensis	0.045	16.67	0.01
Galium septentrionale	0.045	16.67	0.01
****Lesquerella montana*	0.045	16.67	0.01
Nicotiana attenuata	0.045	16.67	0.01
Packera fendleri	0.045	16.67	0.01
Penstemon glaber	0.045	16.67	0.01
Potentilla hippiana	0.045	16.67	0.01
Tragopogon dubius ssp. major	0.045	16.67	0.01
Acer glabrum	0.030	11.11	0.01
Acosta diffusa	0.030	11.11	0.01
Amerosedum lanceolatum	0.030	11.11	0.01
Arnica fulgens	0.030	11.11	0.01
Astragalus spp.	0.030	11.11	0.01
Bromopsis lanatipes	0.030	11.11	0.01
Bromus japonicus	0.030	11.11	0.01
Camelina microcarpa	0.030	11.11	0.01
Cerastium strictum	0.030	11.11	0.01
Collomia linearis	0.030	11.11	0.01
Cylindropyrum cylindricum	0.030	11.11	0.01
Euphorbia spp.	0.030	11.11	0.01
Frasera speciosa	0.030	11.11	0.01
Gaura mollis	0.030	11.11	0.01
Lupinus argenteus	0.030	11.11	0.01
Physaria vitulifera	0.030	11.11	0.01
Rosa woodsii	0.030	11.11	0.01
Sporobolus cryptandrus	0.030	11.11	0.01
Achnatherum nelsonii	0.015	5.56	0.01
Agrostis scabra	0.015	5.56	0.01
Antennaria rosea	0.015	5.56	0.01
Arabis hirsuta	0.015	5.56	0.01
Asclepias stenophylla	0.015	5.56	0.01
Asclepias viridiflora	0.015	5.56	0.01
Astragalus drummondii	0.015	5.56	0.01
Bahia dissecta	0.015	5.56	0.01
Boechera fendleri	0.015	5.56	0.01
Carex sp. 1	0.015	5.56	0.01
Chenopodium foliosum	0.015	5.56	0.01
Chrysothamnus parryi	0.015	5.56	0.01
Collinsia parviflora	0.015	5.56	0.01
Cystopteris fragilis	0.015	5.56	0.01
Dactylis glomerata	0.015	5.56	0.01
Draba spp.	0.015	5.56	0.01
Elymus spp.	0.015	5.56	0.01
Elymus virginicus	0.015	5.56	0.01
Erigeron speciosus	0.015	5.56	0.01
Heuchera spp.	0.015	5.56	0.01
Lepidium densiflorum	0.015	5.56	0.01
Maianthemum stellatum	0.015	5.56	0.01
Melilotus albus	0.015	5.56	0.01
Melilotus officinale	0.015	5.56	0.01
Noccaea montana	0.015	5.56	0.01
Oligosporus dracunculus ssp. glaucus	0.015	5.56	0.01
Oreocarya virgata	0.015	5.56	0.01
Oxybaphus hirsutus	0.015	5.56	0.01
Padus virginiana ssp. melanocarpa	0.015	5.56	0.01
Paronychia jamesii	0.015	5.56	0.01
Penstemon spp.	0.015	5.56	0.01
Poa fendleriana	0.015	5.56	0.01
Podospermum laciniatum	0.015	5.56	0.01
Pterogonum alatum	0.015	5.56	0.01
Rumex triangulivalvis	0.015	5.56	0.01

Schedonnardus paniculatus	0.015	5.56	0.01
Schizachyrium scoparium	0.015	5.56	0.01
Senecio integerrimus	0.015	5.56	0.01
Solanum spp.	0.015	5.56	0.01
Solanum triflorum	0.015	5.56	0.01
Solidago missouriensis	0.015	5.56	0.01
Teloxys botrys	0.015	5.56	0.01
Tithymalus peplus	0.015	5.56	0.01
Triticum aestivum	0.015	5.56	0.01
Unknown forb	0.015	5.56	0.01
Urtica gracilis ssp. gracilis	0.015	5.56	0.01
Vaccinium myrtillus ssp. oreophilum	0.015	5.56	0.01
Yucca glauca	0.015	5.56	0.01

