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Classification & Ordination of 1997 Forest U
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OSMP Studies

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Classification and Ordination of 1997 Forest Understory Data

**Boulder City Open Space
Forest Ecosystem Study
May 1998**



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TABLE OF CONTENTS

Summary	1
Introduction	2
Methods	3
Data collection	3
Overstory data:	3
Cover	3
Slope	3
Aspect	3
Duff/Litter Depth	3
Major Disturbances	3
Understory data	5
Nonvegetation ground cover types	5
Vegetation cover types	6
Vegetation and Ground Cover Sampling	6
Classification	7
Cover classes and pseudospecies	7
Numerical Analysis Iterations	7
Ordination	8
Results & Discussion:	9
Classification	9
Ordination	15
Environmental vectors, sample sites, and species figures.	18
Climatic Factor	44
Sampling methodology in steep areas	44
References	45
Appendices	46
Appendix 1. Samples with group affiliation, sorted by sample ID.	47
Appendix 2. Samples with group affiliation, sorted by group ID	48
Appendix 3. Group A Species Importance	49
Appendix 4. Group B Species Importance	52
Appendix 5. Group C Species Importance	53
Appendix 6. Group D Species Importance	56
Appendix 7. Group E Species Importance	58
Appendix 8. All Samples Importance	61
Appendix 9. Acronyms for environmental vectors, sites, and species.	65
Appendix 10. Climate Diagrams	71
Appendix 11. Computer files	91
Appendix 12. Environmental data	92
Appendix 13. Group summary data with sample data	95

LIST OF FIGURES

Figure 1. Plot Layout	5
Figure 2. Cover-Point optical point projection device.....	6
Figure 3. TWINSpan classification of understory data.	12
Figure 4. Dominant species of the five groups.	14
Figure 5. Axes 1-2 Environmental Vectors.	18
Figure 6. Axes 1-2 Sites.....	19
Figure 7. Axes 1-2 Selected Species.....	20
Figure 8. Axes 1-2 Species.	21
Figure 9. Axes 1-3 Environmental Vectors.	22
Figure 10. Axes 1-3 Sites.....	23
Figure 11. Axes 1-3 Selected Species.....	24
Figure 12. Axes 1-3 Species.	25
Figure 13. Axes 2-3 Environmental Vectors.	26
Figure 14. Axes 2-3 Sites.....	27
Figure 15. Axes 2-3 Selected Species.....	28
Figure 16. Axes 2-3 Species.	29
Figure 17. Axes 1-2-3 Sites.	30
Figure 18. <u>Arnica fulgens</u> Cover Distribution.	31
Figure 19. <u>Poa compressa</u> Cover Distribution.	32
Figure 20. <u>Hypericum perforatum</u> Cover Distribution.	33
Figure 21. <u>Oxytropis sericea</u> Cover Distribution.....	34
Figure 22. <u>Elymus lanceolatus</u> Cover Distribution.....	35
Figure 23. <u>Leymus ambiguus</u> Cover Distribution.....	36
Figure 24. <u>Hesperostipa comata</u> Cover Distribution.....	37
Figure 25. <u>Danthonia spicata</u> var. <u>pintorum</u> Cover Distribution.	38
Figure 26. <u>Andropogon gerardii</u> Cover Distribution.	39
Figure 27. <u>Psoralea tenuiflorum</u> Cover Distribution.....	40
Figure 28. <u>Ceanothus fendleri</u> Cover Distribution.....	41
Figure 29. <u>Harbouria trachyleura</u> Cover Distribution.....	42
Figure 30. <u>Pseudotsuga menziesii</u> Cover Distribution.....	43

LIST OF TABLES

Table 1. Key to the Classification Groups.....	13
Table 2. CANOCO Correlation Matrix.	17

TABLE PACKET

Table packet. TWINSpan 2-Way Classification Table.

Classification and Ordination of 1997 Forest Understory Data

Summary

Boulder City Open Space Department collected 123 vegetation cover samples in the understory of the Ponderosa pine (Pinus ponderosa) foothill forests. Numerical analysis routines were used to classify the samples and construct a graphic ordination based on floristic similarity and environmental correlation.

Four subassociations of the Pinus ponderosa/Carex sp. association were defined. Pinus ponderosa, Carex sp. and a suite of about nine additional species were found to be widely distributed, and typify the association as a whole. Four subassociations (Groups A, B, D, E) appear to represent a complex gradient of grazing impacts superimposed on the well known ecotonal gradient from prairie grasslands to lower montane forests. A fifth group (Group C) appears to be composed of stands that are successional to three (Groups A, D, E) of the four primary groups.

The areas of more significant grazing impacts (Groups A, C, and D) typically have a significant cover of Poa compressa. The samples with the highest cover of Arnica fulgens (Group A) also had high cover of Poa compressa and lower cover of the tall and mid-grass prairie species. Group D had the higher cover of Andropogon gerardii, Hesperostipa comata, and Psoraleidum tenuifolium and is probably representative of areas that have had longer to recover from grazing impacts. Grazing impacts include those that resulted from the last 150 years of European immigration, but may also include the less certain grazing impacts of Native American horses and Bison. Groups A, C, and D are part of the grassland/lower montane ecotone and represent a range of successional stages. The largest number of samples (63) were assigned to Group E and typically had higher cover of Danthonia spicata associated with some combination of Harbouria trachypleura, Ceanothus fendleri, Pseudotsuga menziesii and Mahonia repens. This group typifies the lower montane forest community of the study area.

Group B was composed of only three samples that occurred on a northwest exposure with high cover of Elymus lanceolatus and Leymus ambiguus, with an indicator of Oxytropis sericea. This could be an area that is both more mesic than the other samples from the lower montane forest subassociation (Group D), and has a history of more limited grazing. Alternatively, the uncertain identification of Elymus lanceolatus (possibly Pseudoroegneria spicata) may be a remnant of a relatively recent introduction that has propagated successfully at this mesic site. The wide distribution of Poa compressa is an example of how introduced species may naturalize and appear to be native. Poa agassizensis/Poa pratensis is an even better example of species with uncertain morphological distinctions that may confuse the native/introduced nature of some stands. Some efforts to investigate the true character of this subassociation should be made prior to management decisions.

Because virtually all of the sampled areas have received relatively recent (<150 years) disturbances, successional change is anticipated in all sampled stands. Areas that are more stable typically have a greater proportion of native perennial species, and are sometimes less "diverse" than successional stands. Management of some areas to achieve successional stability may result in a reduction of understory diversity. The diversity inherent in this ecotonal zone of the grassland and forest is expressed between and among plant associations rather than within plant associations.

Observations of site conditions during field review of the results of this study indicate that forestry management practices of the recent past (i.e. Project Greenslope) have introduced non-native species that may be difficult to remove. Management that seeks to modify forest overstory conditions should consider the negative impacts to the forest understory and adjacent grassland communities.

Introduction

The City of Boulder Open Space Department collected forest canopy and forest understory data from the Open Space Foothills in 1997. The purpose of the forest understory study was defined as follows; "The main goals of the Understory Inventory are (1) to describe the composition and structure of the forest vegetation, (2) to form a picture of the current condition of forested open space lands, and (3) to provide baseline data for future management and monitoring projects. "

The forest stands studied in this project form the lower treeline transition zone between mountain forests and prairie grassland vegetation communities. This transition zone includes the Grassland-Lower Montane Ecotone, and the Lower Montane Forest Climax regions described by Marr (1961). This component of the forest ecosystem study examines the associations of species that tend to occur together in the understory of these foothill forests, as well as the relationships that these associations have with selected environmental and disturbance characteristics associated with the sample sites. Once these plant associations are defined, the samples can be grouped (i.e. classified) based on their species composition and their resulting affiliation with the plant associations. The relationships of species, sample sites, environmental, and disturbance factors are presented in a single graphic or series of overlays. This is accomplished using a numerical analysis routine that takes into account the characteristic of species to be normally distributed in response to limiting or excessive environmental factors. This approach allows the large amount of data to be reduced to a more comprehensible level, without oversimplifying the complexity of the ecosystem. This information can be used to summarize the composition of the sampled stands, to understand the environmental position of the understory associations, and to evaluate the environmental, financial, and social costs and benefits of management options.

Methods

Data collection

Overstory data:

The overstory canopy cover data were not analyzed in this report, but some of the environmental data that were used for analysis of the understory data were collected by the overstory data collection team. This methodology is partially described here. The overstory method of canopy collection is also briefly described to allow an understanding of the incompatibility of the overstory data and the understory data. For a complete description of overstory and understory methods, refer to the BCOS Forest Inventory Handbook.

Cover

The forest overstory data were collected using a hand held densitometer. This optical device allows a sample point to be projected into the forest canopy, in approximately the same manner as the Cover-Point optical device. Four to ten sample points were collected at each 1/10th acre plot. The overstory sample points were collected at the perimeter of the plot, but the 200 understory sample points were collected within the plot. The two sampling zones could easily be very different vegetation cover types. For example, if a clump of trees occur in the center of a plot surrounded by grassland, the understory will be associated with high overstory cover, but the overstory sample would indicate low overstory cover.

Slope

A clinometer is used to measure the plot slope. Greater detail on the use of a clinometer for slope measurements can be found in Appendix E of the Forest Inventory Handbook. Record percent slope.

Aspect

Direction which slope faces at plot center. (Example: N, NE, E, SE, S, SW, W, or NW). Enter 0 for plots with 0 slope.

Duff/Litter Depth

Enter the average depth of humus and fresh organic debris from four readings. Using a stiff ruler, push the end into the duff gently until it stops, and then observe depth. One measurement is typically taken at plot center and three more at the 1/100th acre boundary in even thirds around the circle. Record depth to the nearest 0.1 inch.

Major Disturbances

The following disturbance categories were available only as a binary (True-False) data type for this study. Future studies may be able to use the subdivisions within each disturbance type when they become available. The underlined acronym is the acronym used in the ordination graphs.

BURN burn scenarios (fire)
 BB broadcast slash burn - planned ignition
 WS wildfire in slash
 DP dozer pile and burn
 UB understory burn
 WN wildfire - natural fuels
 PI prescribed burn - planned ignition
 UI prescribed burn - unplanned ignition natural fuels
 OB other burning

GRAZ grazing systems
 SL season long grazing system
 DR deferred rotation grazing system
 RR rest rotation grazing system
 DG deferred grazing system
 HN holistic management grazing system
 OC other cattle grazing system
 OS other domestic sheep grazing system

HARV harvest methods
 CC clearcut
 FW firewood harvest
 GS group selection cut
 HE heavy equipment disturbance not associated with one of the coded activities
 IS individual selection cut
 OR overstory removal
 PP post and pole harvest
 SK skid trail
 SN sanitation cut
 ST seed tree
 SV salvage cut
 SW shelterwood
 OH other timber harvest

INSECT insect infestations
 AP aphids
 MP mountain pine beetle (bark beetles)
 SP spruce budworm (defoliators)
 WE weevil
 OI other insect infestation

RECR recreation activities
 FI fishing
 HI hiking trails
 CA camping
 PI picnicking
 OR other recreation activity

REGE regeneration activities
 BR bareroot planting
 CS containerized stock planting
 FA fertilizer application
 FE fencing

GS grass seeding
 HA herbicide application
 PA pesticide application
 PB poison baiting
 SC scarification
 SH shade cards
 SP scalping
 OG other regeneration activity

TIMB timber stand improvements
 CT commercial thinning
 PC precommercial thinning
 PR pruning
 WS weed species removal

WEAT weather conditions
 BD blow down
 DR drought damage
 FD frost damage
 FL flood damage
 IC ice
 SC soil creep
 SN snow
 SS sun scald
 WD winter desiccation

WILD wildlife activities
 AR antler rubs
 BR browsing
 BU burrows
 DN denning
 NE nesting
 RO rodents
 BB black bear
 BV beaver
 CA cattle
 CO coyote
 DE deer
 DO dog
 EL elk
 GS ground squirrel
 HO horse
 MG mountain goat
 NM mountain lion
 PD prairie dog
 PG pocket gopher
 PM pine marten
 PQ porcupine
 RA rabbit
 RT raptor
 TS tree squirrel
 UB upland birds

NA not applicable
 OT other event type

As detailed in the Overstory Methods, within each forest stand every first and fifth plot, and each multiple of five thereafter, was permanently monumented. The understory vegetation was sampled on all permanently monumented plots, with the exception of plots in areas, which were either too steep or too densely forested, where alternative methods were used, as discussed below.

Plot Layout: Measure 10 meters at a 90 degree angle from the plot orientation on each side of the center point and then flag these points, establishing the central transect. From each end of the central transect, measure 10 meters upslope and 10 meters downslope to mark the 20-meter boundary lines. Flag each 20-meter line at 4.5, and 9.0, and 10 meters from the central transect for a total of five 20-meter transects and two boundary lines (Figure 1). The plot area was 20 meters by 20 meters (400 square meters) or approximately one-tenth of an acre. This plot corresponded almost exactly to the area of the Overstory plot except that it was square instead of round.



Gravel: Rock fragments less than one inch in diameter that form a ground cover.

Rock: Individual rocks (over one inch in diameter) or boulders.

Trail: Entered when plot includes a segment of trail (including designated trails, undesignated trails, wildlife trails, etc.)

Vegetation cover types

Plant species name (genus and species): Record when known.

Plant genus name: Record when genus is known but species is unknown (e.g., Carex sp.).

Unknown species: Record when species cannot be identified in the field. These species are collected and described during the vegetation inventory of the plot, as noted above.

Vegetation and Ground Cover Sampling

A Cover-point Optical Point Projection Device mounted on a sturdy tripod was used to project a point using cross hairs in an eyepiece. (See diagram of the optical device below and instructions for use in Field Inventory Manual) This vertical point was projected down on to the vegetation or ground cover on both sides of the transect line, at a distance of 0.5 m from the line. The points were taken on the sides of the transect line to avoid the vegetation that was lightly trampled during the transect installation. One sample point was taken on each side of the transect line at each meter, for a total of two points at each meter, and a total of 200 points for the five 20-meter transect lines. Percent cover for each species or ground cover component was calculated as number of hits divided by 2. Although the point-intercept method is an efficient way to collect accurate and precise data for the dominant species, the rarer species are likely to be missed by the method. This is compensated by listing all of the species present in the 20m X 20m plot. This allows the biodiversity qualities of species density / diversity / evenness to be evaluated on the basis of number of species per 400 sq.m. with abundance values for the dominant species.

The adjustable mirror on the cover-point device can be used alternately in upward and downward positions in order to sample both the canopy cover of overstory plants and the cover of the understory. When canopy cover data is collected with the cover-point device, the Plot Data form should include a column for collecting canopy cover data. Canopy cover was not measured by this method during the 1997 baseline inventory, since the overstory inventory methods include a measurement for canopy cover. A recommendation to include the simultaneous collection of canopy cover with understory cover is found in the discussion.

Figure 2. Cover-Point optical point projection device.

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.

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, 0.02, 1.0, 5.0, 10.0, 20.0, 30.0, 40.0, 60.0. The first cut level included all species cover values that were greater than zero, cut level two included all values that were greater than 0.02%, cut level three included all values greater than 1.0%, etc. The 0.02 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 0.01. Most species had cover values less than 30%. A species that was present (SPEX) in the plot but not "hit" would be assigned one pseudospecies (i.e. SPEX1). A species with a cover value of 12% would be assigned five pseudospecies (i.e. SPEX1, SPEX2, SPEX3, SPEX4, SPEX5) because it could be found to occur within five 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 12% cover would occur in five out of nine possible classes, so its weighted cover would be 56% (i.e. 5/9). 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; 1, 10, 40, 50, 100, 100, 100, 200, 400. For example, the species with 12% cover would be given a weight of 100 that would be multiplied by 56 = 5,600. The maximum weighted value for a species with 100% cover would be 40,000. The net weighting for the 12% species is $5,600/40,000 = 14\%$. The final result is that the cover classes are "unweighted", and more representative of the true cover values.

Numerical Analysis Iterations

Numerous iterations of the understory classification were performed before a satisfactory grouping of the samples and species was achieved. The three main iterations were:

1. Understory with ground cover (i.e. litter bare soil, ...) and overstory :

The overstory species were combined with the understory data as separate species. For example, Pinus ponderosa in the overstory, and P. ponderosa in the understory were given separate codes. The ground cover categories were also included as species. This was found to be unsatisfactory because the overstory data tended to dominate the classification because of their higher cover values, and they were not always correlated with the understory. The fact that the overstory data were collected on the perimeter of the plot rather than internally could have influenced this discrepancy.

2. Understory with ground cover but without overstory:

The overstory species were excluded from the data. This classification was superior to the first classification with overstory, but was also found to be unsatisfactory. This was due to the fact that ground cover values were dominating the groupings due to the relatively low understory vegetation cover.

3. Understory without ground cover and without overstory:

The understory data were treated separately. As a further refinement of the classification, the data were "weighted/unweighted". The previous two classifications were conducted with the lower cover values "weighted" by the cut levels. Once the overwhelming influences of the canopy and ground cover were removed, the groupings of the understory vegetation were found to be satisfactory.

The TWINSpan results were used to define the plant associations and the affiliation of the samples to the associations. This was presented in a dendrogram that includes those selected environmental factors that were most closely associated with each division. The determination of these environmental factors was accomplished using DISCRIM (ter Braak 1982).

Ordination

Since the understory data by itself provided the only satisfactory classification, the ordination was run using only the understory data. The samples were ordinated using CANOCO Version 3.15 (ter Braak 1997) 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 associations as defined by the TWINSpan classification were also represented with distinct symbols, to show the distribution of the groups in 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 symbols with a diameter that is proportional to the cover value. The symbols have shapes that are associated with classification groups, and 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.

Results & Discussion:

Data Tables

The understory data are presented in Appendix 1³ 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 number of species for each sample. The site data are presented in Appendix 12

Classification

The TWINSpan classification is presented in Figure 3 and defined five groups based on species composition. These five groups can be reduced to four associations that are relatively easy to distinguish in the field. The species listed at the top of Figure 3 commonly occurred in all groups, and were non-discriminatory. If the plant "association" were to be defined by the dominants or codominants, 87 percent (107/123) of the samples could be included in the Pinus ponderosa / Carex sp. Association. The term "association" in this study is used to describe the understory groupings. There has been considerable complexity and confusion regarding definition of the terms "community", "association", and divisions above and below the level of association (Shimwell 1972). Although the term association is used for the understory groups, it is understood that all of the defined groups, including samples that are successional, are plant subassociations of the Pinus ponderosa/Carex sp. Association. Alternative vegetation-community taxonomic nomenclature is acknowledged, but no effort is made to select or create a definitive nomenclature. The 16 samples (13 percent of the 123 samples) that did not have Carex sp. present were also evenly distributed among the different groups, and no pattern was observed. The following list shows the percentage importance value, constancy, and average cover values for the top 21 species based on 123 samples. The importance value for P. ponderosa does not include the overstory.

	Percentage Importance	Constancy	Average Cover %
☛ Carex spp.	100.00	86.99	2.85
Danthonia spicata pinetorum	84.53	52.03	3.07
☛ Pinus ponderosa scopulorum	79.98	99.19	1.37
Poa compressa	75.95	70.73	2.02
Andropogon gerardii	68.53	60.98	1.91
Poa agassizensis	66.34	73.17	1.42
☛ Artemisia ludoviciana	62.51	88.62	0.73
☛ Penstemon virens	55.65	80.49	0.60
☛ Achillea lanulosa	53.03	82.11	0.41
Rhus aromatica trilobata	50.06	54.47	1.09
☛ Ribes cereum	45.58	74.80	0.22
Grindelia squarrosa/G. subalpina	45.47	73.98	0.24
☛ Opuntia macrorhiza	44.56	74.80	0.16
Mahonia repens	44.54	48.78	0.96
Ambrosia psilostachya coronopifolia	41.42	57.72	0.52
☛ Drymocallis fissa	41.28	67.48	0.21

<i>Padus virginiana melanocarpa</i>	39.90	47.15	0.76
<i>Campanula rotundifolia</i>	39.19	65.04	0.17
<i>Tragopogon dubius major</i>	38.58	67.48	0.06
☛ <i>Achnatherum nelsonii</i>	37.88	52.03	0.49
☛ <i>Cerastium strictum</i>	36.01	59.35	0.17

☛ 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.

Although *Danthonia spicata* ranks second in importance, it was found to be one of the species that was associated primarily with Group E, and so was not an appropriate species to be used for the highest classification level.

Although five groups were defined by the classification, only four are relatively distinct in the field.

1. Group A was defined by the presence of relatively higher cover of *Arnica fulgens* (>3%) and *Poa compressa* (>5%), and the low cover of most of the tall and mid-grass prairie species such as *Andropogon gerardii*, *Schizachyrium scoparium*, and *Hesperostipa comata*. Note: sample ELDE01 was moved from Group E to Group A because the 3% cover of Unknown Forb was probably *Arnica fulgens*.