*Relative Importance = Importance/ Maximum Importance Value in Data Set, Importance = Constancy X Average Cover-All

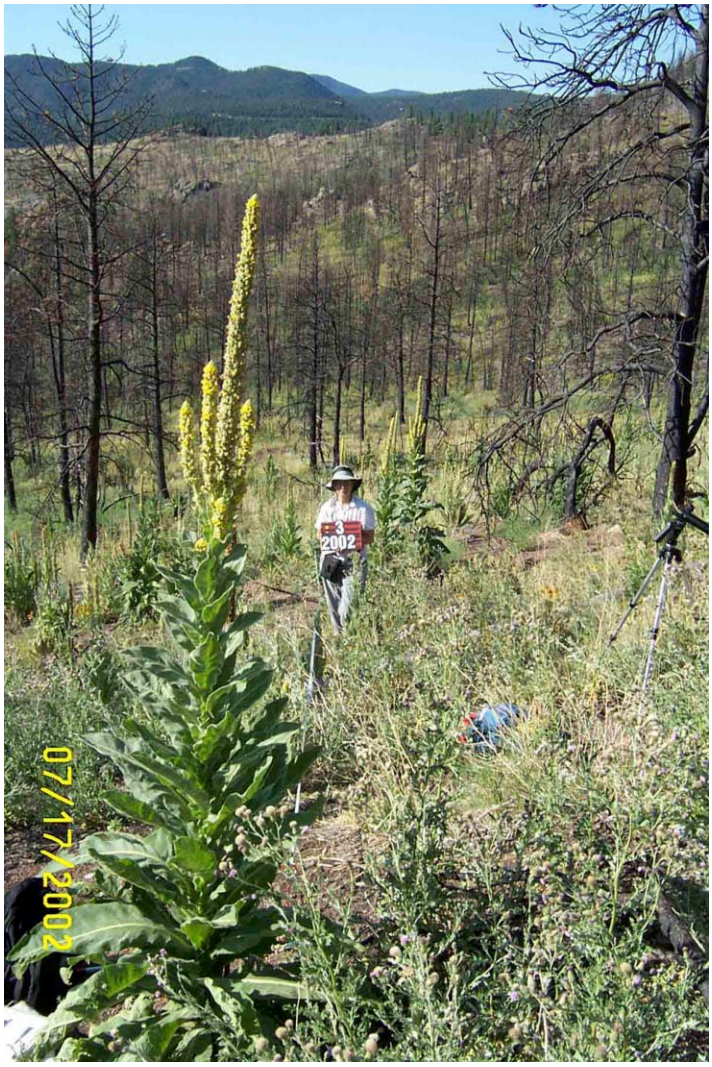
**Average Cover-All = Sum of first and additional hits.