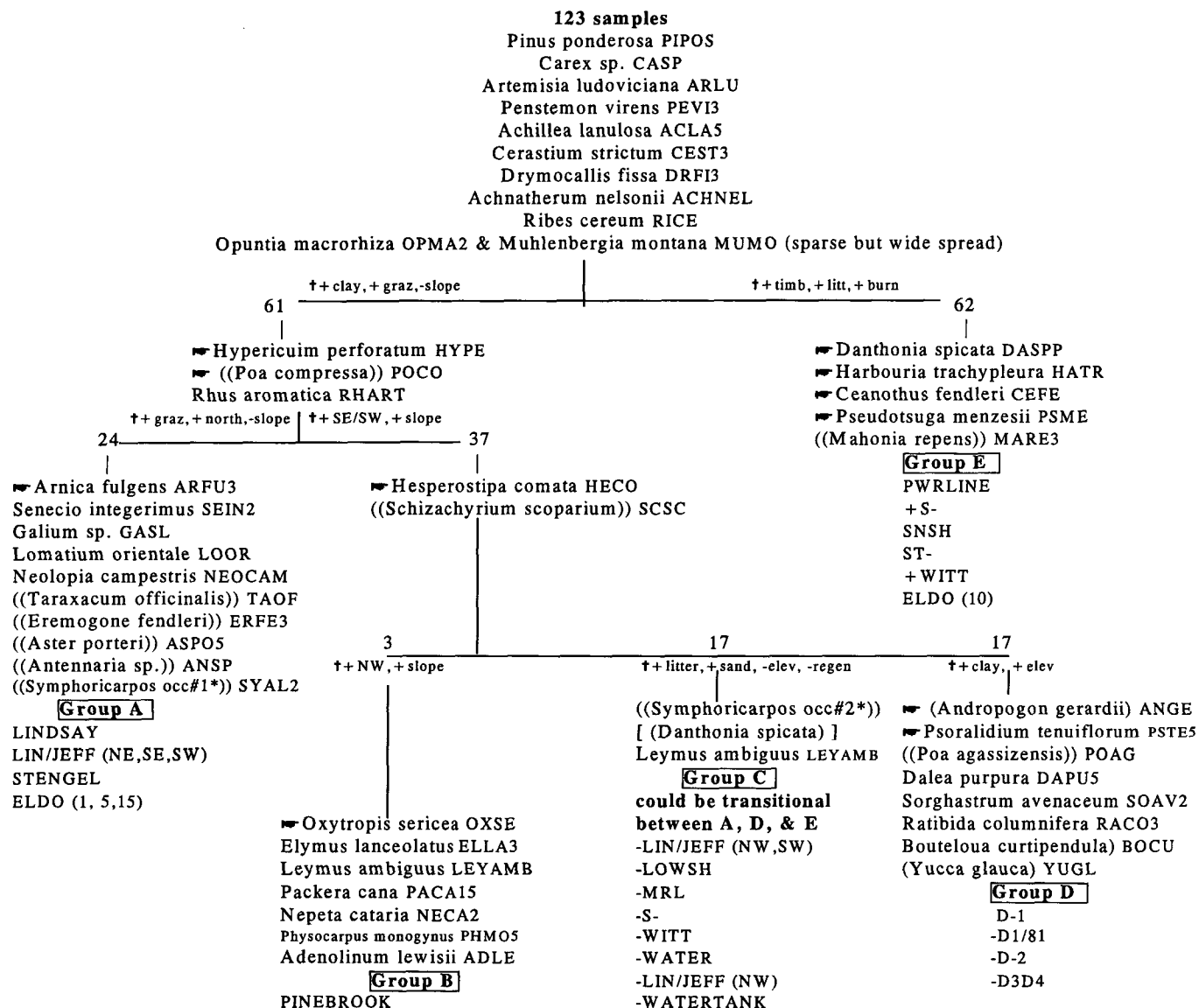
The combination of groups B-C-D from the TWINSpan classification were centered on Group D. Group C was not easily defined, and was composed of samples that are possibly transitional to groups A, D, or E.

2. Group B was represented by only three samples on a stony, northwest-facing slope in Pinebrook Hills. This association was distinguished by the presence of *Oxytropis sericea*, and the relatively high cover of *Elymus lanceolatus* (formerly *Agropyron albicans*) and *Elymus ambiguus*. The *E. lanceolatus* was observed to be only occasionally rhizomatous, which makes it similar to *Pseudoroegneria spicata*. This taxonomic uncertainty merits resolution in the future.
3. Group D was defined by the presence of the tall and mid-grass prairie species such as *Andropogon gerardii* and *Hesperostipa comata*, the low cover or absence of *A. fulgens*, and the low cover or absence of the indicator species defining Group E.
4. Group E was defined by the low cover of *A. fulgens* (<1%), the lower cover (<1%) of the tall and mid-grass prairie species, and the presence or relatively higher cover of montane species such as the conifer *Pseudotsuga menziesii*, the shrub *Ceanothus fendleri*, the endemic forb *Harbouria trachypleura*, and especially the grass *Danthonia spicata* (5% average cover).

These four groups (i.e. A, B, D, E) partially describe the ecotonal transition from foothills grassland to foothill/montane forested communities in Boulder. Group C was possibly representative of successional locations. The distinction of successional and ecotonal associations is defined in this report as a function of stability over time. Successional sites are assumed to be changing from one association to another, ecotonal sites are assumed to be static in the sense of species composition, however, the term "dynamic equilibrium" best describes the processes that occur in an ecotone. The universally disturbed state of most, if not all, sites in the Boulder area is acknowledged, so these terms are made in reference to an arbitrary time scale that is relatively short.

Appendix 1 presents group affiliation of samples sorted by sample ID, and Appendix 2 presents group affiliation of samples sorted by group ID. Appendices 3 through 7 present the species and ground cover categories associated with Groups A, B, C, D, and E, respectively. These species lists are ranked by percentage importance and include the frequency and cover value associated with each species. Appendix 9 presents all of the acronyms used for environmental vectors, sites, or species in the tables and figures of this report.

BCOS TWINSpan RESULTS



➤ This symbol is used to mark the indicator species identified by TWINSpan
 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

**Symphoricarpos occidentalis* and *Danthonia spicata* in Group C seem to have two nodes of distribution in different groups, this might be an artifact of divisive classification. However Group C may be an ecotone or successional transitional to A, D, or E based on the following characteristics; *Danthonia spicata* in group C vs. E is an isolated node of higher cover, and *S. occidentalis* is found in high frequency in groups A & C, and *Andropogon gerardii* cover is relatively high in groups D & E.

† This symbol identifies the environmental factors that the DISCRIM program identified as correlated with the TWINSpan division.

Figure 3. TWINSpan classification of understory data.

The following table presents the average cover of the indicator species identified by TWINSpan and includes a matrix that can be used as a key to identify the grouping of a specific site in the field.

Table 1. Key to the Classification Groups

			Percent Average Cover of TWINSpan Indicator Species.				
			Group ID				
			A	B	C	D	E
<i>Arnica fulgens</i>	>3%	A	5.22		P		0.02
<i>Poa compressa</i>	>5%	ACD	7.35	0.5	1.53	1.38	0.32
<i>Hypericum perforatum</i>	>0.5%	AD	0.59		P	0.26	P
<i>Oxytropis sericea</i>	P	B		P			
<i>Elymus lanceolatus</i>	>5%	B		18.17	P	0.09	0.03
<i>Leymus ambiguus</i>	>5%	B		8.17	0.53		0.13
<i>Hesperostipa comata</i>	>1%	CD	P	P	0.82	1.47	0.16
<i>Andropogon gerardii</i>	>5%	D	0.61		1.41	9.29	0.52
<i>Psoralidium tenuiflorum</i>	>1%	D	0.04		P	1.26	0.18
<i>Danthonia spicata</i>	>3%	EC	0.11		2.56	0.53	5.07
<i>Ceanothus fendleri</i>	>1%	E	0.04		P	P	0.58
<i>Harbouria trachypleura</i>	>0.5%	E	P	P	P	P	0.06
<i>Pseudotsuga menzesii</i>	>1%	E	0.11		P	P	0.93
			Group ID				
			A	B	C	D	E
<i>Arnica fulgens</i>	>=3%	A					
<i>Poa compressa</i>	>=3%	A					
<i>Poa compressa</i>	P	ACD					
<i>Hypericum perforatum</i>	P	AD					
<i>Oxytropis sericea</i>	P	B					
<i>Elymus lanceolatus</i>	>=3%	B					
<i>Leymus ambiguus</i>	>=3%	B					
<i>Hesperostipa comata</i>	P	CD					
<i>Danthonia spicata</i>	P	CE					
<i>Danthonia spicata</i>	>=2%	E					
<i>Andropogon gerardii</i>	>=5%	D					
<i>Psoralidium tenuiflorum</i>	P	DE					
<i>Ceanothus fendleri</i>	P	E					
<i>Harbouria trachypleura</i>	P	E					
<i>Pseudotsuga menzesii</i>	P	E					
	TOTAL						

To use the key, mark a one in each of the open cells for each species cover category that is present. Tally the totals at the bottom of each column. The classification goes to the group with the highest score. Ties are possibly successional or ecotonal samples that should be subjectively assigned based on observable trends of the indicator species. This simple key was tested against the TWINSpan classification and 83/123 (67%) of the samples were correctly assigned, 24/123 (20%) were in a tie that included the classification group assigned by TWINSpan, and 16/123 (13%) were assigned to a different group. This key is a coarse first-approximation guide, but should be useful for initial vegetation mapping efforts. Figure 4 shows the ten most important species or ground cover (not including litter) for each of the five groups.

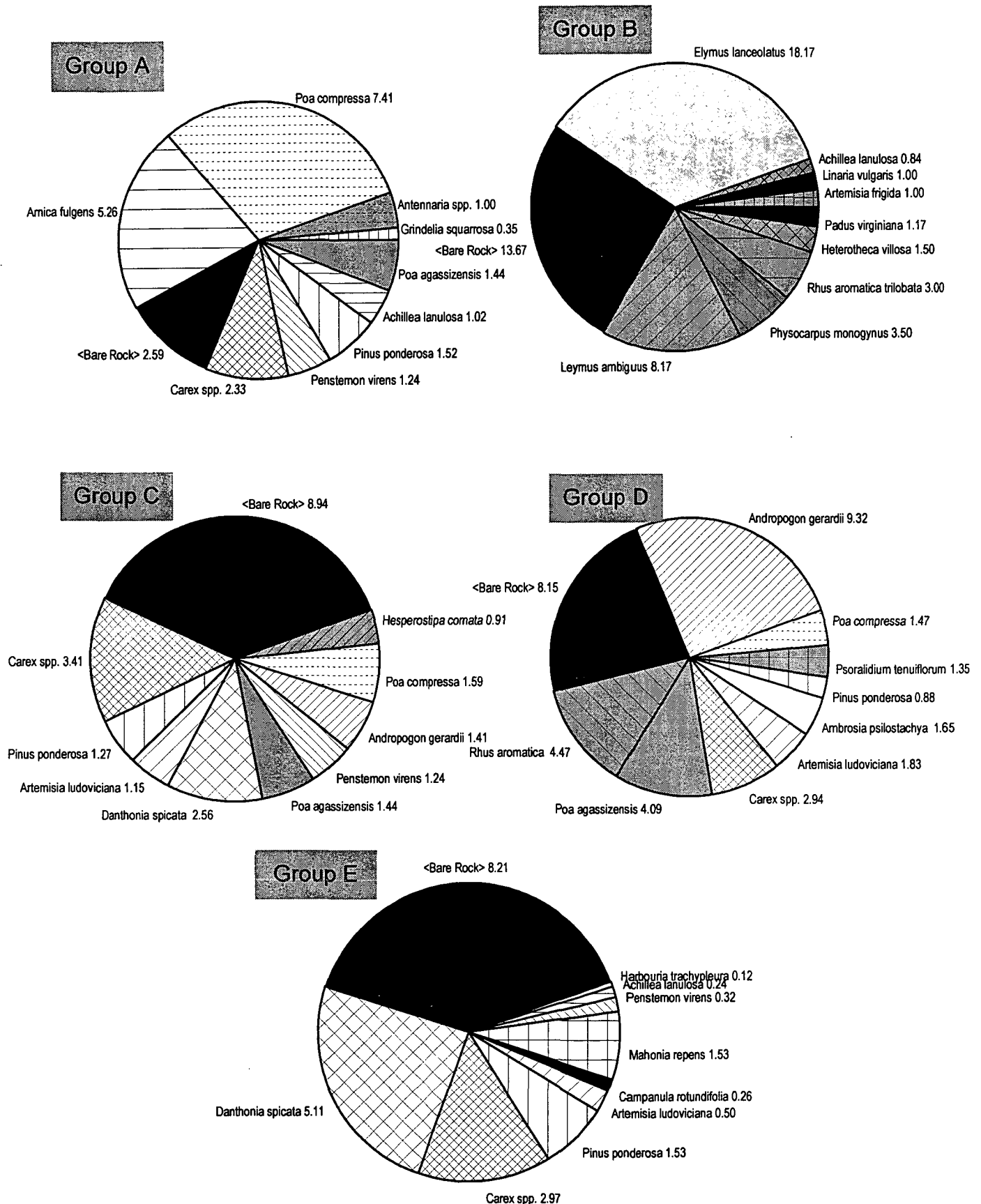


Figure 4. Dominant species of the five groups.

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 2

These graphics are presented in three sets of four figures. Each set of four figures consists of ordinations of the; environmental vectors, the sample sites, indicator species, and many species. The four figures can be superimposed on each other to evaluate how the measured environmental factors were associated with certain sites, or with the centers of distribution for certain species. The position of a sample site in the ordination is determined both by its species composition, and its environmental site factors. The position of a species is determined by its cover distribution among the sites. 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. CANOCO provides ordinations with four axes that are typically represented two axes at a time. The three sets of ordinations represent axes 1&2, 1&3, and 2&3, respectively. The fourth axis was found to be redundant and is not presented here.

Each sample site has been assigned a group symbol, that was assigned based on the TWINSpan classification results, and the perimeter of the group has been defined in the sample site ordinations. The overlap of some of the groups was heavily influenced by the "Grazing" environmental factor. As can be seen from the ordinations, "Grazing" is the most influential factor correlated with species and sample distributions. However, since the "Grazing" factor was measured with a logical (binary) unit (i.e. true/false), some sites that may have had some grazing may have receive an incorrect "False" value. These samples would be grouped with the grazed sites because of species composition (via TWINSpan), but would be "pushed" away (in the ordination) from the other samples in the group by the strong influence of the assigned "False" value. Although these outliers slightly complicate the interpretation of the ordination, the central areas of the groups are still distinctive.

Two species ordinations are presented with each set to facilitate the interpretation. The first species ordination includes only the thirteen species used in the association key. Eleven of these species were the indicator species defined by TWINSpan. All of the acronyms used in these figures are defined in Appendix 9..

Table 2. CANOCO Correlation Matrix.

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

SPEC AX1	1.0000													
SPEC AX2	.0433	1.0000												
SPEC AX3	.0531	-.0026	1.0000											
SPEC AX4	-.0012	.0263	-.0039	1.0000										
ENVI AX1	.9097	.0000	.0000	.0000	1.0000									
ENVI AX2	.0000	.8529	.0000	.0000	.0000	1.0000								
ENVI AX3	.0000	.0000	.8756	.0000	.0000	.0000	1.0000							
ENVI AX4	.0000	.0000	.0000	.8090	.0000	.0000	.0000	1.0000						
ELEV	.0899	-.1701	.3691	.2321	.0989	-.1995	.4215	.2868	1.0000					
ASP	-.0818	.2883	.4779	.0218	-.0899	.3380	.5458	.0270	-.0644	1.0000				
SLOPE	.6289	.2483	.0713	.2229	.6913	.2912	.0815	.2755	.2564	.1132	1.0000			
NORTH	-.1870	.2717	.4701	.0039	-.2055	.3186	.5369	.0048	-.0707	.9660	-.0031	1.0000		
EAST	-.3665	-.1870	-.1587	-.0537	-.4029	-.2192	-.1813	-.0663	-.0719	-.2122	-.4688	.0244	1.0000	
ROCK	.0241	-.0525	.0035	-.0989	.0265	-.0615	.0040	-.1222	-.1664	.0315	-.1228	.0306	.0677	
GRAVEL	.0070	-.0200	-.1750	.0296	.0077	-.0234	-.1998	.0366	-.2014	-.1585	-.0172	-.1642	-.0277	
LITTER	.2209	.0854	.3055	-.2639	.2429	.1002	.3489	-.3262	-.0696	.1579	-.0287	.1705	.0772	
SOIL	.0164	-.2380	.2542	.0637	.0180	-.2790	.2903	.0787	.1856	-.0525	.0085	-.0635	-.0291	
LITDEP	.5336	.0436	.2307	.0116	.5866	.0511	.2635	.0143	.1461	.0388	.3480	-.0334	-.2703	
CLAY	-.3316	.1863	-.1131	-.2486	-.3645	.2185	-.1291	-.3073	-.0783	.1755	-.0548	.2297	.1666	
SAND	-.1532	-.2344	-.0965	.1635	-.1684	-.2748	-.1102	.2020	-.1490	-.0998	-.1305	-.1374	-.1010	
REG	.0391	.0378	-.0269	-.0579	.0430	.0443	-.0308	-.0716	.0075	-.0720	.0232	-.0619	.0148	
TIMB	.1862	-.5150	.2762	-.1632	.2047	-.6038	.3155	-.2018	-.1566	-.0080	-.1366	-.0118	.0303	
WILD	.0879	.0178	-.2325	.5614	.0966	.0208	-.2655	.6939	.1524	-.1163	.2284	-.1107	.0916	
INSEC	-.0243	-.0037	.1697	.1009	-.0267	-.0044	.1938	.1247	.0997	.1074	.0515	.0655	-.2193	
REC	.0495	-.1148	.0076	.0130	.0544	-.1346	.0087	.0161	-.1581	-.0452	-.0143	-.0469	-.0150	
BURN	.1213	-.3340	.1375	.3405	.1333	-.3916	.1571	.4209	.2722	-.1800	.0298	-.2106	-.1058	
HARV	.3048	.4430	-.1395	.2069	.3350	.5194	-.1593	.2557	.0249	.0533	.2690	.0149	-.1991	
GRAZ	-.7267	.3617	.3105	.0637	-.7988	.4241	.3547	.0788	.0634	.3092	-.3913	.3872	.1968	
	SPEC AX1	SPEC AX2	SPEC AX3	SPEC AX4	ENVI AX1	ENVI AX2	ENVI AX3	ENVI AX4	ELEV	ASP	SLOPE	NORTH	EAST	
ROCK	1.0000													
GRAVEL	.1356	1.0000												
LITTER	.1191	.1347	1.0000											
SOIL	-.0231	-.0593	-.0620	1.0000										
LITDEP	.0065	-.0511	.1715	.1340	1.0000									
CLAY	-.1111	-.0015	-.0517	-.0007	-.1568	1.0000								
SAND	.0945	.1183	-.0052	.0294	.0057	-.3155	1.0000							
REG	.0770	-.0028	.0588	-.0101	.0499	-.0022	.0041	1.0000						
TIMB	.1883	.0191	.2087	.2814	.1292	-.1952	.1195	-.0015	1.0000					
WILD	-.1716	-.0225	-.0764	-.1572	.0413	-.0943	-.0279	-.0066	-.2639	1.0000				
INSEC	-.0209	-.0386	-.1679	.2715	-.0637	.0241	.0163	.1060	-.0315	-.1252	1.0000			
REC	.2106	-.0181	.0367	.0563	.0072	-.0807	.0913	-.0704	.1800	-.0391	-.0535			
BURN	.0398	.0488	-.0292	.0447	.0779	-.2158	.0448	-.0305	.2381	.0579	-.0508			
HARV	.1146	-.0141	.1316	-.1205	.1224	-.1489	.1056	.1528	-.2662	.0547	.0627			
GRAZ	-.0134	-.1108	-.0155	-.0565	-.3083	.2486	.0061	-.0730	-.3533	-.0806	.0693			
	ROCK	GRAVEL	LITTER	SOIL	LITDEP	CLAY	SAND	REG	TIMB	WILD	INSEC			
REC	1.0000													
BURN	.0129	1.0000												
HARV	.0105	.0331	1.0000											
GRAZ	-.1041	-.1932	-.0982	1.0000										
	REC	BURN	HARV	GRAZ										

Degrees of freedom = 123-2 = 121

p .05 = .177

p .01 = .232

Environmental vectors, sample sites, and species figures.

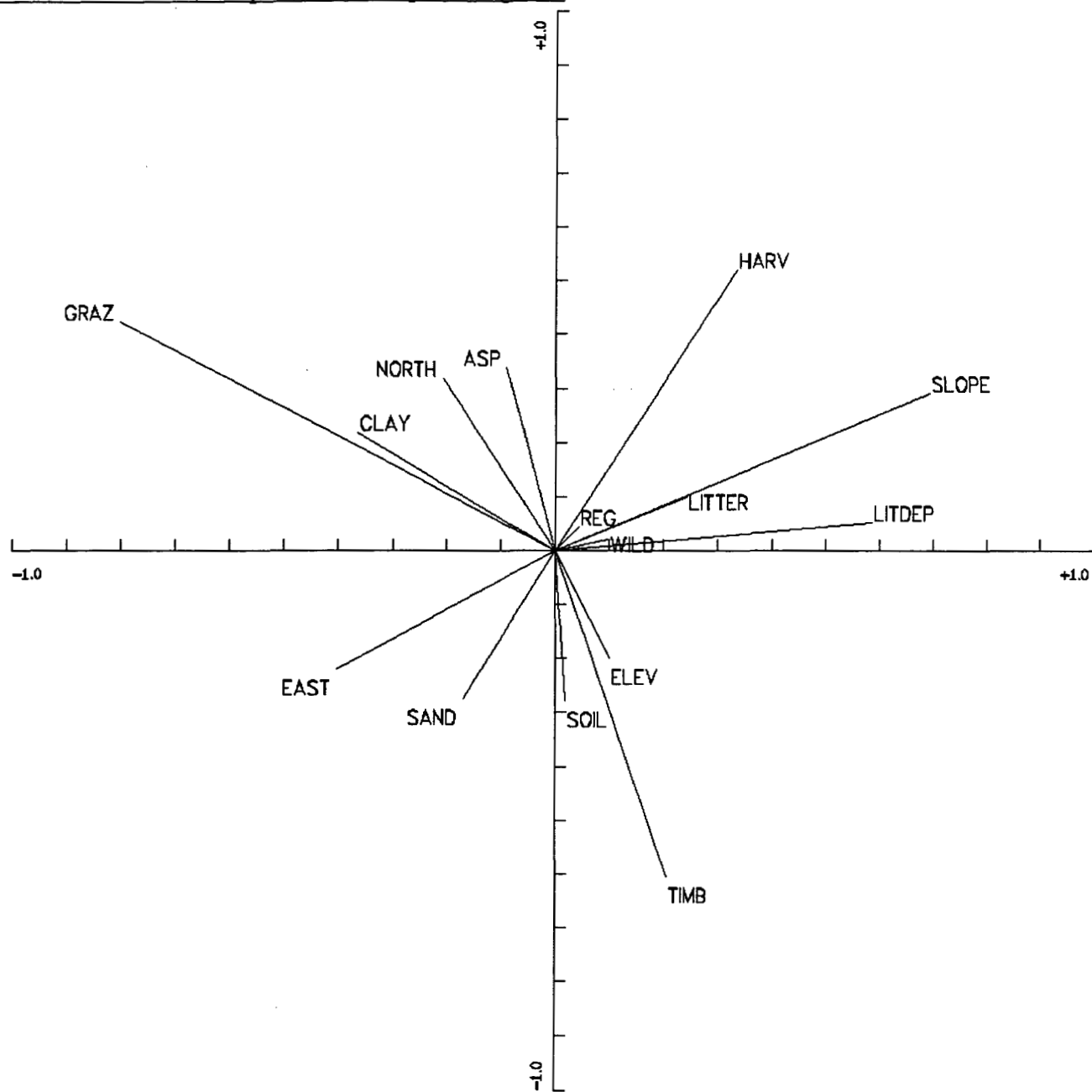


Figure 5. Axes 1-2 Environmental Vectors.