***Indicator Species in TWINSPAN Classification

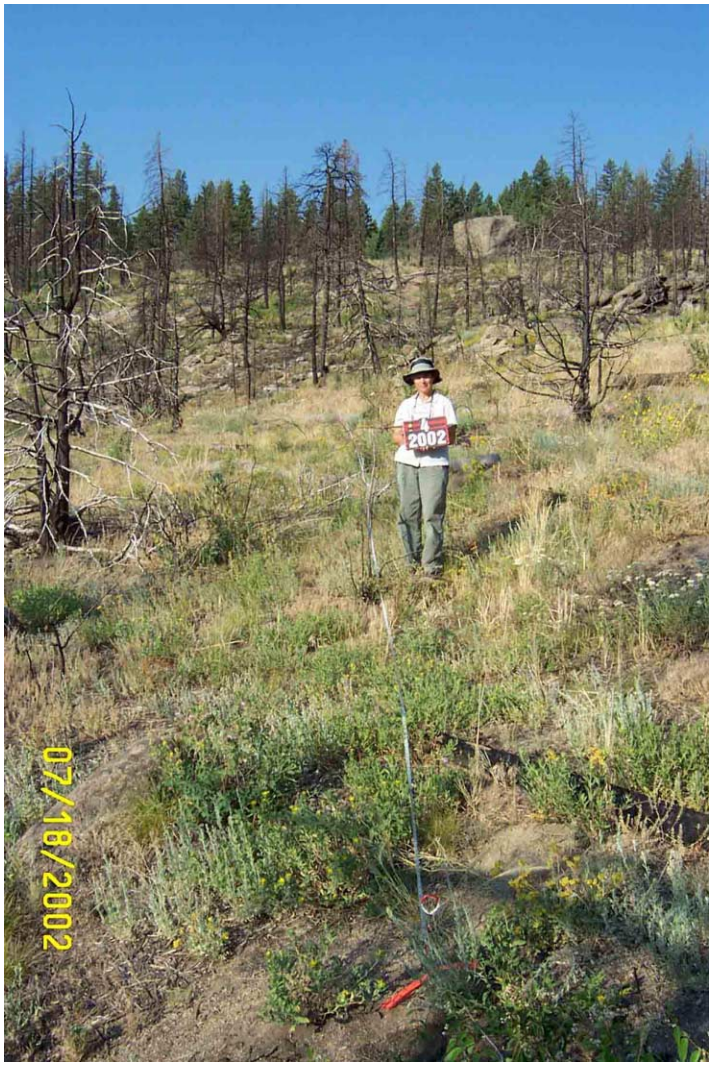
Photographs
Walker Ranch
Boulder County
July, 2002

Sample Site 1. Southwest facing view.

Sample Site 2. Northeast facing view.



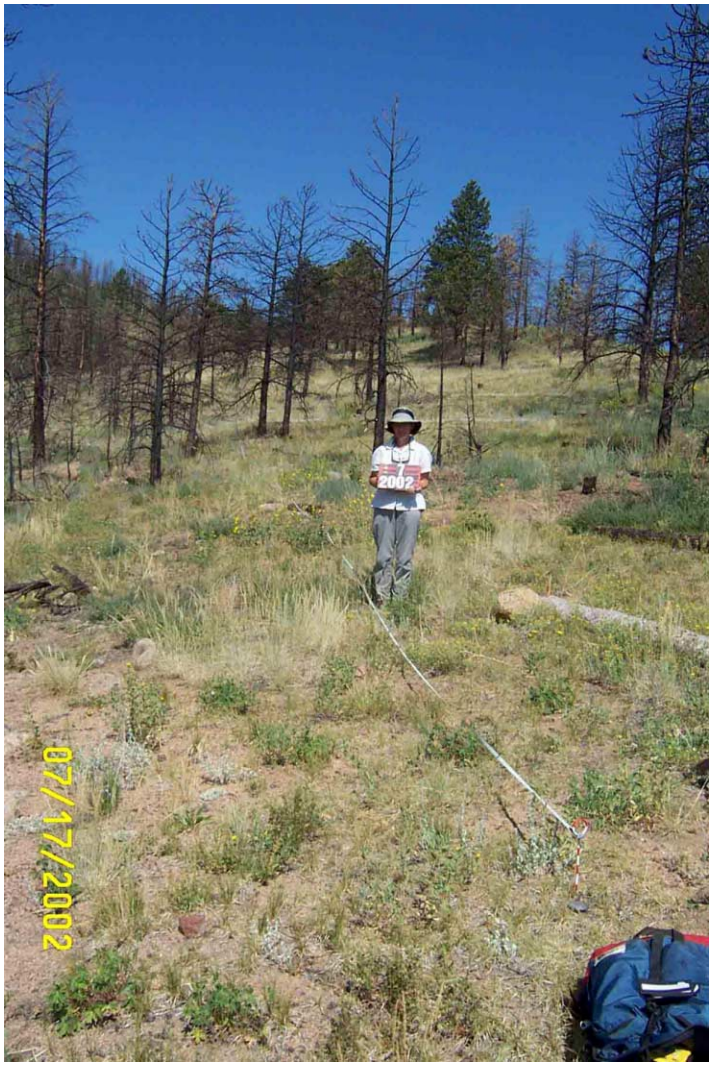
Sample Site 3. Southwest facing view.



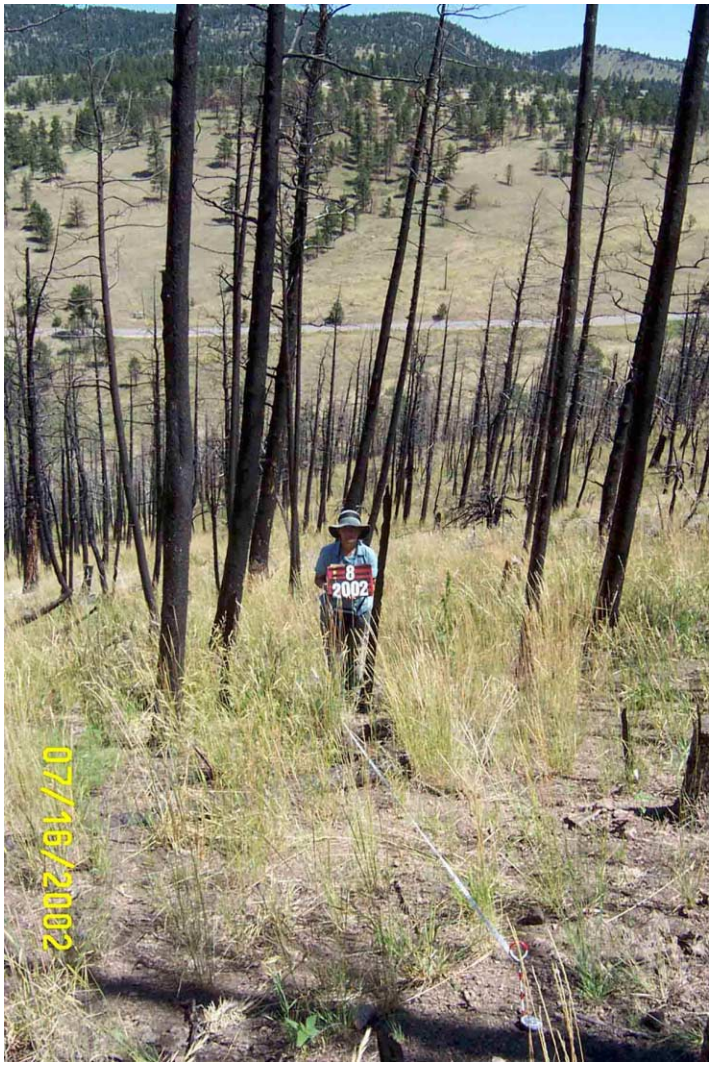
Sample Site 4. Southwest facing view.

Sample Site 5. Southwest facing view.

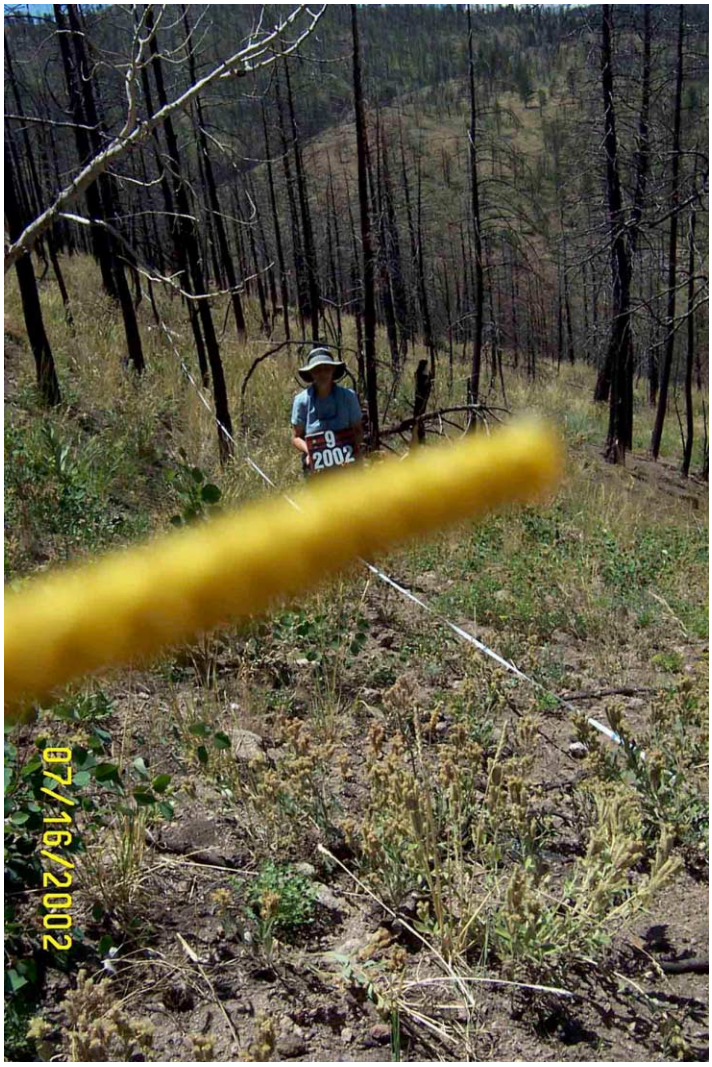
Sample Site 6. North facing view.