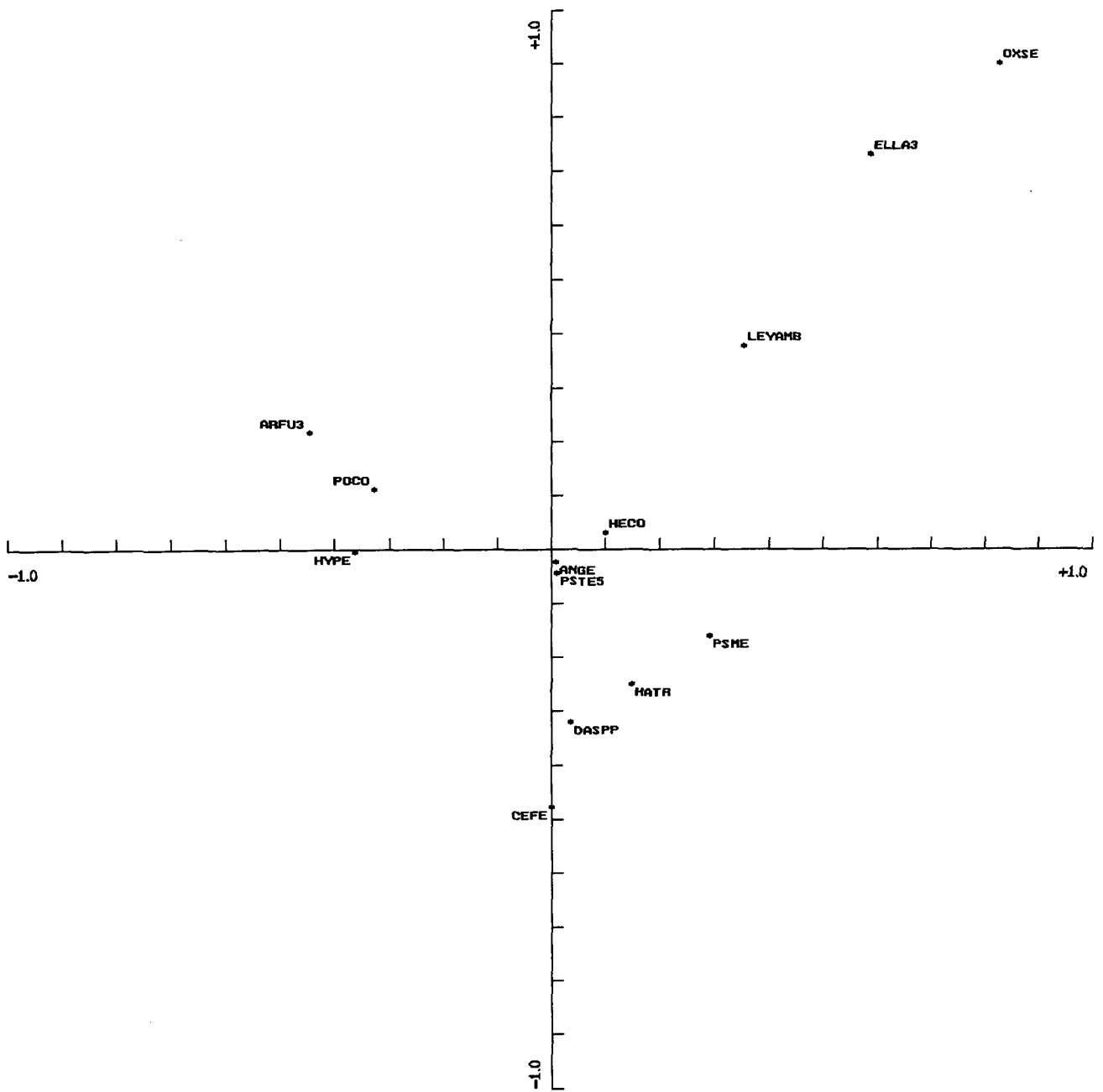


Figure 7. Axes 1-2 Selected Species.

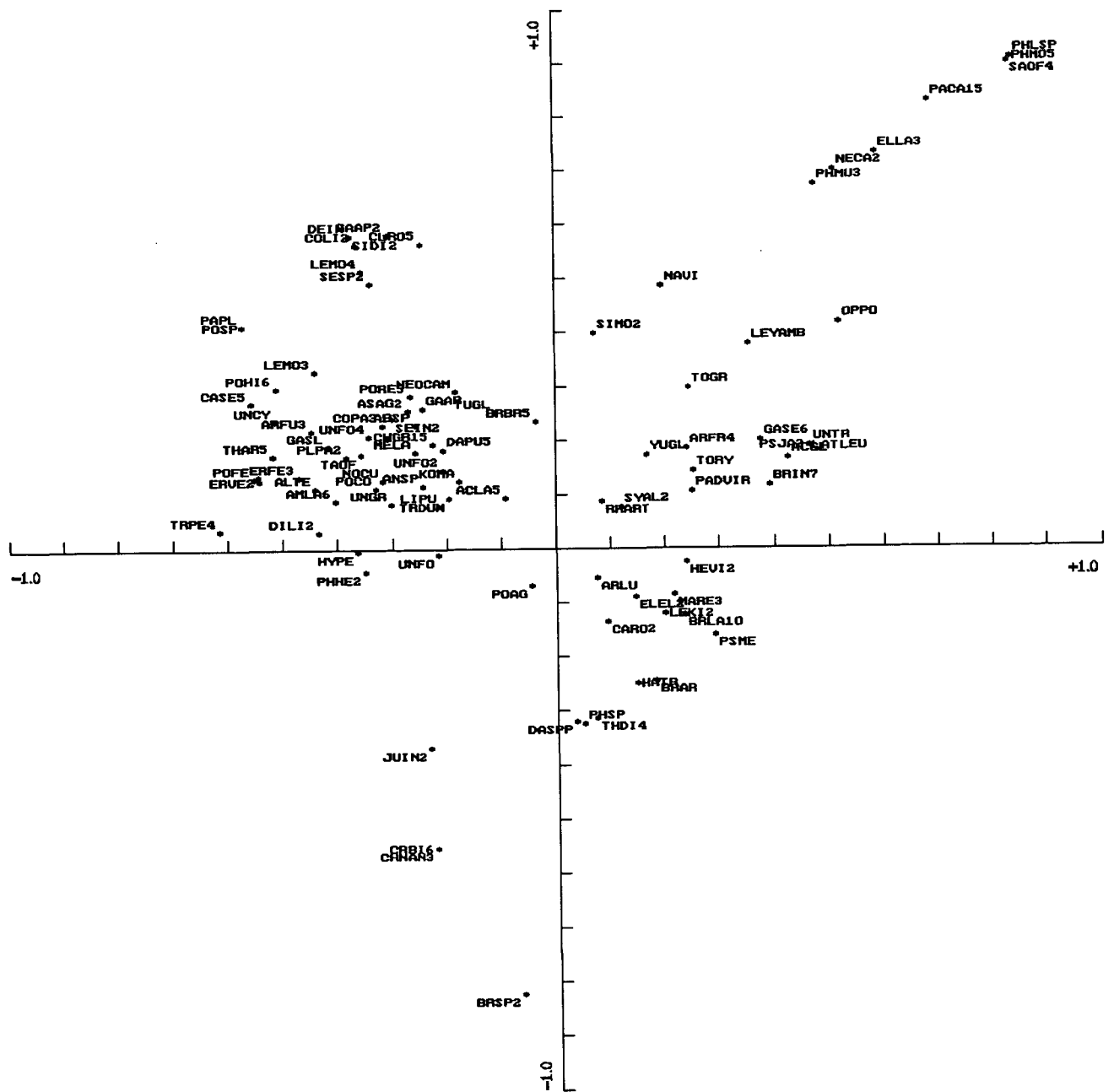


Figure 8. Axes 1-2 Species.

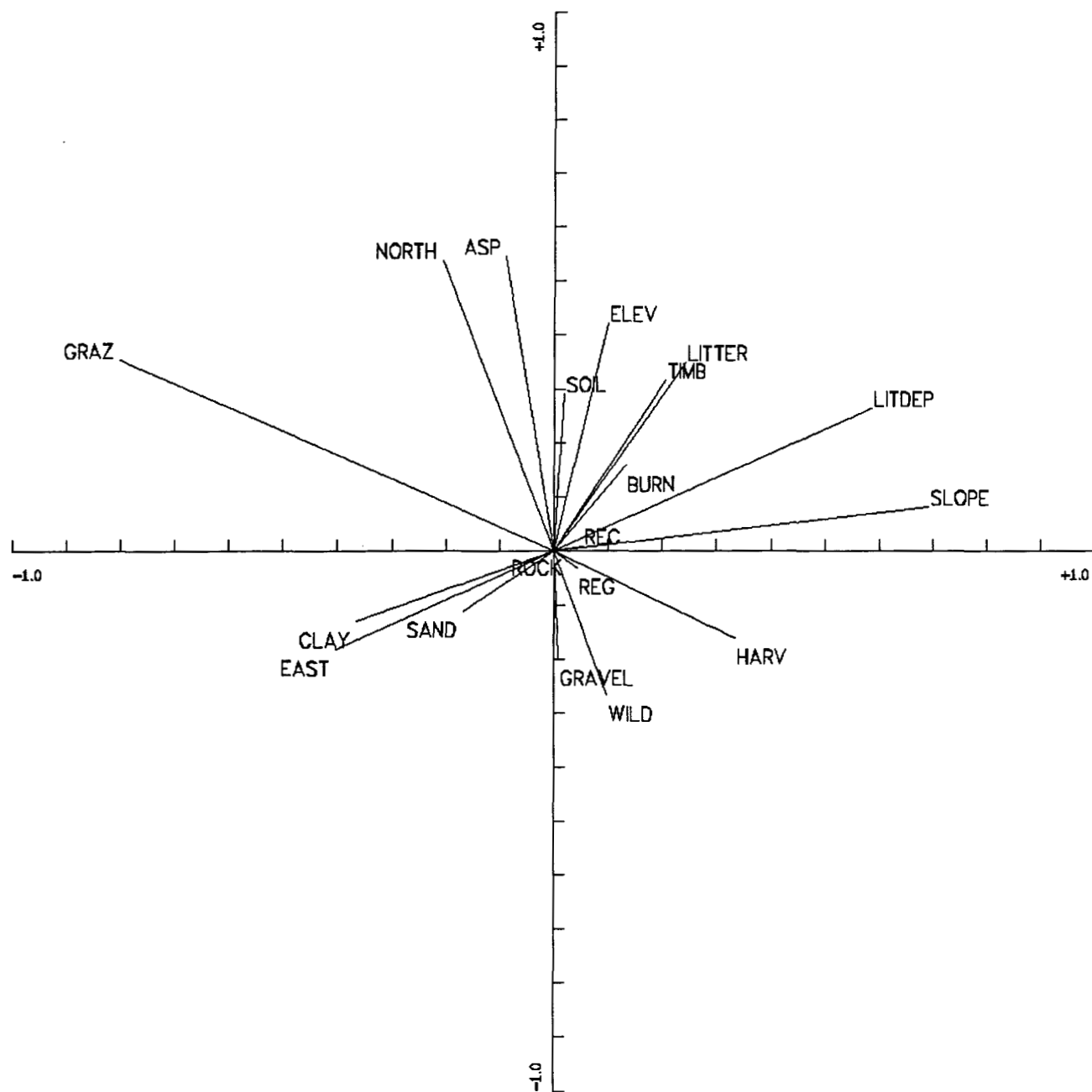


Figure 9. Axes 1-3 Environmental Vectors.

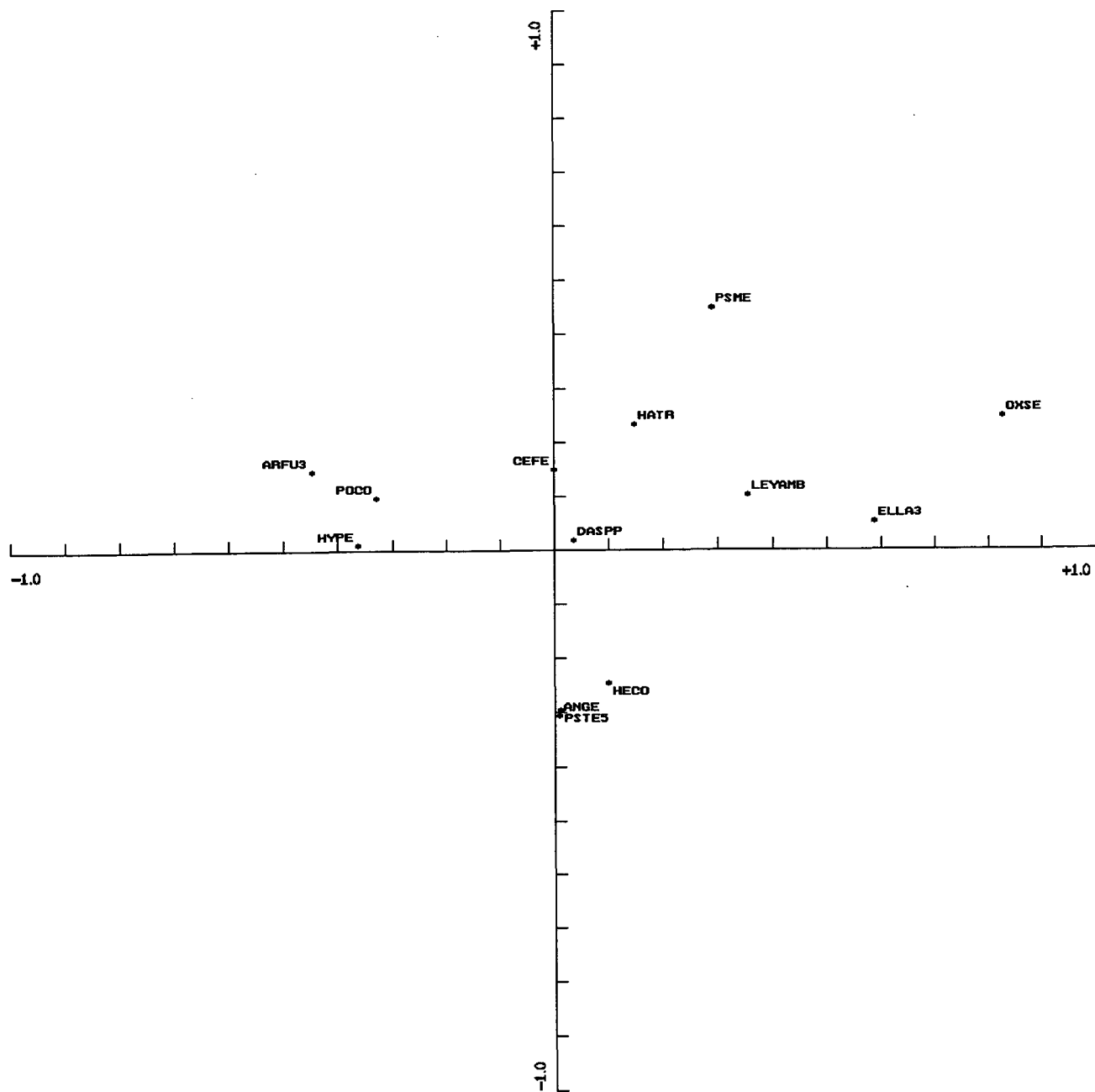


Figure 11. Axes 1-3 Selected Species.

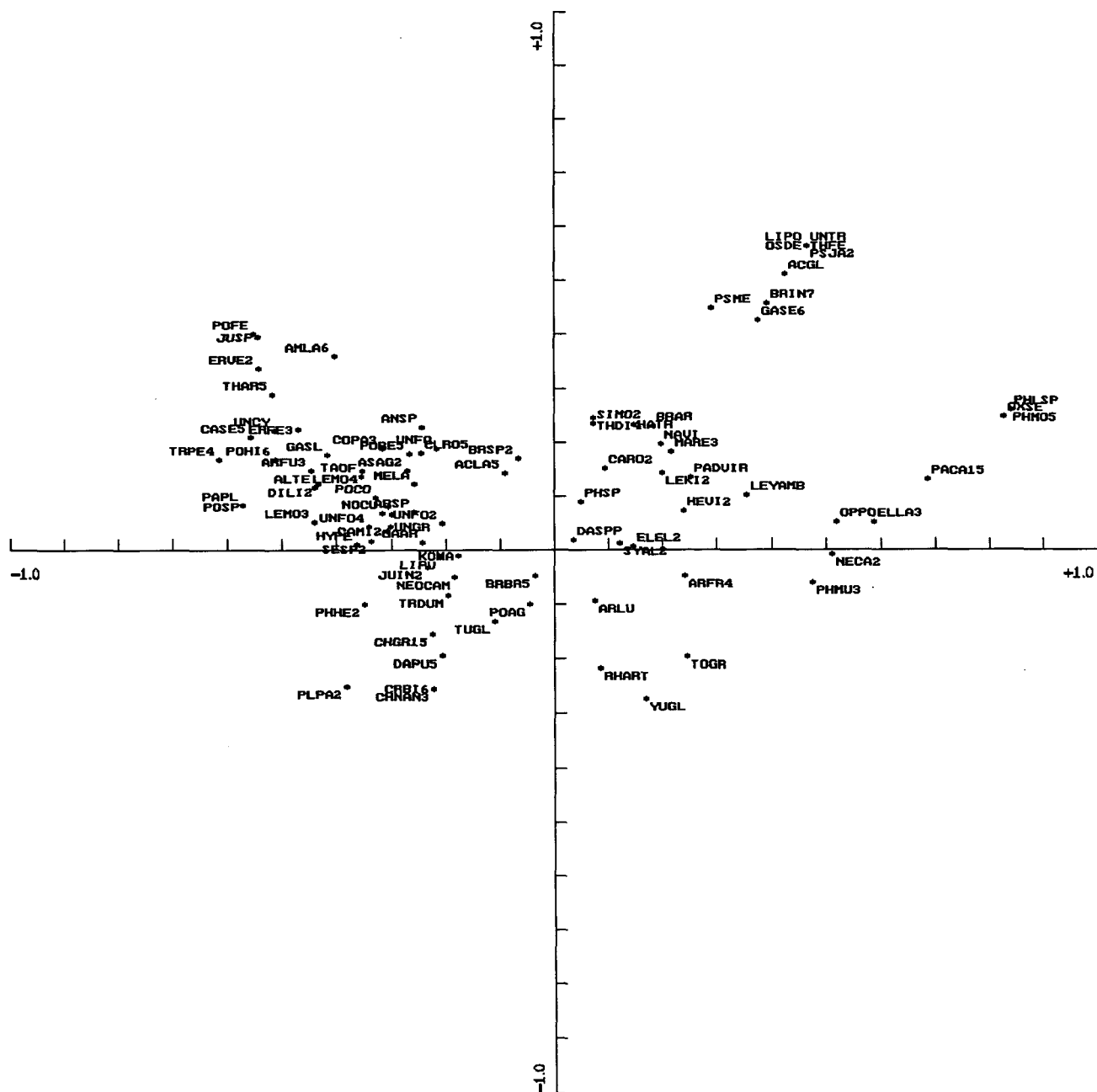


Figure 12. Axes 1-3 Species.

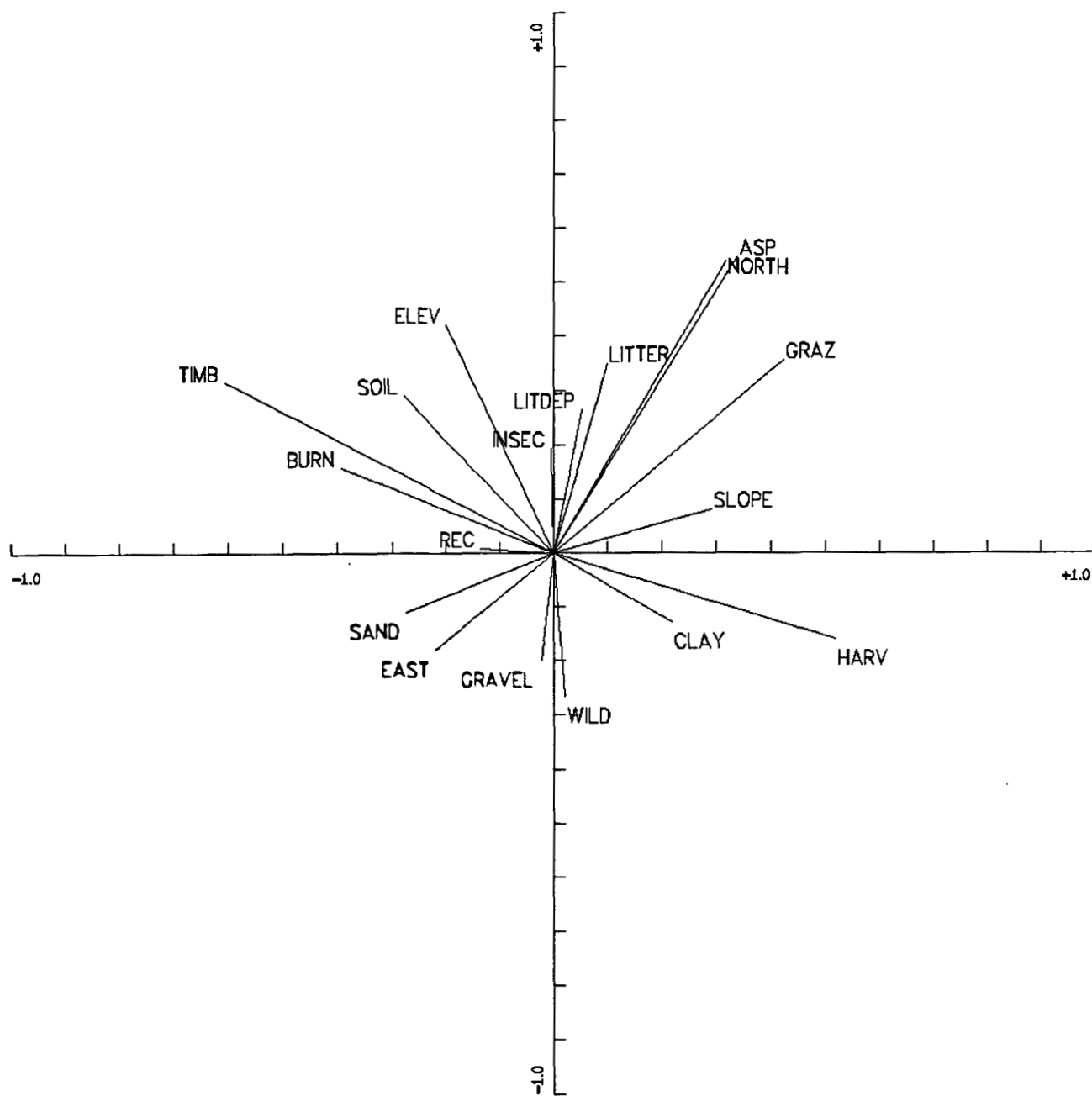


Figure 13. Axes 2-3 Environmental Vectors.