Sample Site 7. West facing view.



Sample Site 8. North facing view.



Sample Site 9. West facing view.

Sample Site 10. Northeast facing view.

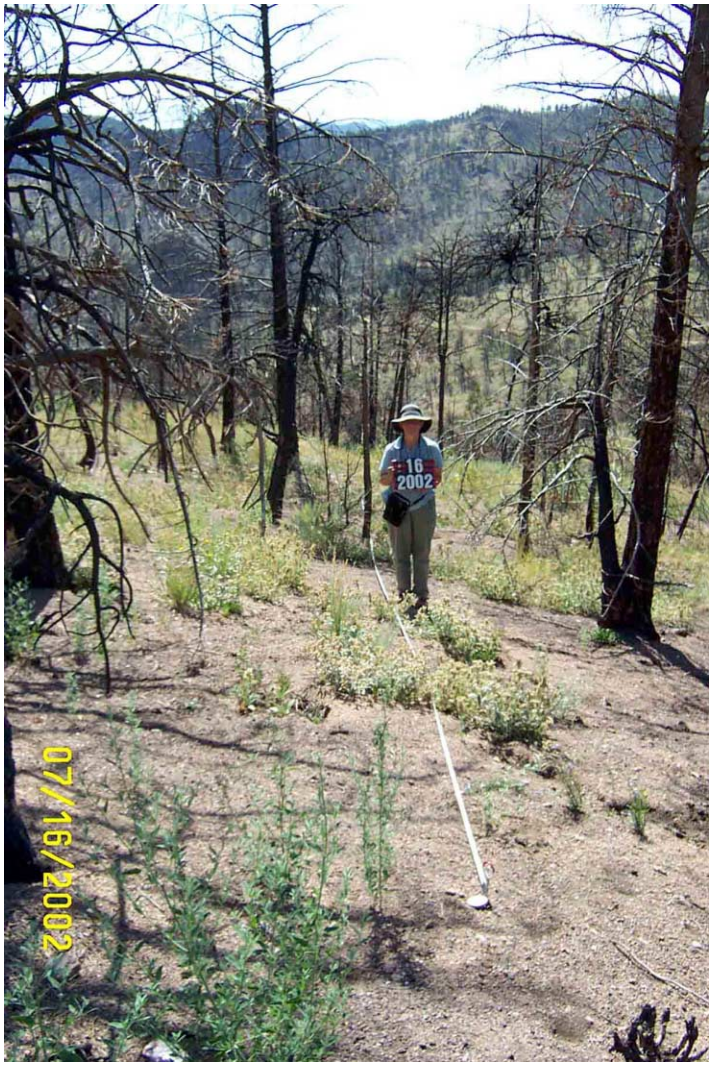
Sample Site 11. Northeast facing view.

Sample Site 12. South facing view.

Sample Site 13. South facing view.

Sample Site 14. West facing view.

Sample Site 15. Southeast facing view.



Sample Site 16. West facing view.

Sample Site 17. Southwest facing view.

Sample Site 18. Northwest facing view.

Appendix 4. Eldorado Fire, Walker Ranch TWINSPAN 2-Way Table with Sample and Species Classification.

Vertical lines define Sample groups and horizontal lines define species groups.

Sample Classification Groups

☛ This symbol identifies the indicator species defined by TWINSPAN

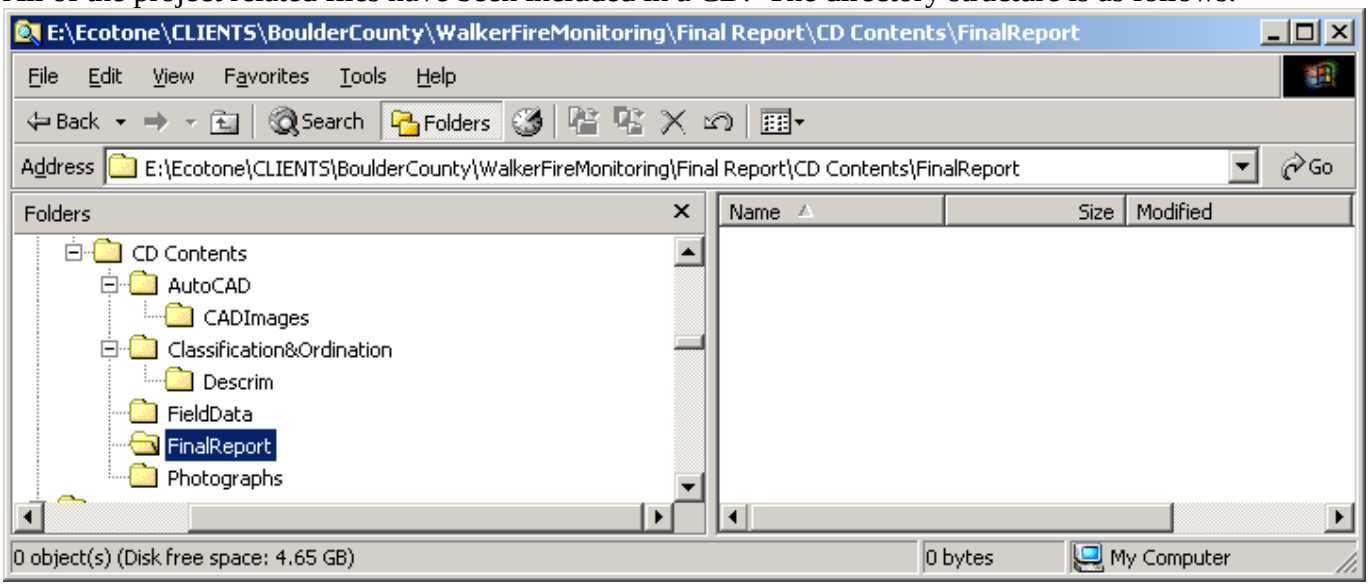
```
                    111  1      11111
                    875371245968106423
                    E D C  B  A
143 Sisy alti  ---1-2249-1-31-421  00000
 74 Gail aris  --1111211----1-3--  000010
102 Nico atte  -------11--------1  000010
 78 Grin squa  -2-2452--------211-  000011
 83 Hete foli  -1--1--5-1--------1  000011
104 Oeno caes  ---11121----1--2--  000011
159 Verb thap  -2771311112131131  0001
 10 Amer lanc  11-----------------  001000
 27 Astr shor  -1-11----------  001000
 33 Brom lana  -1-1-----------  001000
 34 Brom japo  --1--1----------  001000
 44 Cerc mont  -5---2-11---------  001000
 82 Hesp coma  --21-1-1---------  001000
 90 Lesq mont  -111-----------  001000
101 Muhl mont  -4-----1---------  001000
  9 Alys minu  ---1-316---1-------  001001
 35 Came micr  -----11----------  001001
 38 Care pens  539566682122--11--  001001
 50 Cirs ochr  ---2-21----------  001001
 63 Elym lanc  -2124-1-2--1-------  001001
 84 Hete vill  1-112242----11----  001001
 88 Lapp redo  ----1-12---------  001001
100 Moss       3---------------  001001
109 Oxyt lamb  -----12----------  001001
128 Pseu menz  9---------------  001001
  8 Alli cern  -1-1----------1---  001010
 22 Aste port  -1112-121-1-111---  001010
 23 Astr agre  -----2----------1---  001010
 30 Bass siev  ---2--111-1--------  001010
 62 Elym elym  --122111----3-1---  001010
 69 Erio umbe  -1--1111---1--1---  001010
 79 Harb trac  ---111--2--1-1----  001010
 91 Leuc king  2421121-11-111-1---  001010
 92 Liat punc  -1----2----------1---  001010
106 Oreo deli  -11-----1-1--------  001010
110 Pack fend  -1--1----------1---  001010
153 Trag dubi  --11----------1-----  001010
160 Verb brac  -----2---------1-----  001010
 18 Arte frig  1-115-61----1-1-1-  001011
140 Scut brit  -11-21111-----1-1--  001011
 70 Erys capi  -2112111-111-12---  001100
 86 Koel macr  ---11--1--1-1-1---  001100
 98 Mert lanc  --111-1-1--1111---  001100
119 Pinu ponD  4-65699-67782-4---  001100
131 Puls ludo  --21----1111-111---  001100
  4 Acos diff  -----1----1---------  001101