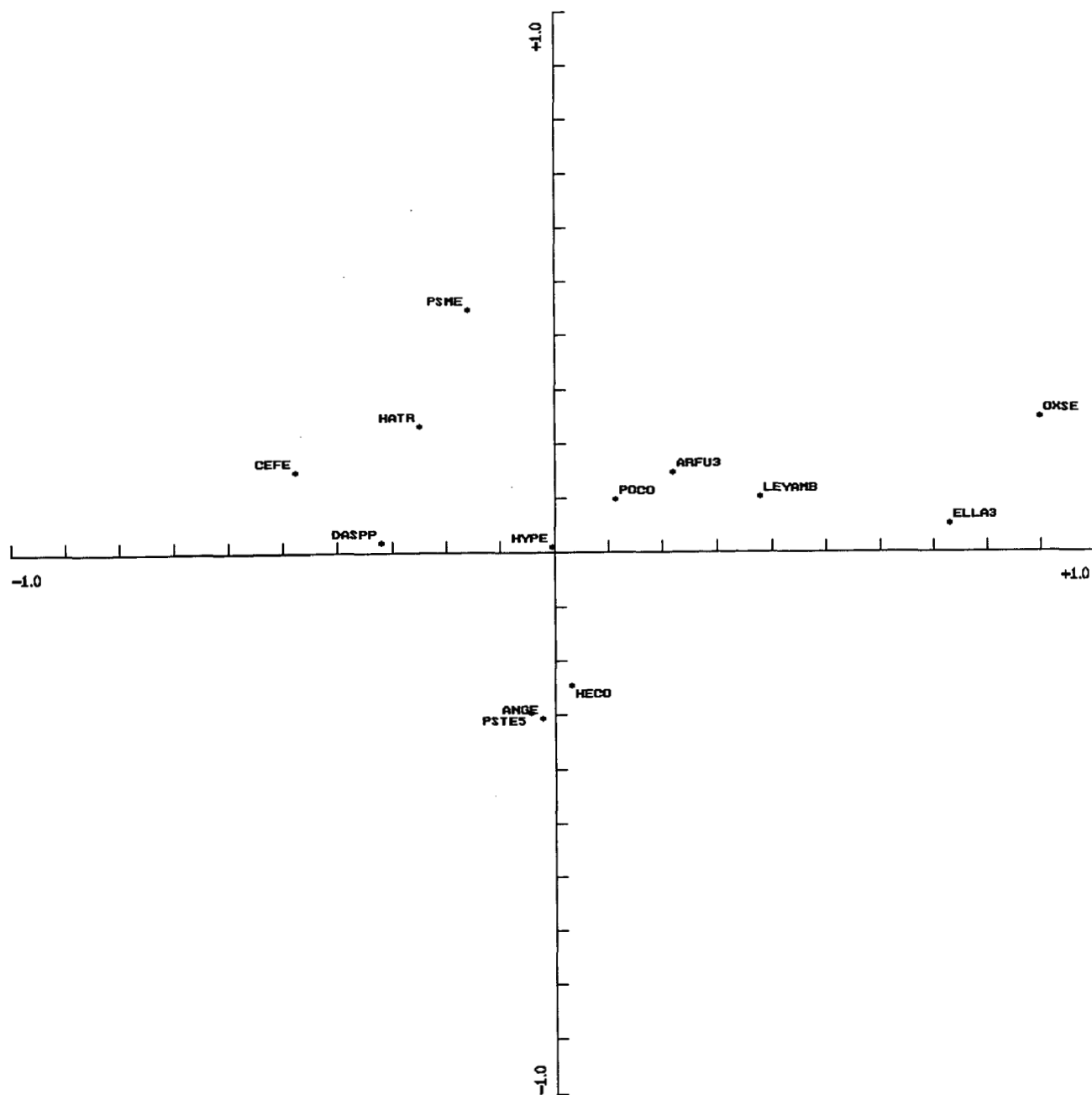


Figure 15. Axes 2-3 Selected Species.

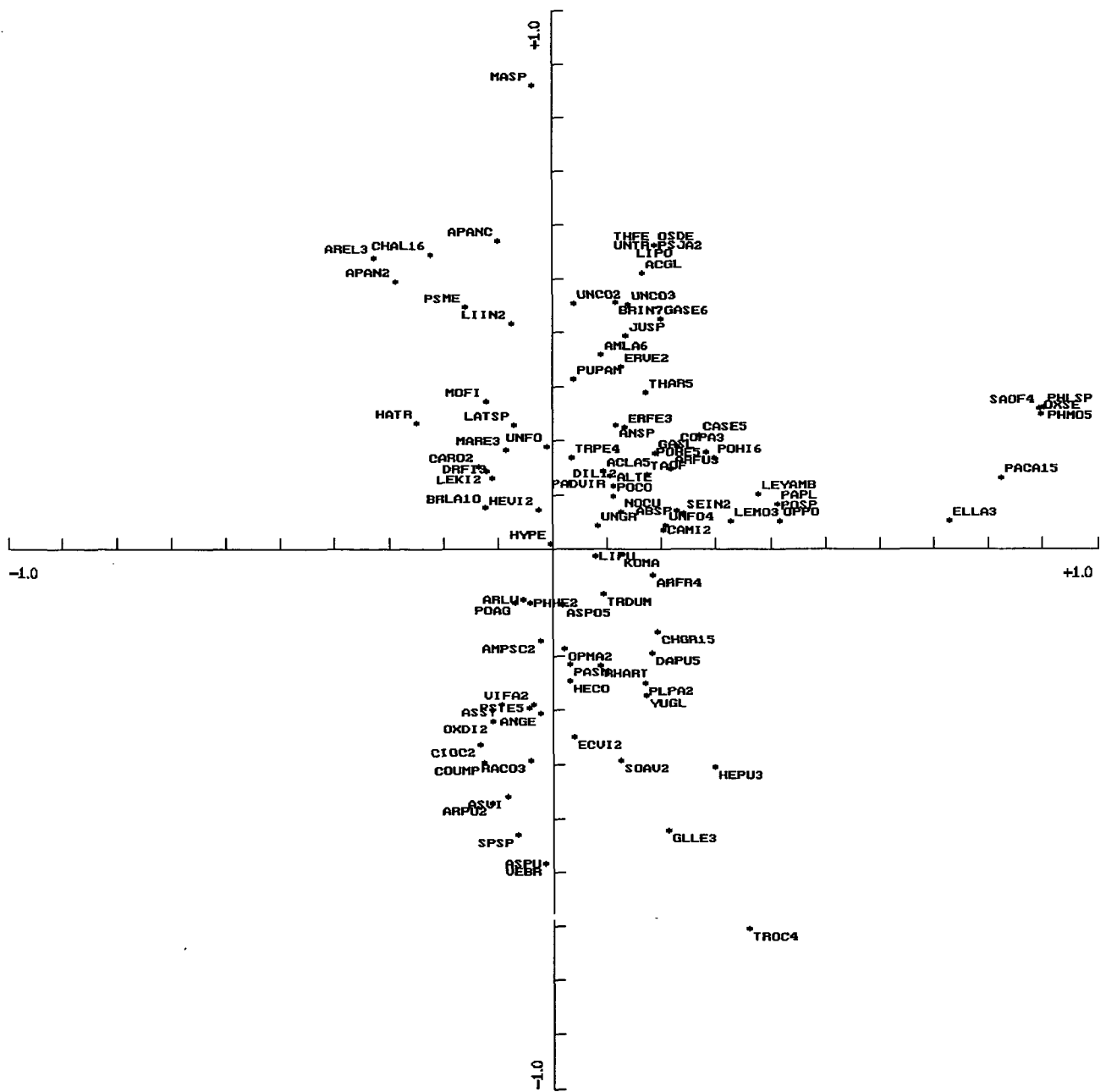


Figure 16. Axes 2-3 Species.

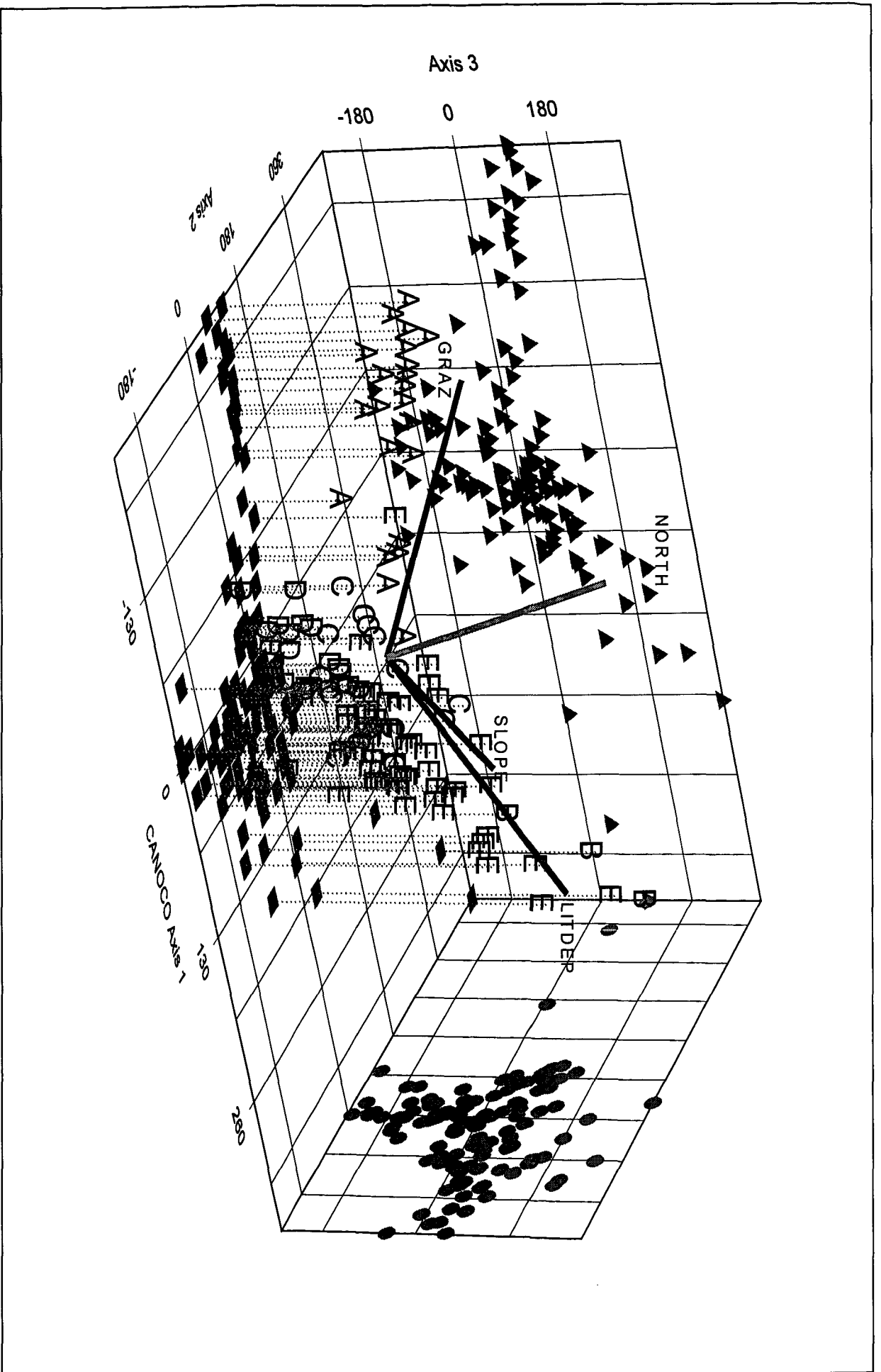


Figure 17. Axes 1-2-3 Sites.

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 group symbols from the site ordinations are repeated in these ordinations. The position of the symbol 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 are those used for the group classification key. The species are presented in the same order as found in the key. This order progresses from Group A to Group E indicator species.

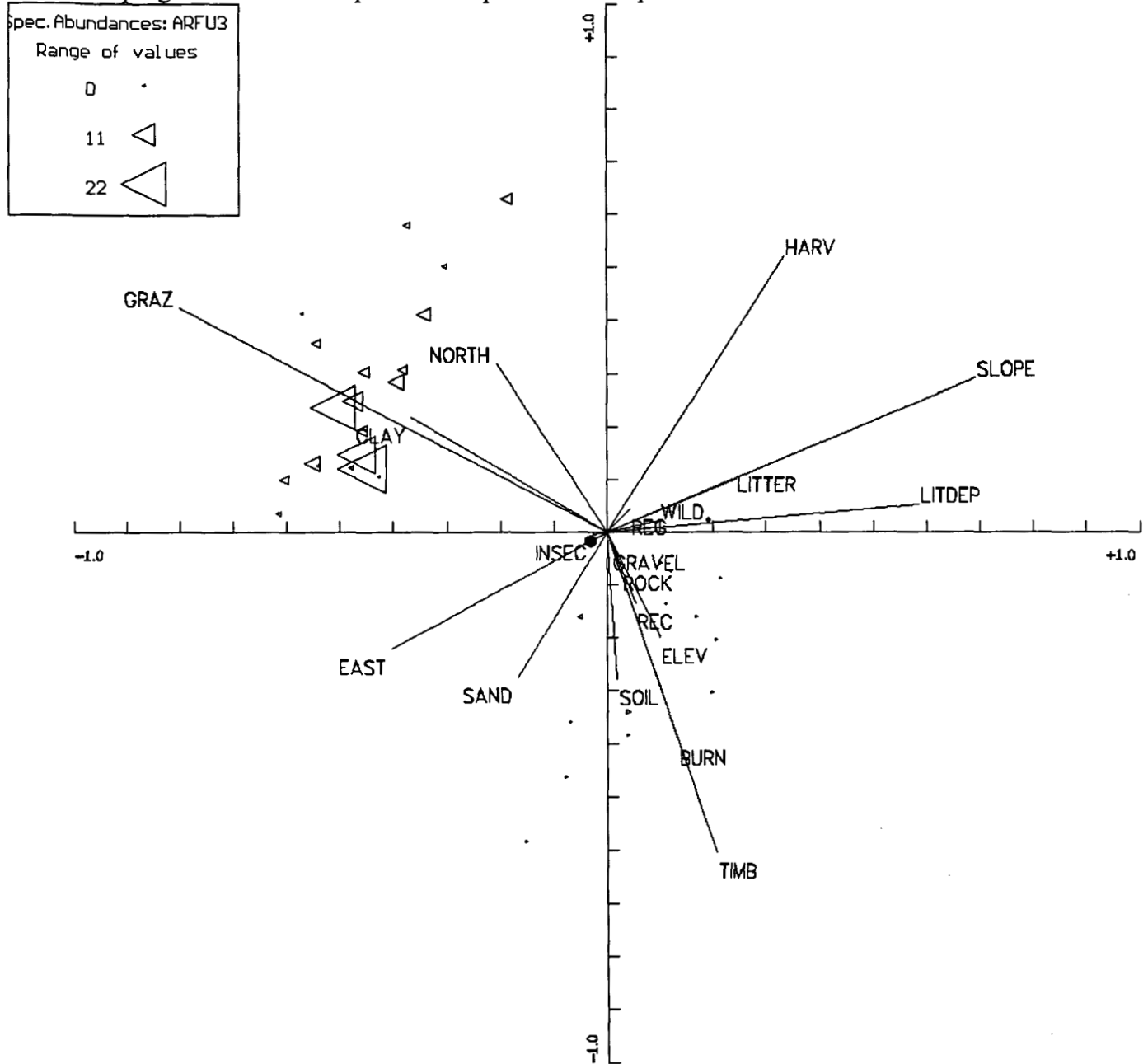


Figure 18. Arnica fulgens Cover Distribution.

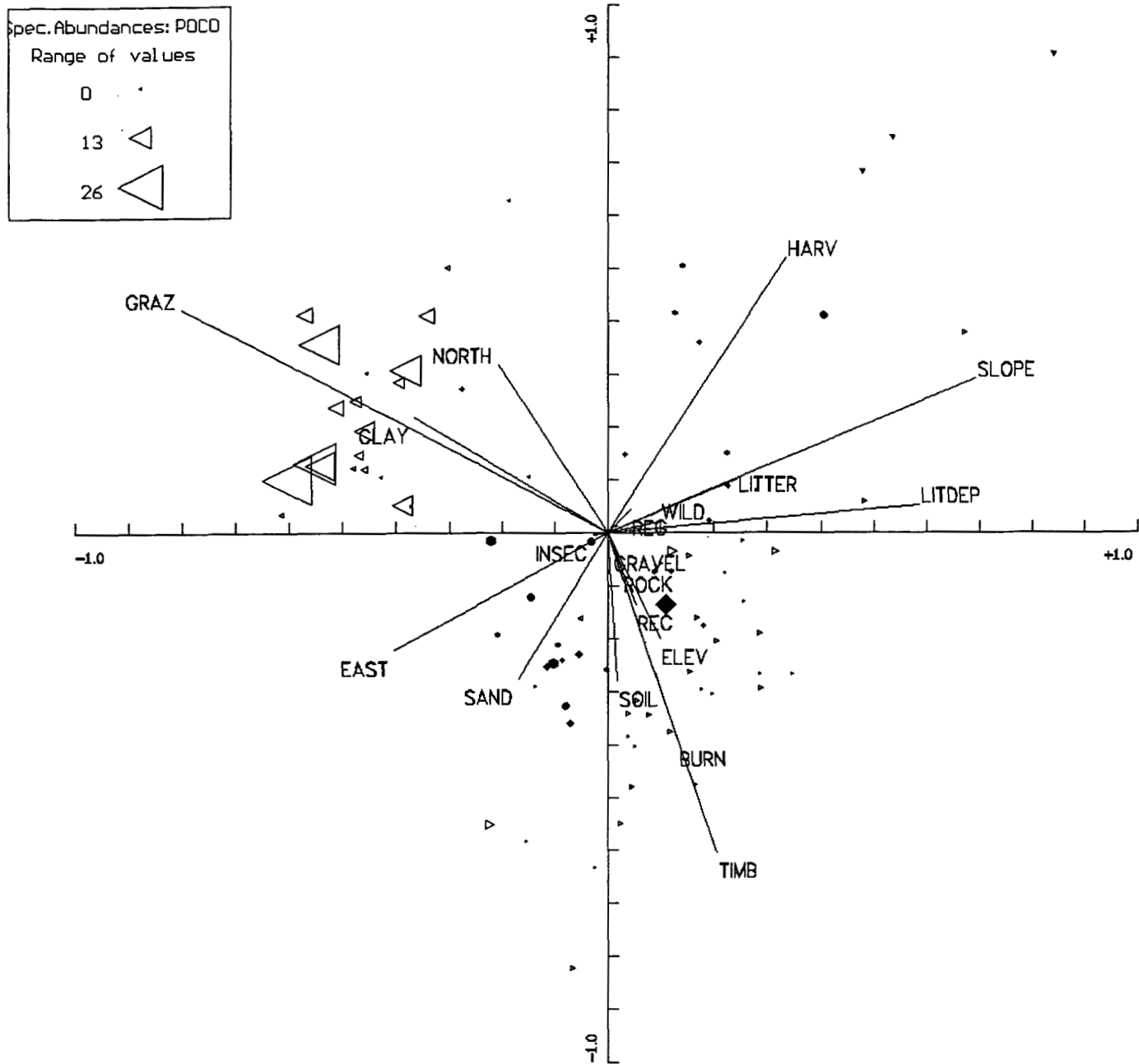


Figure 19. *Poa compressa* Cover Distribution.

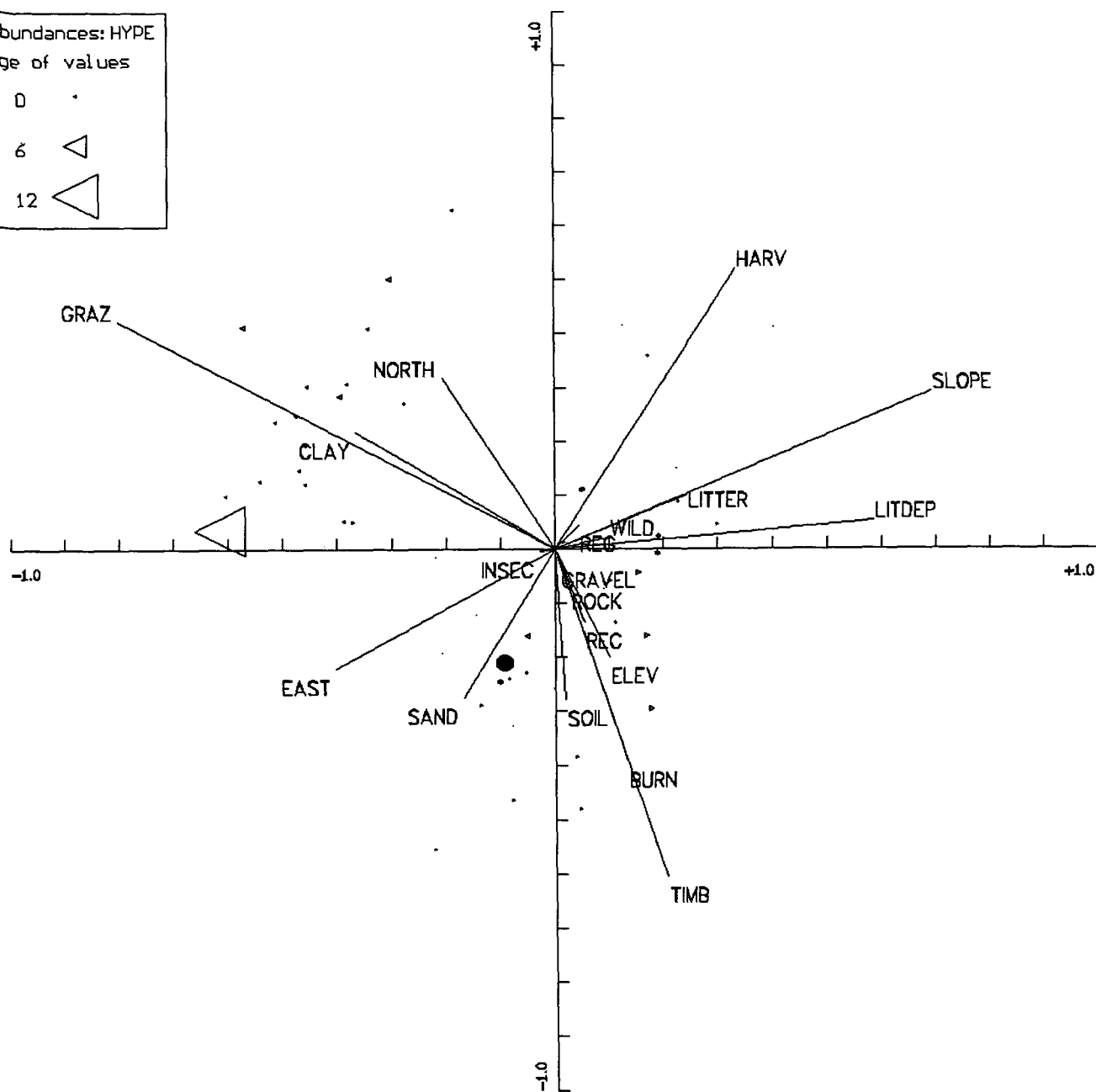
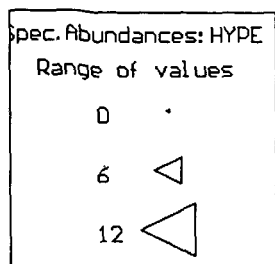


Figure 20. Hypericum perforatum Cover Distribution.

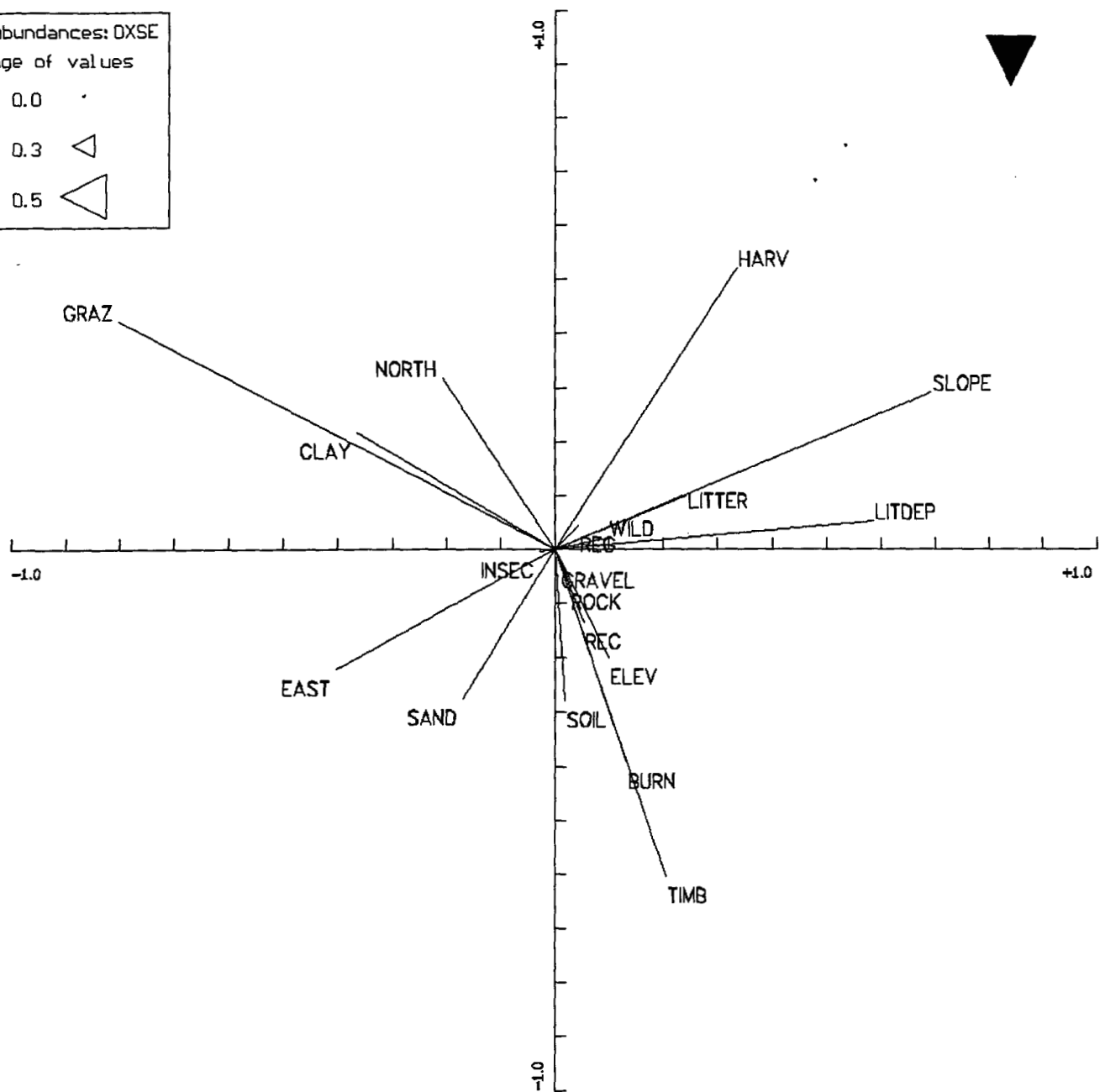
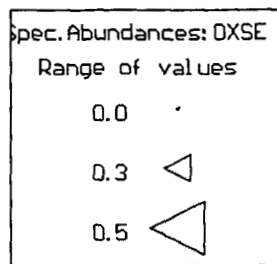


Figure 21. Oxytropis sericea Cover Distribution.

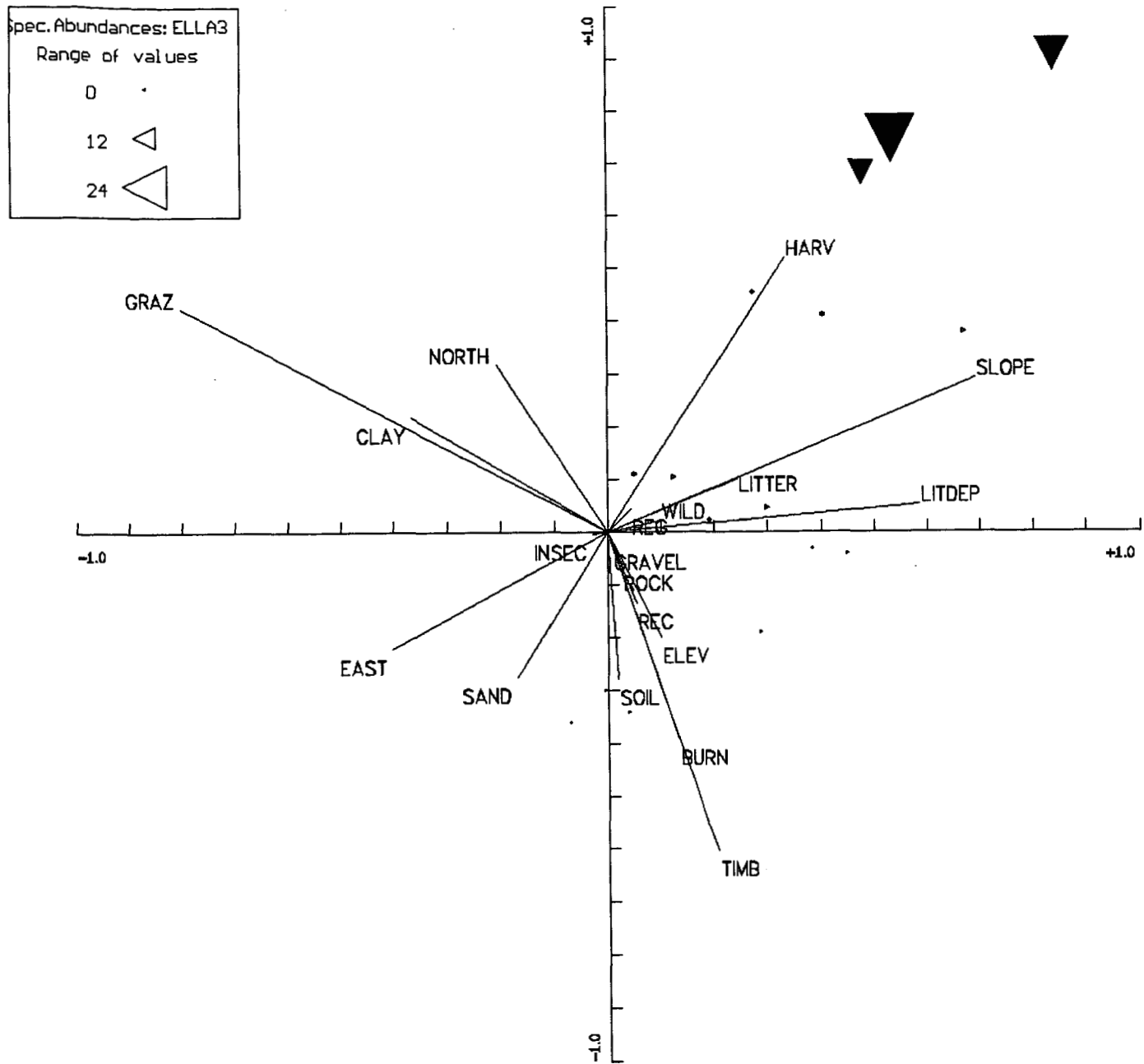


Figure 22. Elymus lanceolatus Cover Distribution.

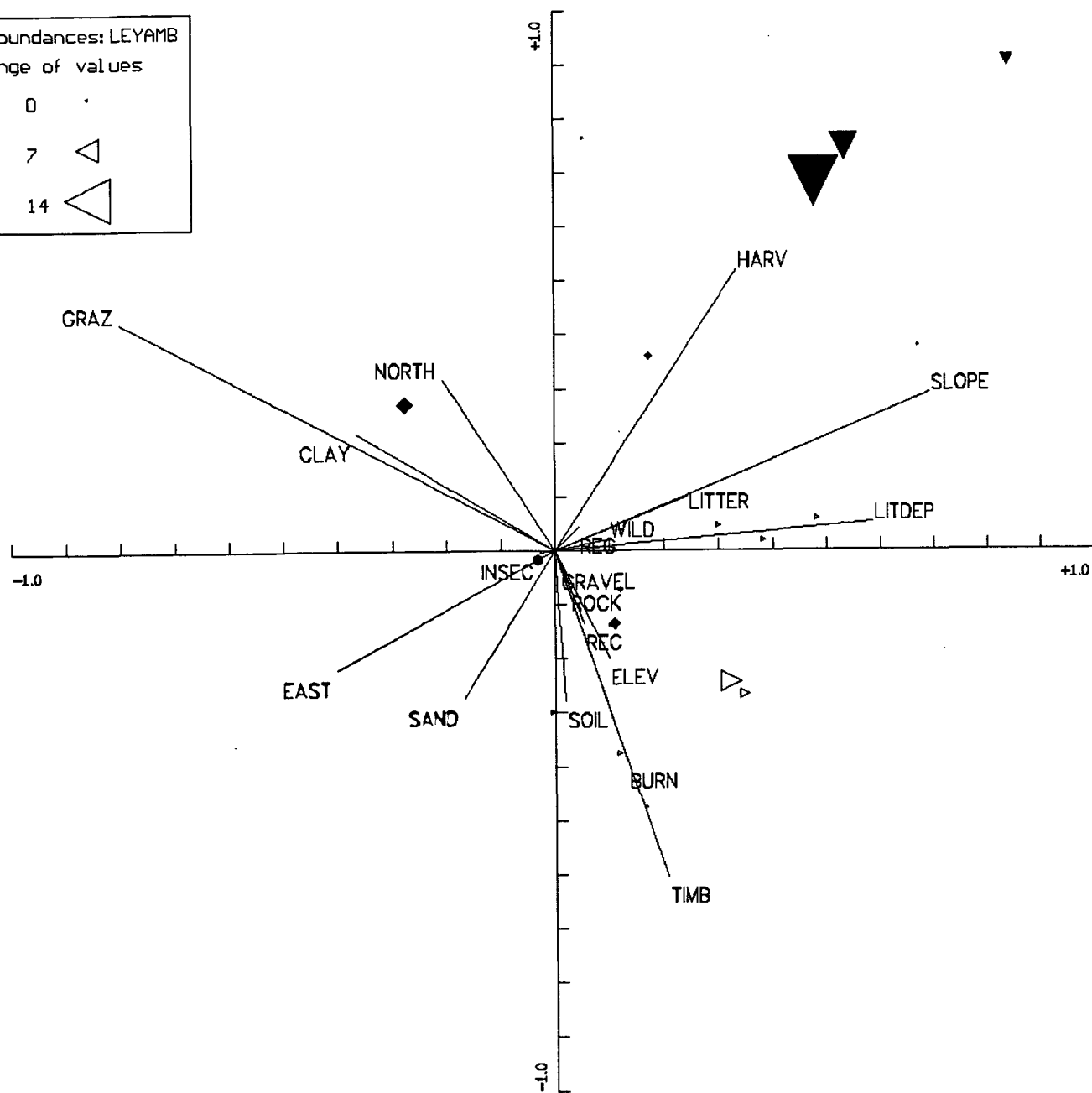
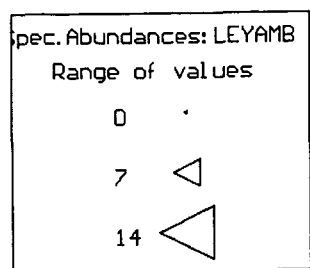


Figure 23. Leymus ambiguus Cover Distribution.

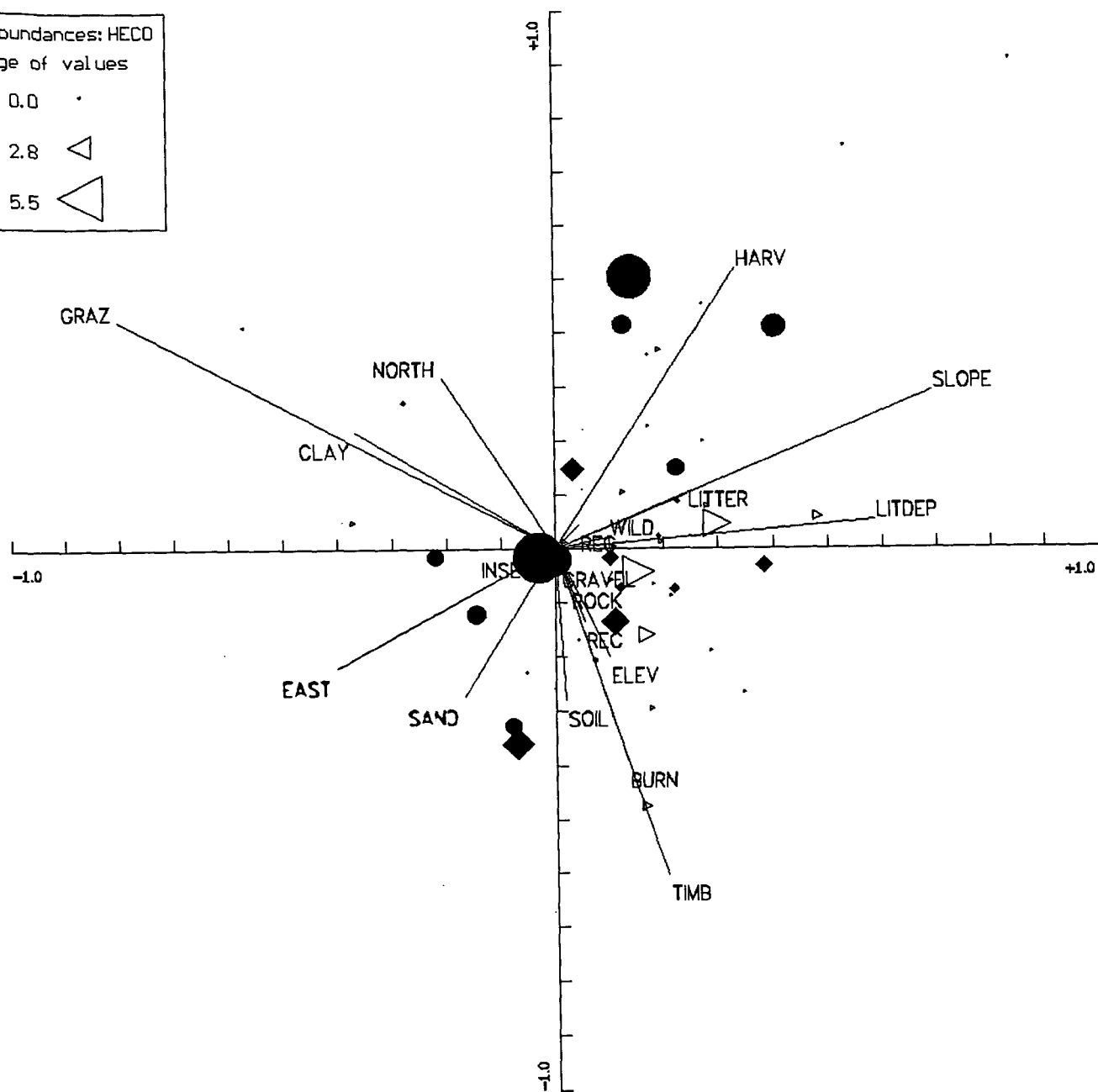
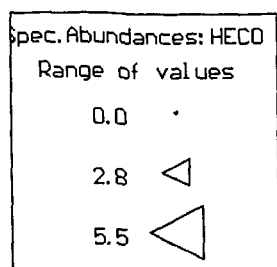


Figure 24. Hesperostipa comata Cover Distribution.

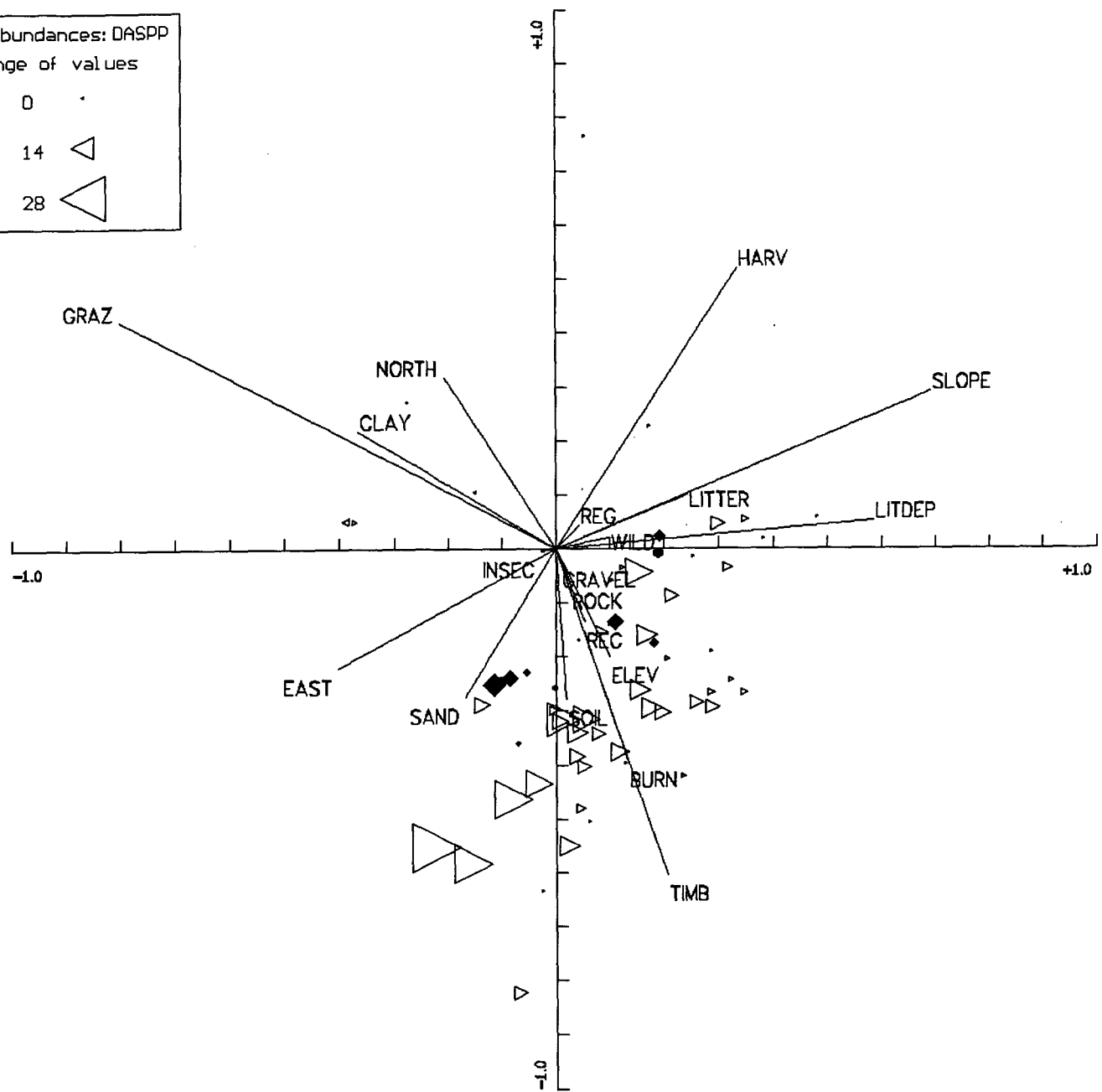
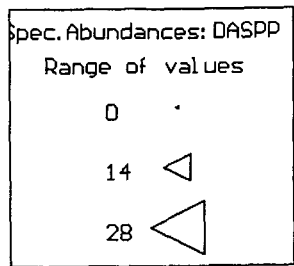


Figure 25. *Danthonia spicata* var. *pintorum* Cover Distribution.