121 Poa  comp  -----2----------2-----  001101
127 Pote hipp  --1-------11---------  001101
155 Trit xely  ---1111114133-----  001101
  2 Achi lanu  1-111--21--1111-1-  001110
132 Ribe cere  1211-11--1-21111--  001110
147 Soli simp  1-2-----241111--1--  001110
 19 Arte ludo  -41121213112--51--  001111
 28 Astr spp   ----------1-----1---  010000
 43 Cera cari  -----3----61877-----  010010
 65 Elym trac  -----4----46795-----  010010
 48 Chon grac  --2--2-1-11442-----  010011
115 Pens vire  141112-113231231 1-  01010
 37 Card nuta  --2--1----1-11-21--  010110
120 Poa  agas  ---1-------211-1-  010111
116 Phac hete  -16331112663--95-4  011000
 25 Astr laxm  -1--2-----112--1-1  011001
 26 Astr mise  1-11112--1-1122-13  011001
 61 Drym fiss  1-1-1111-11-121--2  011001
  7 Alet acau  11-------12-1--2--1  011010
 67 Epil brac  --1---121111-15111  011011
124 Poly doug  --1-----11----1--1--  01110
 12 Anis tect  -11111266-212-16--  011110
 77 Gera caes  -11141511 1-1115--  011111
 81 Heli pumi  -151211--111---221  100000
  1 Acer glab  --1-----------------1  100001
 41 Cean fend  -4553322111113 1268  100001
133 Rosa arka  --1--11-12-------3  100001
118 Phys mono  -2111--1-11-----5-  100010
137 Sabi scop  --5----21------5--  100010
 32 Bree arve  ---6-1----21-1-15-  100011
142 Sile anti  1-21--1-1--111-31-  10010
 46 Chen lept  --11112211-1-21421  10011
 17 Arni fulg  ----------------11  101001
 60 Drac parv  ---------1------51  101001
 99 Mona fist  ----1----------2--  101001
125 Popu trem  ---------2-----645  101001
149 Symp rotu  1----------------21-  101001
 14 Apoc andr  --------1-1-----78  101010
 75 Gali sept  ----------1--1-1-1  101011
113 Pens glab  ----------1--11  101011
  5 Acro disp  -11--1-----113--  101100
 40 Care spp   6-1--21-----31-324  101101
 47 Chen simp  -111-2-1121113-865  10111
135 Rubu idae  ---1--11-111--1141  110000
 87 Lact serr  --11---111111-1241  110001
150 Tara offi  --11-------12--111  110010
129 Pseu menD  325------3-756677  110011
 36 Camp rotu  1-212-1-11-1123221  1101
 54 Cony cana  ----------11----1-  111000
 80 Heli annu  ----------1-21--2--  111001
126 Popu treD  ----------2------2-  111001
 55 Cory aure  --1----2-43112-125  11101
 11 Andr sept  ---------1211-1-11  11110
 16 Arct ouva  ----------21-1--  11111

                    00000000000000111
                    00000000011111001
                    01111111100000101
                     000111110011
                     001000110110
                     01 0010
                    E D C  B  A
```