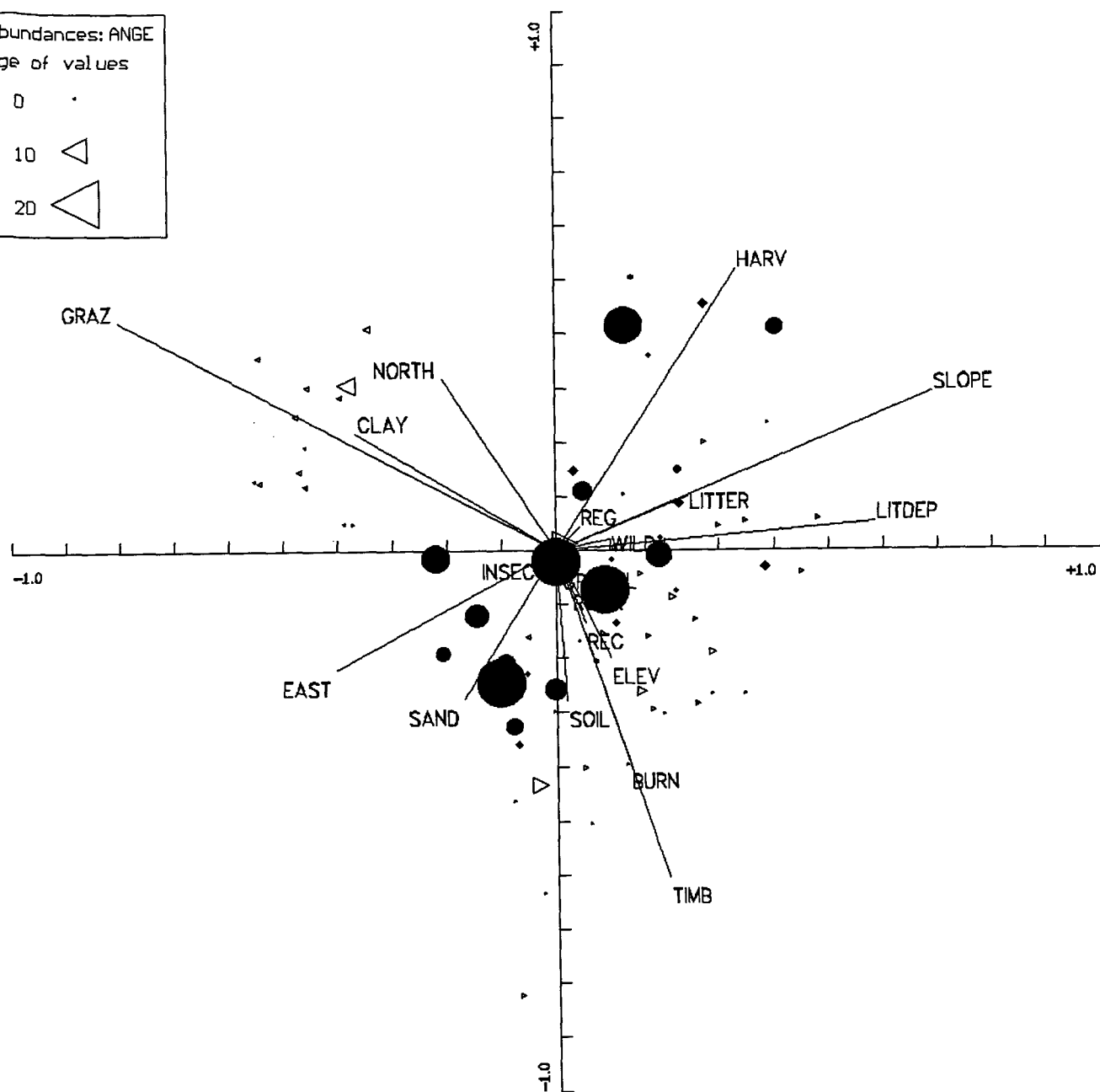
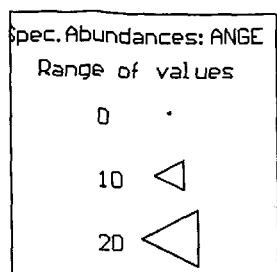


Figure 26. Andropogon gerardii Cover Distribution.

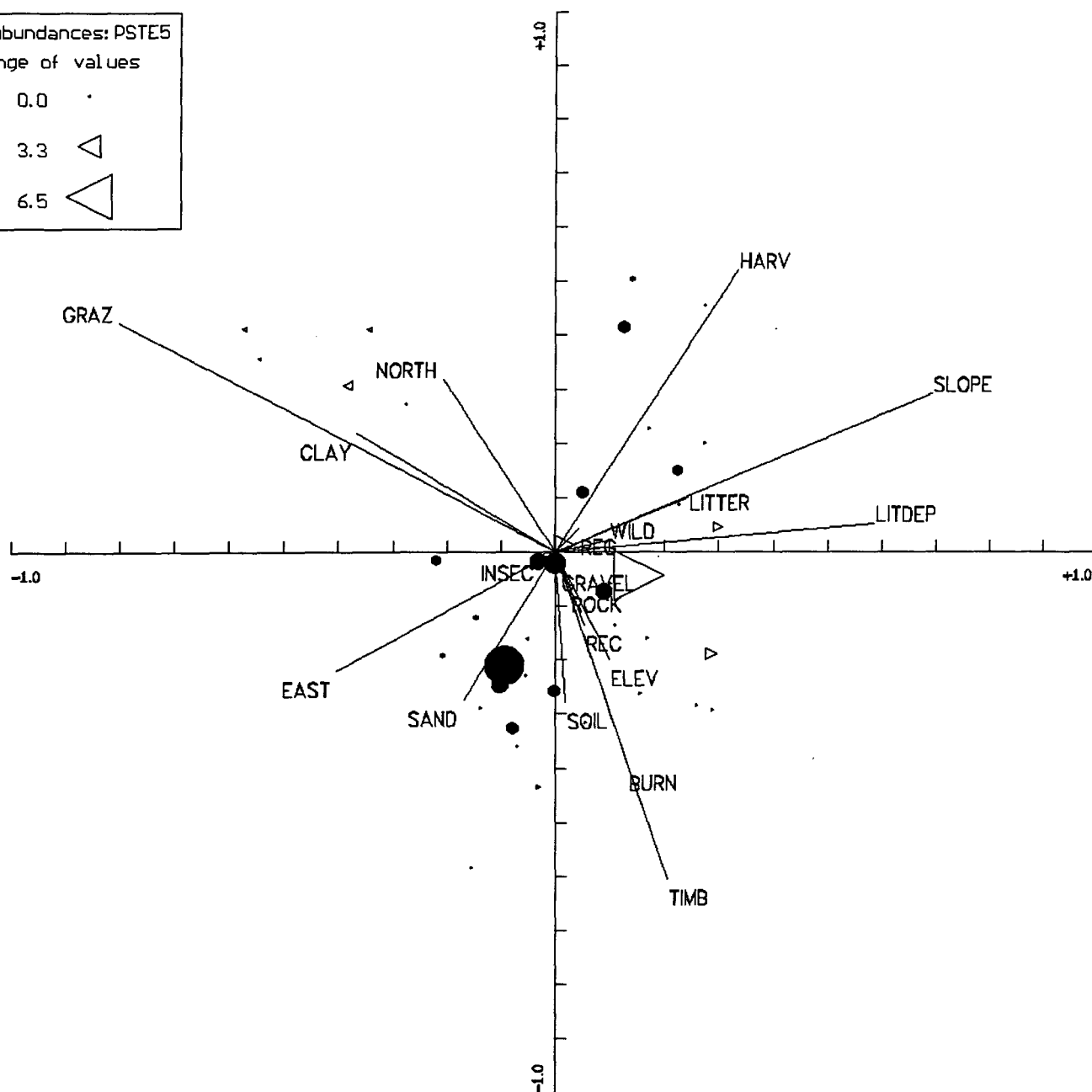
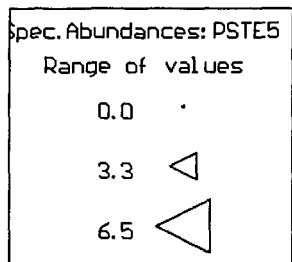


Figure 27. Psoralidium tenuiflorum Cover Distribution.

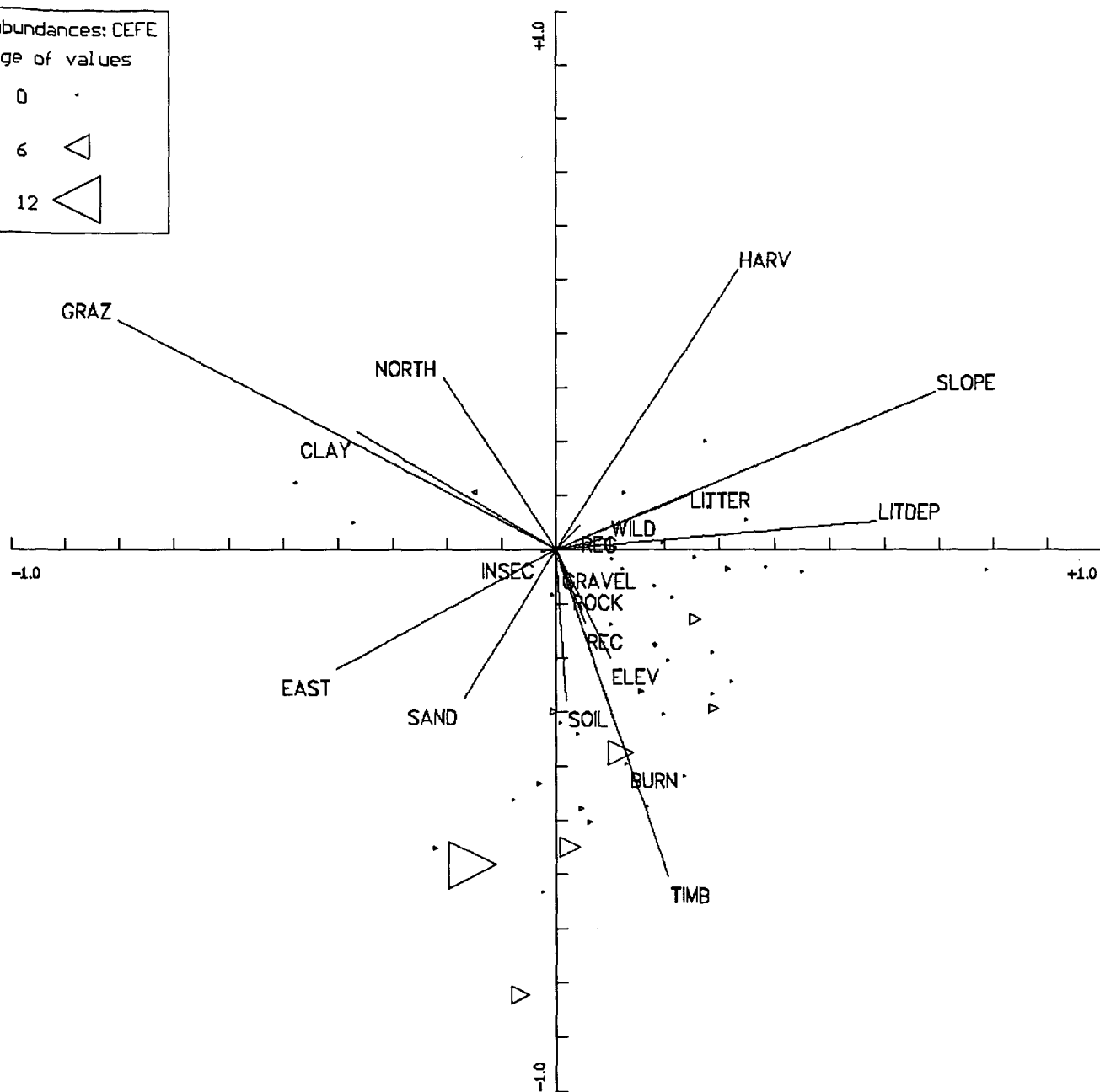
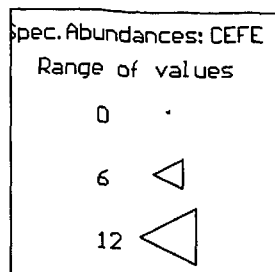


Figure 28. Ceanothus fendleri Cover Distribution.

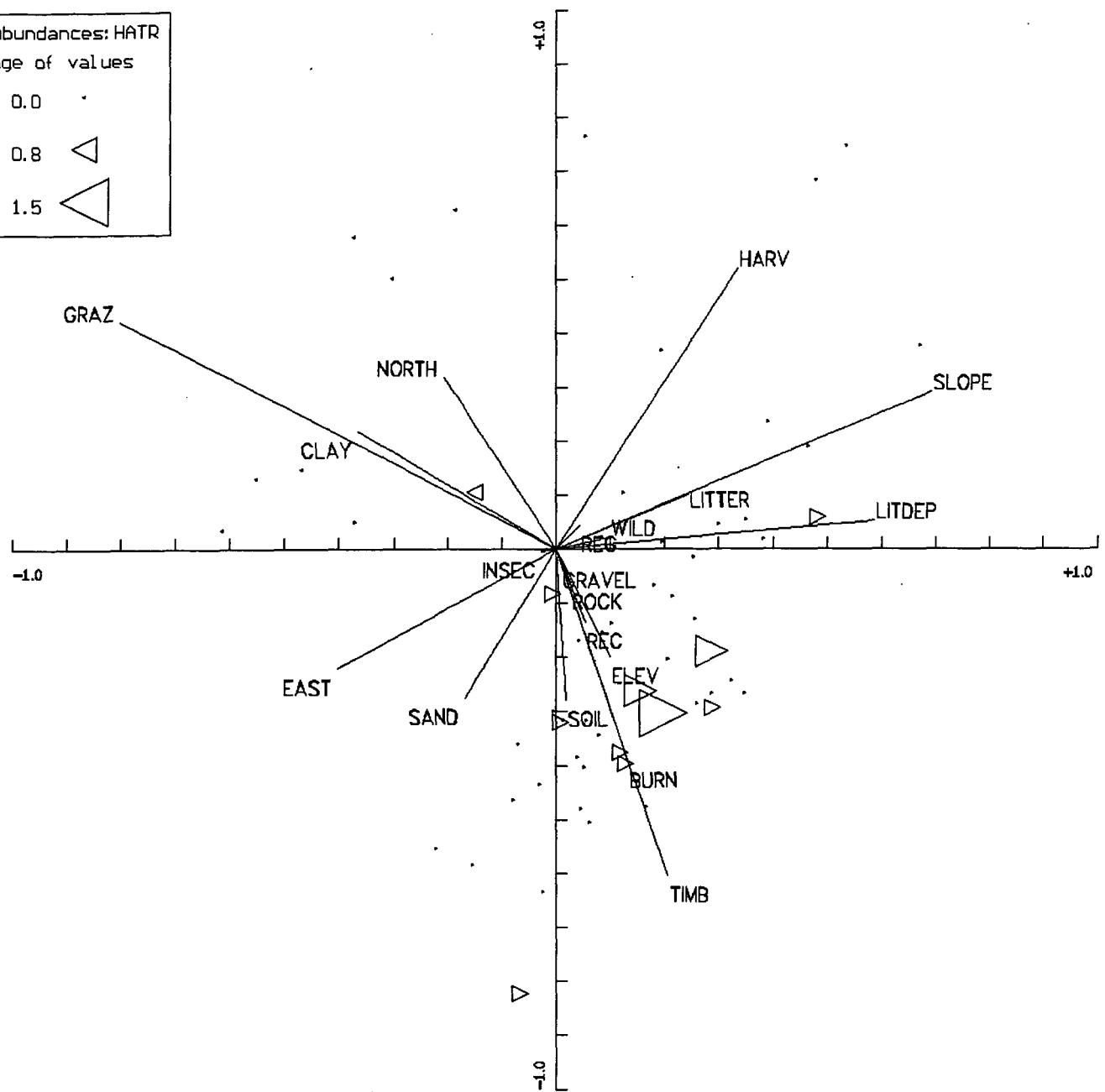
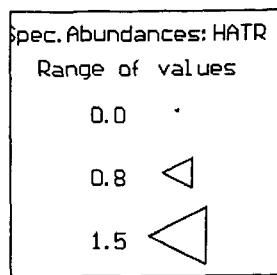


Figure 29. Harbouria trachyleura Cover Distribution.

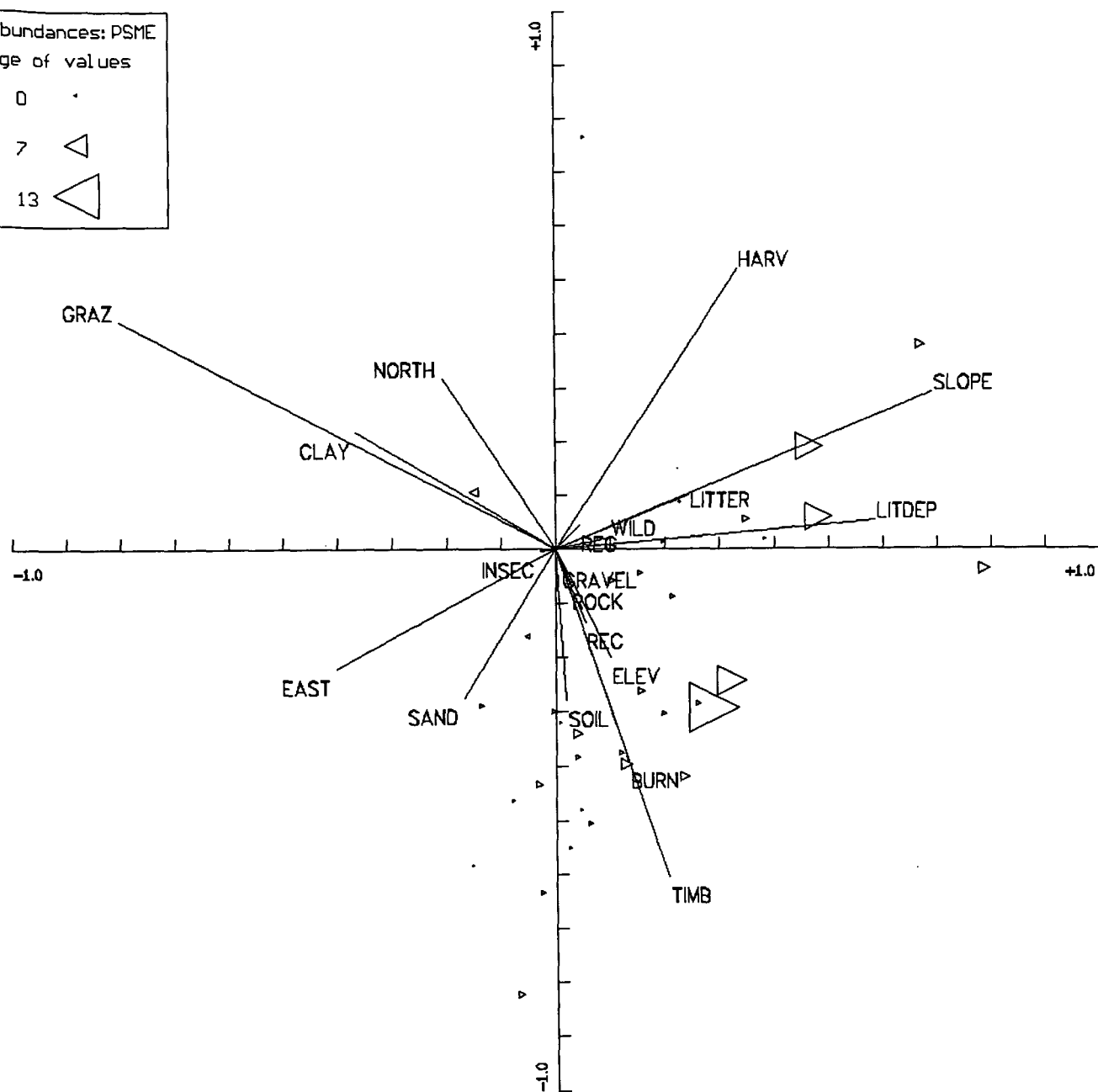
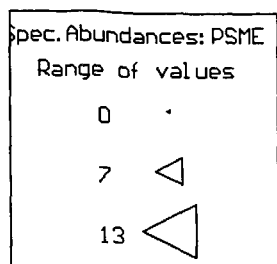


Figure 30. Pseudotsuga menziesii Cover Distribution.

Climatic Factor

Although this report does not discuss the historical disturbances or climatic factors that have resulted in the current plant associations, climatic data that may be used for that purpose are included in Appendix 9. The annual precipitation; and monthly temperature, precipitation and potential evapotranspiration, can provide great insight into the timing and severity of disturbance conditions that existed in the past. The first figure in Appendix 9 is the annual precipitation for Boulder from 1894 to 1997. The mean and $\pm$ one standard deviation is also indicated on the graph. The Thornthwaite climate diagrams for 1894 to 1997 are also included in Appendix 9. 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. When using tree ring analysis to evaluate the timing and duration of disturbance or vegetation change, the climatic data should be assessed simultaneously. For example, the 1982 BCOS Forest Management Plan includes a picture of a cross section of a tree stump on Page 8. The earliest growth rings demonstrated slow growth followed by a release that came to a sudden end in 1954. The text attributed this reduced ring-growth to a closed tree canopy. This may be true, but 1954 also happened to be the severest drought year in Boulder in the last 100 years. This climatic fact was not mentioned, and may actually have been the cause of the reduced ring width.

Sampling methodology in steep areas

There will be times when the slope of a plot is too steep and/or the woody vegetation is too dense for safe and efficient use of the cover-point device. The following suggestions apply where the difficulty of laying out the transect lines and moving the ocular device from point to point suggests the use of an alternative method. In these cases, simply list all of the species possible, and make cover estimates for the understory species which have the estimated highest cover values as determined by visual inspection. The overstory cover can be estimated in a similar fashion, but a higher level of accuracy and precision can be achieved using a densiometer. (about \$100 in catalogs). Care should be taken to be sure the measurement of tree canopy is in the same area as the understory cover estimates.