Sample Classification Groups

Appendix 5. Computer files and GPS Sample Coordinates

File inventory:

All of the project related files have been included in a CD. The directory structure is as follows:



The following is an explanation of the contents of the subdirectories:

AutoCAD – Contains files that were used to construct the report graphics that included sample locations and treatment and burn areas. The CADimages subdirectory includes the aerial photography and USGS images that were used in the AutoCAD files.

Classification&Ordination – Contains input and output files from TWINSPAN and CANOCO. The subdirectory Descrim contains the input and output files from DESCRIM.

FieldData – Contains the original vegetation and site data and summary information in EXCEL tables.

FinalReport - The Final report is included as both a Microsoft Word 97 document (WalkerRept2002.doc) and as an Adobe .pdf file (WalkerRept2002.pdf).

Photographs – Contains all of the photographs for the sample sites.

BCOS Walker Ranch Sample Coordinates in NAD 27 meters.				
b = endpoint location				
Sample	Easting	Northing	Elevation meters	Elevation feet
01W	469880.8437	4422661.001	2,291.7	7,516.9
01Wb	469841.8349	4422693.786	2,284.0	7,491.6
02W	470317.4706	4422385.029	2,221.0	7,284.8
02Wb	470354.3336	4422416.798	2,223.6	7,293.4
03W	470581.0993	4422307.06	2,191.1	7,186.8
03Wb	470575.4982	4422259.169	2,181.3	7,154.7
04W	470487.8308	4421647.758	2,187.5	7,175.2
04Wb	470456.6417	4421609.965	2,189.9	7,183.0
05W	470584.955	4421466.509	2,192.2	7,190.3
05Wb	470545.0933	4421439.673	2,208.8	7,244.8
06W	470616.5988	4422709.626	2,193.8	7,195.8
06Wb	470627.8345	4422758.683	2,198.8	7,212.1
07W	470416.5734	4422424.966	2,222.4	7,289.6
07Wb	470368.4336	4422440.474	2,221.6	7,286.8
08W	470983.607	4422261.868	2,254.5	7,394.7
08Wb	470982.5333	4422307.953	2,234.3	7,328.4
09W	470986.5468	4422350.805	2,219.6	7,280.3
09Wb	470935.3977	4422334.677	2,214.2	7,262.5
10W	470376.6053	4422757.102	2,227.1	7,304.7
10Wb	470408.969	4422792.934	2,222.5	7,289.7
11W	471153.6737	4422071.149	2,204.4	7,230.3
11Wb	471177.9175	4422113.921	2,210.8	7,251.3
12W	470050.6251	4422210.839	2,306.2	7,564.3
12Wb	470067.7753	4422165.655	2,320.7	7,611.8
13W	470266.3481	4422257.252	2,234.0	7,327.6
13Wb	470274.092	4422214.133	2,241.5	7,352.1
14W	470293.3149	4422682.776	2,227.9	7,307.4
14Wb	470242.6538	4422681.216	2,236.1	7,334.5
15W	472036.5941	4421527.002	2,125.0	6,969.8
15Wb	472071.8191	4421492.047	2,118.6	6,949.1
16W	471447.0587	4421997.785	2,256.4	7,400.8
16Wb	471400.6597	4421996.488	2,257.0	7,402.9
17W	471402.2156	4421877.771	2,250.8	7,382.5
17Wb	471375.284	4421833.911	2,242.9	7,356.8
18W	471595.568	4422000.41	2,258.5	7,408.0
18Wb	471578.2815	4422047.327	2,258.5	7,408.0