References

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Appendices

Appendix 1. Samples with group affiliation, sorted by sample ID.

Samples with group affiliation, sorted by sample ID.

Sample #	- ID	- Group	Sample #	- ID	- Group	Sample #	- ID	- Group
1	D101	D	42	LJSW10	A	83	ST501	E
2	D105	D	43	LOSH01	D	84	ST505	E
3	D110	D	44	LOSH05	C	85	ST601	E
4	D1/8101	D	45	LOSH10	C	86	ST605	E
5	D1/8105	E	46	MRL01	C	87	ST610	E
6	D201	E	47	MRL10	C	88	ST615	E
7	D205	D	48	MRL15	E	89	ST701	E
8	D210	D	49	PNBK01	B	90	ST705	E
9	D3D401	D	50	PNBK05	B	91	ST801	E
10	D3D405	E	51	PNBK10	B	92	ST805	E
11	D3D410	D	52	PWRL01	E	93	ST901	E
12	D3D415	D	53	PWRL05	E	94	ST905	E
13	D3D420	D	54	PWRL10	E	95	STG201	A
14	D3D425	D	55	PWRL15	E	96	STG205	A
15	D3D430	E	56	PWRL20	E	97	STG210	A
16	DAKR10	D	57	PWRL25	E	98	STG215	A
17	ELDE01	A	58	S1001	E	99	STG220	A
18	ELDE05	A	59	S1005	E	100	SNSH01	E
19	ELDE10	E	60	S1010	C	101	SNSH05	E
20	ELDE15	A	61	S301	E	102	WTRT01	D
21	LINN01	E	62	S305	E	103	WTRT05	C
22	LINN05	A	63	S310	E	104	WTRT10	C
23	LINN10	A	64	S315	E	105	WTRT15	D
24	LINS01	A	65	S320	E	106	WTRT20	D
25	LINS05	A	66	S325	E	107	WITE05	E
26	LINS10	A	67	S401	E	108	WITE10	E
27	LINS15	A	68	S405	E	109	WITNE01	E
28	LJNE01	A	69	S501	C	110	WITNE05	E
29	LJNE05	A	70	S505	E	111	WITNE10	C
30	LJNE10	A	71	S510	E	112	WITNE15	E
31	LJNW01	E	72	S901	C	113	WITNE20	E
32	LJNW05	C	73	S905	E	114	WITNE25	E
33	LJNW10	C	74	S910	E	115	WITNE30	E
34	LJNW15	D	75	ST101	E	116	WITNW01	C
35	LJSE01	A	76	ST105	E	117	WITNW15	E
36	LJSE05	A	77	ST110	E	118	WITNW20	E
37	LJSE10	A	78	ST115	E	119	WITS01	C
38	LJSE15	A	79	ST1001	E	120	WITS05	E
39	LJSE20	A	80	ST1005	E	121	WITS10	C
40	LJSW01	C	81	ST305	E	122	WITW01	C
41	LJSW05	A	82	ST310	E	123	WITW05	E

Appendix 2. Samples with group affiliation, sorted by group ID

Samples with group affiliation, sorted by group ID.

Sample#	ID	Group	Sample#	ID	Group	Sample#	ID	Group
17	ELDE01	A	103	WTRT05	C	68	S405	E
18	ELDE05	A	104	WTRT10	C	70	S505	E
20	ELDE15	A	4	D1/8101	D	71	S510	E
22	LINN05	A	1	D101	D	73	S905	E
23	LINN10	A	2	D105	D	74	S910	E
24	LINS01	A	3	D110	D	100	SNSH01	E
25	LINS05	A	7	D205	D	101	SNSH05	E
26	LINS10	A	8	D210	D	79	ST1001	E
27	LINS15	A	9	D3D401	D	80	ST1005	E
28	LJNE01	A	11	D3D410	D	75	ST101	E
29	LJNE05	A	12	D3D415	D	76	ST105	E
30	LJNE10	A	13	D3D420	D	77	ST110	E
35	LJSE01	A	14	D3D425	D	78	ST115	E
36	LJSE05	A	16	DAKR10	D	81	ST305	E
37	LJSE10	A	34	LJNW15	D	82	ST310	E
38	LJSE15	A	43	LOSH01	D	83	ST501	E
39	LJSE20	A	102	WTRT01	D	84	ST505	E
41	LJSW05	A	105	WTRT15	D	85	ST601	E
42	LJSW10	A	106	WTRT20	D	86	ST605	E
95	STG201	A	5	D1/8105	E	87	ST610	E
96	STG205	A	6	D201	E	88	ST615	E
97	STG210	A	10	D3D405	E	89	ST701	E
98	STG215	A	15	D3D430	E	90	ST705	E
99	STG220	A	19	ELDE10	E	91	ST801	E
49	PNBK01	B	21	LINN01	E	92	ST805	E
50	PNBK05	B	31	LJNW01	E	93	ST901	E
51	PNBK10	B	48	MRL15	E	94	ST905	E
32	LJNW05	C	52	PWRL01	E	107	WITE05	E
33	LJNW10	C	53	PWRL05	E	108	WITE10	E
40	LJSW01	C	54	PWRL10	E	109	WITNE01	E
44	LOSH05	C	55	PWRL15	E	110	WITNE05	E
45	LOSH10	C	56	PWRL20	E	112	WITNE15	E
46	MRL01	C	57	PWRL25	E	113	WITNE20	E
47	MRL10	C	58	S1001	E	114	WITNE25	E
60	S1010	C	59	S1005	E	115	WITNE30	E
69	S501	C	61	S301	E	117	WITNW15	E
72	S901	C	62	S305	E	118	WITNW20	E
111	WITNE10	C	63	S310	E	120	WITS05	E
116	WITNW01	C	64	S315	E	123	WITW05	E
119	WITS01	C	65	S320	E			
121	WITS10	C	66	S325	E			
122	WITW01	C	67	S401	E			

Appendix 3. Group A Species Importance

RANKED Group A	Percentage Importance	Constancy	Average Cover
<Other - Litter>	415.25	100.00	52.83
<i>Poa compressa</i>	100.00	95.65	7.41
<i>Arnica fulgens</i>	82.94	91.30	5.26
<Other - Bare Rock>	64.50	91.30	2.59
<i>Carex</i> spp.	62.71	91.30	2.33
<i>Penstemon virens</i>	59.68	100.00	1.24
<i>Pinus ponderosa</i> <i>scopulorum</i>	59.38	95.65	1.52
<i>chillea lanulosa</i>	58.17	100.00	1.02
<i>Poa agassizensis</i>	52.12	82.61	1.44
<i>Grindelia</i> <i>squarrosa</i> /G. <i>subalpina</i>	46.87	86.96	0.35
<i>Antennaria</i> spp.	44.69	73.91	1.00
<i>Hypericum</i> <i>perforatum</i>	42.31	73.91	0.66
<i>Artemisia</i> <i>ludoviciana</i>	41.98	78.26	0.29
<i>Cerastium strictum</i>	41.53	78.26	0.22
<i>Eremogone fendleri</i>	41.30	65.22	1.16
<i>Taraxacum</i> <i>officinale</i>	40.95	73.91	0.46
<i>Tragopogon dubius</i> <i>major</i>	38.72	73.91	0.14
<i>Opuntia macrorhiza</i>	38.42	73.91	0.09
<i>Koeleria macrantha</i>	38.12	69.57	0.37
<i>Ribes cereum</i>	37.09	69.57	0.22
<i>Lomatium orientale</i>	36.34	69.57	0.11
<Other - Soil>	35.98	47.83	1.67
<i>Muhlenbergia</i> <i>montana</i>	35.61	65.22	0.33
<i>Rhus aromatica</i> <i>trilobata</i>	35.47	60.87	0.63
<i>Dryocallis fissa</i>	34.86	65.22	0.22
<i>Gaillardia aristata</i>	34.12	65.22	0.11
<i>Anisantha/Bromus</i> spp.	33.86	52.17	1.04
<i>Neolepia campestris</i>	33.82	65.22	0.07
<i>Andropogon</i> <i>gerardii</i>	33.69	56.52	0.70
<i>Symphoricarpos</i> <i>albus</i> /S. <i>occidentalis</i>	33.55	56.52	0.68
<i>Senecio</i> <i>integerrimus</i>	33.37	60.87	0.33
<i>Allium</i> spp.	32.94	60.87	0.27
<i>Gallium</i> spp.	32.80	56.52	0.57
<i>Aster porteri</i>	32.35	56.52	0.50
<i>Achnatherum</i> <i>nelsonii</i>	31.80	47.83	1.07
<i>Mertensia</i> <i>lanceolata</i>	29.67	56.52	0.11

<i>Mahonia repens</i>	27.77	47.83	0.48
<i>Oreobatus</i> <i>deliciosus</i>	27.74	52.17	0.16
Unknown grass	27.67	34.78	1.43
<i>Pulsatilla patens</i> <i>multifida</i>	27.44	52.17	0.11
<i>Anisantha tectorum</i>	26.14	43.48	0.57
<i>Campanula</i> <i>rotundifolia</i>	25.21	47.83	0.11
<i>Potentilla hippiana</i>	24.77	47.83	0.05
<i>Collinsia parviflora</i>	22.25	43.48	0.00
<i>Potentilla recta</i>	21.52	39.13	0.22
<i>Padus virginiana</i> <i>melanocarpa</i>	20.92	39.13	0.13
<i>Camelina</i> <i>microcarpa</i>	20.62	39.13	0.09
<i>Erigeron</i> spp.	20.62	39.13	0.09
<i>Carduus nutans</i> <i>macrolepis</i>	20.32	39.13	0.05
<i>Rosa woodsii</i> /R. <i>sayi</i>	19.29	34.78	0.22
<i>Carex pensylvanica</i> <i>heliophila</i>	19.00	34.78	0.18
<i>Ambrosia</i> <i>psilostachya</i> <i>coronopifolia</i>	18.11	30.43	0.37
<i>Bromus japonicus</i>	17.81	30.43	0.33
<i>Chondrosium</i> <i>gracile</i>	17.21	30.43	0.24
Unknown forb	16.93	26.09	0.52
<i>Bromus briziformis</i>	16.62	30.43	0.15
<i>Pneumonanthe</i> <i>bigelovii</i>	15.87	30.43	0.05
<i>Artemisia frigida</i>	15.72	30.43	0.02
<i>Harbouria</i> <i>trachyleura</i>	15.72	30.43	0.02
<i>Liatris punctata</i>	15.59	26.09	0.33
<i>Pascopyrum smithii</i>	14.84	26.09	0.22
Unknown grass 1	14.58	17.39	0.83
<i>Phacelia</i> <i>heterophylla</i>	14.25	26.09	0.13
<i>Phleum pratense</i>	13.94	26.09	0.09
<i>Alyssum</i> <i>alyssoides</i>	13.65	26.09	0.05
<i>Amerosedum</i> <i>lanceolatum</i>	13.65	26.09	0.05
<i>Cynoglossum</i> <i>officinale</i>	13.65	26.09	0.05
<i>Psoraleidium</i> <i>tenellum</i>	11.72	21.74	0.09
<i>Geranium</i> <i>caespitosum</i>	11.27	21.74	0.02
<i>Gutierrezia</i> <i>sarothrae</i>	11.27	21.74	0.02
<i>Lesquerella</i> <i>montana</i>	11.27	21.74	0.02
<i>Allium textile</i>	10.84	17.39	0.28

Heterotheca villosa/H. foliosa	9.34	17.39	0.07
Unknown forb 1	9.06	13.04	0.35
Alyssum spp.	9.05	17.39	0.02
Eriogonum spp.	9.05	17.39	0.02
Juncus spp.	9.05	17.39	0.02
Noccaea montana	9.05	17.39	0.02
Frasera speciosa	8.90	17.39	0.00
Unknown grass 2	8.32	13.04	0.24
Acetosella vulgaris	7.27	13.04	0.09
Juncus interior	7.12	13.04	0.07
Dalea purpurea	6.97	13.04	0.04
Elymus trachycaulus	6.82	13.04	0.02
Eriogonum umbellatum	6.82	13.04	0.02
Nassella viridula	6.82	13.04	0.02
Selaginella spp.	6.82	13.04	0.02
Senecio spp.	6.82	13.04	0.02
porobolus rypandrus	6.82	13.04	0.02
Verbascum thapsus	6.82	13.04	0.02
Corallorhiza maculata	6.68	13.04	0.00
Heuchera spp.	6.68	13.04	0.00
Leucocrinum montanum	6.68	13.04	0.00
Lithospermum multiflorum	6.68	13.04	0.00
Oxalis dillenii	6.68	13.04	0.00
Rumex crispus	6.68	13.04	0.00
Scutellaria brittonii	6.68	13.04	0.00
Thermopsis divaricarpa	6.68	13.04	0.00
Thlaspi arvense	6.68	13.04	0.00
Turritis glabra	6.68	13.04	0.00
Lactuca serriola	6.40	8.70	0.28
Pseudotsuga menziesii	5.34	8.70	0.13
Danthonia spicata	5.20	8.70	0.11
pinetorum			
Erigeron vetensis	4.90	8.70	0.07
Galium aparine	4.89	8.70	0.07
Ceanothus fendleri	4.75	8.70	0.04
Monarda fistulosa	4.75	8.70	0.04
methifolia/M. pectinata			
Sabina scopulorum	4.75	8.70	0.04
Packera fendleri	4.74	8.70	0.04
Allium cernuum	4.60	8.70	0.02
Apocynum adrosaemifolium/A. cannabinum	4.60	8.70	0.02
Convolvulus arvensis	4.60	8.70	0.02
Elymus elymoides/E. longifolius	4.60	8.70	0.02
Astragalus agrestis	4.45	8.70	0.00

Breca arvensis	4.45	8.70	0.00
Calochortus gunnisonii	4.45	8.70	0.00
Castilleja sessiliflora	4.45	8.70	0.00
Cercocarpus montanus	4.45	8.70	0.00
Cirsium ochrocentrum	4.45	8.70	0.00
Claytonia rosea	4.45	8.70	0.00
Elytrigia repens	4.45	8.70	0.00
Erysimum capitatum	4.45	8.70	0.00
Lathyrus spp.	4.45	8.70	0.00
Nothocalais cuspidata	4.45	8.70	0.00
Oligosporus dracunculus glaucus	4.45	8.70	0.00
Opuntia fragilis	4.45	8.70	0.00
Oreocarya virgata	4.45	8.70	0.00
Ratibida columnifera	4.45	8.70	0.00
Silene antirrhina	4.45	8.70	0.00
Dichanthelium linearifolium	3.57	4.35	0.20
Poa spp.	3.42	4.35	0.17
Carex sp. 1	2.97	4.35	0.11
Danthonia spp.	2.67	4.35	0.07
Carex sp. 2	2.52	4.35	0.04
Collomia linearis	2.52	4.35	0.04
Crataegus spp.	2.52	4.35	0.04
Poa fendleriana longiligula	2.52	4.35	0.04
Poa nervosa	2.52	4.35	0.04
Silene dichotoma	2.52	4.35	0.04
Unknown forb 3	2.52	4.35	0.04
Alyssum parviflorum	2.37	4.35	0.02
Anaphalis margaritacea	2.37	4.35	0.02
Antennaria parvifolia	2.37	4.35	0.02
Delphinium nuttallianum	2.37	4.35	0.02
Galium septentrionale	2.37	4.35	0.02
Juniperus communis alpina	2.37	4.35	0.02
Poa secunda	2.37	4.35	0.02
Schizachyrium scoparium	2.37	4.35	0.02
Yucca glauca	2.37	4.35	0.02
Antennaria neglecta	2.23	4.35	0.00
Aristida spp.	2.23	4.35	0.00
Bromus commutatus	2.23	4.35	0.00
Carex brevior	2.23	4.35	0.00
Chenopodium spp.	2.23	4.35	0.00
Comandra umbellata pallida	2.23	4.35	0.00

Coriflora hirsutissima	2.23	4.35	0.00
Cystopteris fragilis	2.23	4.35	0.00
Descurainia incisa	2.23	4.35	0.00
Eleocharis elliptica compressa	2.23	4.35	0.00
Erigeron colo- mexicanus	2.23	4.35	0.00
Eriogonum flavum	2.23	4.35	0.00
Fallopia convolvulus	2.23	4.35	0.00
Helianthus spp.	2.23	4.35	0.00
Hesperostipa comata	2.23	4.35	0.00
Heuchera bracteata	2.23	4.35	0.00
Juncus arcticus ater	2.23	4.35	0.00
Muhlenbergia wrightii	2.23	4.35	0.00
Opuntia spp.	2.23	4.35	0.00
Oxytropis lambertii	2.23	4.35	0.00
Packera plattensis	2.23	4.35	0.00
Paronychia jamesii	2.23	4.35	0.00
Penstemon secundiflorus	2.23	4.35	0.00
Plantago patagonica	2.23	4.35	0.00
Poa pratensis	2.23	4.35	0.00
Polygonum douglasii	2.23	4.35	0.00
Ribes inerme	2.23	4.35	0.00
Rubus idaeus melanolasius	2.23	4.35	0.00
Sisyrinchium montanum	2.23	4.35	0.00
Solidago spp.	2.23	4.35	0.00
Toxicoscordion venenosum	2.23	4.35	0.00
Trifolium pratense	2.23	4.35	0.00
Triodanis perfoliata	2.23	4.35	0.00
Viola spp.	2.23	4.35	0.00

Appendix 4. Group B Species Importance.

RANKED Group B	Percentage Importance	Constancy	Average Cover
<Other - Litter>	109.00	100.00	36.33
<i>Elymus lanceolatus</i>	54.50	100.00	18.17
<Other - Bare Rock>	41.00	100.00	13.67
<i>Leymus ambiguus</i>	24.50	100.00	8.17
<i>Physocarpus monogynus</i> /P. <i>opulifolius</i>	10.50	33.33	3.50
<i>Rhus aromatica trilobata</i>	9.01	100.00	3.00
<i>Heterotheca villosa</i> /H. <i>foliosa</i>	4.51	100.00	1.50
<i>Padus virginiana melanocarpa</i>	3.51	100.00	1.17
<i>Artemisia frigida</i>	3.00	100.00	1.00
<i>Linaria vulgaris</i>	3.00	33.33	1.00
<i>Achillea lanulosa</i>	2.51	100.00	0.84
<i>Anisantha tectorum</i>	2.51	100.00	0.84
<i>Yucca glauca</i>	2.51	100.00	0.84
<i>Poa compressa</i>	2.50	100.00	0.83
<i>Bromus japonicus</i>	2.01	100.00	0.67
<i>Carex</i> spp.	2.01	100.00	0.67
<i>Grindelia squarrosa</i> /G. <i>subalpina</i>	2.01	100.00	0.67
<i>Cerastium strictum</i>	2.00	100.00	0.67
<i>Achnatherum nelsonii</i>	1.51	100.00	0.50
<i>Leucopoa kingii</i>	1.51	100.00	0.50
<i>Carduus nutans macrolepis</i>	1.50	100.00	0.50
<i>Alyssum alyssoides</i>	1.02	100.00	0.34
<i>Artemisia ludoviciana</i>	1.02	100.00	0.34
<i>Opuntia polyacantha</i>	1.02	100.00	0.34
<i>Poa agassizensis</i>	1.01	66.67	0.34
<i>Saponaria officinalis</i>	1.00	33.33	0.33
<i>Campanula rotundifolia</i>	0.52	100.00	0.17
<i>Elymus elymoides</i> /E. <i>longifolius</i>	0.52	100.00	0.17
<i>Eriogonum flavum</i>	0.52	100.00	0.17
<i>Lathyrus</i> spp.	0.52	100.00	0.17
<i>Opuntia macrorhiza</i>	0.52	100.00	0.17
<i>Pinus ponderosa scopulorum</i>	0.52	100.00	0.17
<i>Verbascum thapsus</i>	0.52	100.00	0.17
<i>Astragalus flexuosus</i>	0.52	100.00	0.17
<i>Hellanthus pumilus</i>	0.52	100.00	0.17
<i>Oxytropis sericea</i>	0.52	100.00	0.17
<i>Bromus briziformis</i>	0.51	66.67	0.17
<i>Galium septentrionale</i>	0.51	66.67	0.17
<i>Schizachyrium scoparium</i>	0.51	66.67	0.17
<i>Nepeta cataria</i>	0.51	66.67	0.17
<i>Phlox multiflora</i>	0.51	66.67	0.17

<Other - Soil>	0.50	33.33	0.17
<i>Nassella viridula</i>	0.50	33.33	0.17
<i>Iris missouriensis</i>	0.50	33.33	0.17
<i>Phlox</i> spp.	0.50	33.33	0.17
<i>Allium cernuum</i>	0.03	100.00	0.01
<i>Lithospermum multiflorum</i>	0.03	100.00	0.01
<i>Penstemon virens</i>	0.03	100.00	0.01
<i>Ribes cereum</i>	0.03	100.00	0.01
<i>Symphoricarpos albus</i> /S. <i>occidentalis</i>	0.03	100.00	0.01
<i>Tragopogon dubius major</i>	0.03	100.00	0.01
<i>Adenolinum lewisii</i>	0.03	100.00	0.01
<i>Cystopteris fragilis</i>	0.02	66.67	0.01
<i>Dryocallis fissa</i>	0.02	66.67	0.01
<i>Eriogonum umbellatum</i>	0.02	66.67	0.01
<i>Harbouria trachyleura</i>	0.02	66.67	0.01
<i>Hesperostipa comata</i>	0.02	66.67	0.01
<i>Koeleria macrantha</i>	0.02	66.67	0.01
<i>Taraxacum officinale</i>	0.02	66.67	0.01
<i>Elymus canadensis</i>	0.02	66.67	0.01
<i>Bouteloua curtipendula</i>	0.02	66.67	0.01
<i>Packera cana</i>	0.02	66.67	0.01
<i>Amerosedum lanceolatum</i>	0.01	33.33	0.00
<i>Aster porteri</i>	0.01	33.33	0.00
<i>Camelina microcarpa</i>	0.01	33.33	0.00
<i>Cirsium ochrocentrum</i>	0.01	33.33	0.00
<i>Convolvulus arvensis</i>	0.01	33.33	0.00
<i>Gaillardia aristata</i>	0.01	33.33	0.00
<i>Galium</i> spp.	0.01	33.33	0.00
<i>Lactuca serriola</i>	0.01	33.33	0.00
<i>Monarda fistulosa methifolia</i> /M. <i>pectinata</i>	0.01	33.33	0.00
<i>Oreobatus deliciosus</i>	0.01	33.33	0.00
<i>Paronychia jamesii</i>	0.01	33.33	0.00
<i>Phacelia heterophylla</i>	0.01	33.33	0.00
<i>Pulsatilla patens multifida</i>	0.01	33.33	0.00
<i>Rosa woodsii</i> /R. <i>sayi</i>	0.01	33.33	0.00
<i>Sabina scopulorum</i>	0.01	33.33	0.00
<i>Scutellaria brittonii</i>	0.01	33.33	0.00
<i>Silene antirrhina</i>	0.01	33.33	0.00
<i>Sisyrinchium montanum</i>	0.01	33.33	0.00
<i>Thermopsis divaricarpa</i>	0.01	33.33	0.00
<i>Poa cusickii epilis</i>	0.01	33.33	0.00
<i>Bromopsis lanatipes</i>	0.01	33.33	0.00
<i>Townsendia grandiflora</i>	0.01	33.33	0.00
<i>Linaria genistifolia dalmatica</i>	0.01	33.33	0.00

Appendix 5. Group C Species Importance.

RANKED Group C	Percentage Importance	Constancy	Average Cover
<Other - Litter>	945.71	100.00	57.35
<Other - Bare Rock>	192.28	100.00	8.94
Carex spp.	100.00	88.24	3.41
Pinus ponderosa scopulorum	72.84	100.00	1.27
Artemisia ludoviciana	71.02	100.00	1.15
Danthonia spicata pinetorum	67.97	52.94	2.56
Poa agassizensis	66.21	82.35	1.44
Penstemon virens	66.17	88.24	1.24
Andropogon gerardii	65.74	82.35	1.41
Poa compressa	65.35	76.47	1.59
Hesperostipa comata	57.98	82.35	0.91
Ambrosia psilostachya coronopifolia	53.88	82.35	0.65
Opuntia macrorhiza	52.44	88.24	0.36
Achillea lanulosa	51.54	88.24	0.30
Rhus aromatica trilobata	49.97	64.71	1.00
Ribes cereum	49.32	82.35	0.36
Grindelia squarrosa/G. subalpina	48.38	82.35	0.30
Symphoricarpos albus/S. occidentalis	45.55	52.94	1.12
Padus virginiana melanocarpa	45.19	47.06	1.30
Schizachyrium scoparium	43.51	70.59	0.39
Heterotheca villosa/H. foliosa	42.23	64.71	0.50
Artemisia frigida	41.67	70.59	0.27
Bromus japonicus	40.35	64.71	0.38
Verbascum thapsus	39.86	70.59	0.15
Phacelia heterophylla	38.06	70.59	0.04
Muhlenbergia montana	35.42	58.82	0.27
Tragopogon dubius major	35.38	64.71	0.06
Oreobatus deliciosus	34.51	58.82	0.21
Drymocallis fissa	34.48	64.71	0.01
Mahonia repens	34.14	52.94	0.39
Cerastium strictum	34.05	58.82	0.18
Elymus elymoides/E. longifolius	33.15	58.82	0.12
Lathyrus spp.	32.82	47.06	0.50
Carduus nutans macrolepis	31.79	58.82	0.03
Anisantha tectorum	30.98	47.06	0.38
Koeleria macrantha	29.10	52.94	0.06
Erigeron spp.	28.70	47.06	0.24
Rosa woodsii/R. sayi	26.44	47.06	0.09
Bromus briziformis	26.02	41.18	0.27
Achnatherum nelsonii	25.56	41.18	0.24

Yucca glauca	23.75	41.18	0.12
Gaillardia aristata	22.39	41.18	0.03
Hypericum perforatum	22.39	41.18	0.03
Anisantha/Bromus spp.	22.05	29.41	0.41
Psoraleidium tenuiflorum	21.94	41.18	0.00
Cercocarpus montanus	21.58	29.41	0.38
Leymus ambiguus	21.20	23.53	0.56
<Other - Soil>	21.12	29.41	0.35
Eriogonum flavum	20.69	29.41	0.33
<Other - Gravel>	20.36	17.65	0.71
Allium spp.	20.22	29.41	0.30
Chondrosium gracile	20.16	35.29	0.09
Bromopsis lanatipes	19.70	35.29	0.06
Geranium caespitosum	19.70	35.29	0.06
Campanula rotundifolia	19.25	35.29	0.03
Cirsium ochrocentrum	19.25	35.29	0.03
Eriogonum umbellatum	19.25	35.29	0.03
Allium cernuum	18.80	35.29	0.00
Bouteloua curtipendula	18.80	35.29	0.00
Liatris punctata	18.80	35.29	0.00
Monarda fistulosa methifolia/M. pectinata	18.40	29.41	0.18
Cynoglossum officinale	16.12	29.41	0.03
Mertensia lanceolata	16.12	29.41	0.03
Opuntia fragilis	16.12	29.41	0.03
Sporobolus cryptandrus	15.79	17.65	0.41
Breea arvensis	15.67	29.41	0.00
Cystopteris fragilis	15.67	29.41	0.00
Taraxacum officinale	15.67	29.41	0.00
Sabina scopulorum	14.82	23.53	0.15
Antennaria spp.	14.81	23.53	0.15
Galium spp.	14.35	23.53	0.12
Oreocarya virgata	14.34	23.53	0.12
Elymus trachycaulus	13.90	23.53	0.09
Eremogone fendleri	13.89	23.53	0.09
Toxicodendron rydbergii	13.44	23.53	0.06
Elymus lanceolatus	13.43	23.53	0.06
Opuntia polyacantha	13.43	23.53	0.06
Arnica fulgens	12.99	23.53	0.03
Aster porteri	12.99	23.53	0.03
Eriogonum spp.	12.99	23.53	0.03
Gutierrezia sarothrae	12.99	23.53	0.03
Pulsatilla patens multifida	12.99	23.53	0.03
Lactuca serriola	12.54	23.53	0.00

Tradescantia occidentalis scopulorum	12.54	23.53	0.00
Carex sp. 1	12.20	11.76	0.38
Alyssum alyssoides	12.13	17.65	0.18
Lupinus argenteus	11.29	11.76	0.32
<Other - Trail>	10.91	5.88	0.50
Neolepia campestre	10.30	17.65	0.06
Astragalus flexuosus	9.85	17.65	0.03
Ceanothus fendleri	9.85	17.65	0.03
Leucopoa kingii	9.85	17.65	0.03
Pneumonanthe bigelovii	9.85	17.65	0.03
Corallorhiza maculata	9.40	17.65	0.00
Helianthus pumilus	9.40	17.65	0.00
Hesperostipa spartea	9.40	17.65	0.00
Phleum pratense	9.40	17.65	0.00
Physalis virginiana	9.40	17.65	0.00
Linaria vulgaris	8.62	5.88	0.35
Bromopsis inermis	7.17	11.76	0.06
Lithospermum multiflorum	7.17	11.76	0.06
Oligosporus pacificus	7.17	11.76	0.06
Potentilla recta	7.17	11.76	0.06
Ribes inerme	7.17	11.76	0.06
Acosta diffusa	6.72	11.76	0.03
Colutea arborescens	6.72	11.76	0.03
Senecio integerrimus	6.72	11.76	0.03
Thermopsis divaricarpa	6.72	11.76	0.03
Amerosedum lanceolatum	6.27	11.76	0.00
Asclepias spp.	6.27	11.76	0.00
Calochortus gunnisonii	6.27	11.76	0.00
Carex pensylvanica	6.27	11.76	0.00
heliophila	6.27	11.76	0.00
Coryphantha missouriensis	6.27	11.76	0.00
Dactylis glomerata	6.27	11.76	0.00
Echinocereus viridiflorus	6.27	11.76	0.00
Fallopia convolvulus	6.27	11.76	0.00
Frasera speciosa	6.27	11.76	0.00
Harbouria trachypleura	6.27	11.76	0.00
Lesquerella montana	6.27	11.76	0.00
Lomatium orientale	6.27	11.76	0.00
Nassella viridula	6.27	11.76	0.00
Onosmodium molle occidentale	6.27	11.76	0.00
Oxalis dillenii	6.27	11.76	0.00
Packera fendleri	6.27	11.76	0.00
Pseudognaphalium canescens	6.27	11.76	0.00
Senecio spp.	6.27	11.76	0.00
Silene antirrhina	6.27	11.76	0.00
Sorghastrum avenaceum	6.27	11.76	0.00

Townsendia grandiflora	6.27	11.76	0.00
Heterotheca villosa	5.87	5.88	0.18
Agrostis gigantea	4.96	5.88	0.12
Unknown grass	4.50	5.88	0.09
Arctostaphylos uva-ursi	4.04	5.88	0.06
Bromus spp.	4.04	5.88	0.06
Crataegus spp.	4.04	5.88	0.06
Grindelia squarrosa	4.04	5.88	0.06
Rhus glabra	4.04	5.88	0.06
Unknown forb	4.04	5.88	0.06
Alyssum parviflorum	3.58	5.88	0.03
Carex sp. 2	3.58	5.88	0.03
Convolvulus arvensis	3.58	5.88	0.03
Heuchera spp.	3.58	5.88	0.03
Rubus idaeus melanolasius	3.58	5.88	0.03
Tragia ramosa	3.58	5.88	0.03
Adenolinum lewisii	3.13	5.88	0.00
Agropyron cristatum desertorum	3.13	5.88	0.00
Aristida spp.	3.13	5.88	0.00
Aster laevis geyeri	3.13	5.88	0.00
Camelina microcarpa	3.13	5.88	0.00
Carex brevior	3.13	5.88	0.00
Castilleja miniata	3.13	5.88	0.00
Celtis reticulata	3.13	5.88	0.00
Chenopodium leptophyllum	3.13	5.88	0.00
Chlorocrepis albiflora	3.13	5.88	0.00
Clematis ligusticifolia	3.13	5.88	0.00
Collinsia parviflora	3.13	5.88	0.00
Comandra umbellata pallida	3.13	5.88	0.00
Coriflora hirsutissima	3.13	5.88	0.00
Dalea purpurea	3.13	5.88	0.00
Dichanthelium spp.	3.13	5.88	0.00
Elytrigia repens	3.13	5.88	0.00
Erigeron speciosus macranthus	3.13	5.88	0.00
Erysimum capitatum	3.13	5.88	0.00
Heuchera bracteata	3.13	5.88	0.00
Juncus arcticus ater	3.13	5.88	0.00
Lathyrus leucanthus	3.13	5.88	0.00
Linaria genistifolia dalmatica	3.13	5.88	0.00
Lithospermum incisum	3.13	5.88	0.00
Muhlenbergia wrightii	3.13	5.88	0.00
Nepeta cataria	3.13	5.88	0.00
Oenothera villosa strigosa	3.13	5.88	0.00
Oligosporus dracunculus glaucus	3.13	5.88	0.00
Penstemon secundiflorus	3.13	5.88	0.00
Penstemon spp.	3.13	5.88	0.00
Physalis hederifolia comata	3.13	5.88	0.00

Prunella vulgaris	3.13	5.88	0.00
Pseudotsuga menziesii	3.13	5.88	0.00
Quercus spp.	3.13	5.88	0.00
Scrophularia lanceolata	3.13	5.88	0.00
Scutellaria brittonii	3.13	5.88	0.00
Solidago spp.	3.13	5.88	0.00
Sporobolus	3.13	5.88	0.00

heterolepis			
Stenactis strigosa	3.13	5.88	0.00
Thinopyrum intermedium	3.13	5.88	0.00
Turritis glabra	3.13	5.88	0.00
Viola spp.	3.13	5.88	0.00

Appendix 6. Group D Species Importance.

RANKED Group D	Percentage Importance	Constancy	Average Cover
<Other - Litter>	286.91	100.00	44.18
Andropogon gerardii	100.00	100.00	9.32
<Other - Bare Rock>	93.69	100.00	8.15
Rhus aromatica trilobata	73.98	100.00	4.47
Poa agassizensis	71.93	100.00	4.09
Carex spp.	62.83	94.12	2.94
Artemisia ludoviciana	59.79	100.00	1.83
Ambrosia psilostachya coronopifolia	58.85	100.00	1.65
Pinus ponderosa scopulorum	54.74	100.00	0.88
Psoralea tenuiflorum	54.32	94.12	1.35
Poa compressa	52.01	88.24	1.47
Grindelia squarrosa/G. subalpina	48.82	94.12	0.33
Tragopogon dubius major	47.88	94.12	0.15
Opuntia macrorhiza	45.88	88.24	0.33
Bromus japonicus	45.77	82.35	0.86
Hesperostipa comata	43.34	70.59	1.50
Hypericum perforatum	42.94	82.35	0.33
Ribes cereum	42.62	82.35	0.27
Liatris punctata	42.31	82.35	0.21
Achillea lanulosa	39.37	76.47	0.21
Rosa woodsii/R. sayi	37.52	70.59	0.42
Elymus elymoides/E. longifolius	37.05	70.59	0.33
Koeleria macrantha	36.42	70.59	0.21
Drymocallis fissa	34.41	64.71	0.38
Phacelia heterophylla	33.01	64.71	0.12
Cirsium ochrocentrum	32.70	64.71	0.06
Dalea purpurea	32.70	64.71	0.06
Verbascum thapsus	32.54	64.71	0.04
Yucca glauca	31.62	58.82	0.41
Penstemon virens	30.69	58.82	0.24
Achnatherum nelsonii	30.58	52.94	0.77
Muhlenbergia montana	28.85	52.94	0.44
Bouteloua curtipendula	27.75	52.94	0.24
Sorghastrum avenaceum	27.63	47.06	0.77
Aster porteri	27.48	47.06	0.74
Schizachyrium scoparium	27.28	52.94	0.15
Oxalis dillenii	27.12	52.94	0.12
Carduus nutans macrolepis	26.97	52.94	0.09
Onosmodium molle occidentale	26.97	52.94	0.09
Artemisia frigida	26.81	52.94	0.06
Ratibida columnifera	26.65	52.94	0.03
Heterotheca villosa/H. foliosa	23.71	47.06	0.03
Virgulus falcatus	22.49	41.18	0.35

Oreobatus deliciosus	22.02	41.18	0.27
Chondrosium gracile	22.01	41.18	0.27
Padus virginiana melanocarpa	21.92	35.29	0.80
Lactuca serriola	20.92	41.18	0.06
Oligosporus dracunculus glaucus	20.92	41.18	0.06
Cynoglossum officinale	20.92	41.18	0.06
Campanula rotundifolia	20.76	41.18	0.03
Gutierrezia sarothrae	20.76	41.18	0.03
Danthonia spicata pinetorum	20.65	35.29	0.56
Allium cernuum	20.61	41.18	0.00
Symphoricarpos albus/S. occidentalis	18.92	35.29	0.24
Comandra umbellata pallida	18.13	35.29	0.09
Adenolinum lewisii	17.98	35.29	0.06
Lathyrus spp.	17.82	35.29	0.03
Pneumonanthe bigelovii	17.82	35.29	0.03
Cerastium strictum	17.67	35.29	0.00
Opuntia fragilis	17.67	35.29	0.00
Pulsatilla patens multifida	17.67	35.29	0.00
Taraxacum officinale	17.67	35.29	0.00
Sabina scopulorum	17.24	29.41	0.47
Pascopyrum smithii	16.92	29.41	0.41
Anisantha tectorum	16.29	29.41	0.30
Helianthus pumilus	15.35	29.41	0.12
Eremogone fendleri	15.03	29.41	0.06
Monarda fistulosa methifolia/M. pectinata	14.72	29.41	0.00
<Other - Soil>	14.13	23.53	0.44
Erigeron colo-mexicanus/E. divergens	13.82	23.53	0.38
Mahonia repens	13.03	23.53	0.24
Tragia ramosa	12.71	23.53	0.18
Lithospermum multiflorum	12.25	23.53	0.09
Bromus briziformis	12.09	23.53	0.06
Antennaria spp.	12.09	23.53	0.06
Eriogonum umbellatum	12.09	23.53	0.06
Juncus interior	12.09	23.53	0.06
Camelina microcarpa	11.93	23.53	0.03
Hesperostipa spartea	11.93	23.53	0.03
Toxicodendron rydbergii	11.93	23.53	0.03
Tradescantia occidentalis scopulorum	11.93	23.53	0.03
Geranium caespitosum	11.78	23.53	0.00
Harbouria trachyleura	11.78	23.53	0.00
Unknown grass 2	10.40	17.65	0.29
Muhlenbergia wrightii	9.77	17.65	0.18
Agrostis spp.	9.61	17.65	0.15
Elymus lanceolatus	9.46	17.65	0.12

Erigeron spp.	9.30	17.65	0.09
Astragalus flexuosus	8.99	17.65	0.03
Celtis reticulata	8.99	17.65	0.03
Frasera speciosa	8.99	17.65	0.03
Gaillardia aristata	8.99	17.65	0.03
Solidago spp.	8.99	17.65	0.03
Acosta diffusa	8.83	17.65	0.00
Alyssum alyssoides	8.83	17.65	0.00
Apocynum adrosaemifolium/A. cannabinum	8.83	17.65	0.00
Asclepias stenophylla	8.83	17.65	0.00
Asclepias viridiflora	8.83	17.65	0.00
Bromopsis lanatipes	8.83	17.65	0.00
Calochortus gunnisonii	8.83	17.65	0.00
Chenopodium leptophyllum	8.83	17.65	0.00
Eriogonum spp.	8.83	17.65	0.00
Physalis virginiana	8.83	17.65	0.00
Thermopsis divaricarpa	8.83	17.65	0.00
Sporobolus spp.	7.62	11.76	0.32
Unknown grass	7.62	11.76	0.32
Anisantha/Bromus spp.	6.51	11.76	0.12
Dichanthellum oligosanthos scribnerianum	6.51	11.76	0.12
Panicum virgatum	6.51	11.76	0.12
Sporobolus heterolepis	6.20	11.76	0.06
Thinopyrum intermedium	6.04	11.76	0.03
Amorpha nana	5.89	11.76	0.00
Aristida purpurea	5.89	11.76	0.00
Aster laevis geyeri	5.89	11.76	0.00
Cystopteris fragilis	5.89	11.76	0.00
Echinocereus viridiflorus	5.89	11.76	0.00
Heuchera spp.	5.89	11.76	0.00
Lesquerella montana	5.89	11.76	0.00
Mertensia lanceolata	5.89	11.76	0.00
Neolepia campestre	5.89	11.76	0.00
Oligoneuron rigidum	5.89	11.76	0.00
Penstemon secundiflorus	5.89	11.76	0.00
Phleum pratense	5.89	11.76	0.00
Pseudotsuga menziesii	5.89	11.76	0.00
Scutellaria brittonii	5.89	11.76	0.00
Carex sp. 1	4.36	5.88	0.26
Lupinus argenteus	3.73	5.88	0.15
Dichanthellum linearifolium	3.57	5.88	0.12
Unknown grass 1	3.57	5.88	0.12
Asclepias pumila	3.41	5.88	0.09
Bromopsis inermis	3.41	5.88	0.09
Elymus canadensis	3.41	5.88	0.09
Tithymalus spathulatus	3.26	5.88	0.06
Unknown forb	3.26	5.88	0.06

Alyssum spp.	3.10	5.88	0.03
Calylophus serrulatus	3.10	5.88	0.03
Cercocarpus montanus	3.10	5.88	0.03
Heterotheca foliosa	3.10	5.88	0.03
Oligosporus pacificus	3.10	5.88	0.03
Potentilla recta	3.10	5.88	0.03
Prunus americana	3.10	5.88	0.03
Acer glabrum	2.94	5.88	0.00
Acetosella vulgaris	2.94	5.88	0.00
Alyssum parviflorum	2.94	5.88	0.00
Amelanchier alnifolia	2.94	5.88	0.00
Amerosedum lanceolatum	2.94	5.88	0.00
Asclepias spp.	2.94	5.88	0.00
Asparagus officinalis	2.94	5.88	0.00
Astragalus spp.	2.94	5.88	0.00
Bassia sieversiana	2.94	5.88	0.00
Brexa arvensis	2.94	5.88	0.00
Brickellia rosmarinifolia	2.94	5.88	0.00
chlorolepis	2.94	5.88	0.00
Bromopsis canadensis/B. porteri	2.94	5.88	0.00
Carex pensylvanica	2.94	5.88	0.00
heliophila	2.94	5.88	0.00
Ceanothus fendleri	2.94	5.88	0.00
Ceanothus herbaceus	2.94	5.88	0.00
Corallorrhiza maculata	2.94	5.88	0.00
Crataegus spp.	2.94	5.88	0.00
Dactylis glomerata	2.94	5.88	0.00
Dianthus armeria	2.94	5.88	0.00
Elymus trachycaulus	2.94	5.88	0.00
Fallopia convolvulus	2.94	5.88	0.00
Galium spp.	2.94	5.88	0.00
Heterotheca villosa	2.94	5.88	0.00
Iris missouriensis	2.94	5.88	0.00
Nassella viridula	2.94	5.88	0.00
Negundo aceroides	2.94	5.88	0.00
interius	2.94	5.88	0.00
Opuntia polyacantha	2.94	5.88	0.00
Oreocarya virgata	2.94	5.88	0.00
Oxybaphus hirsutus	2.94	5.88	0.00
Oxybaphus spp.	2.94	5.88	0.00
Oxytropis lambertii	2.94	5.88	0.00
Packera fendleri	2.94	5.88	0.00
Penstemon spp.	2.94	5.88	0.00
Plantago patagonica	2.94	5.88	0.00
Silene antirrhina	2.94	5.88	0.00
Solidago missouriensis	2.94	5.88	0.00
Sporobolus cryptandrus	2.94	5.88	0.00
Verbena bracteata	2.94	5.88	0.00
Viola nuttallii	2.94	5.88	0.00
Viola spp.	2.94	5.88	0.00

Appendix 7. Group E Species Importance.

RANKED Group E	Percentage Importance	Constancy	Average Cover
<Other - Litter>	752.46	100.00	62.05
<Other - Bare Rock>	147.40	96.83	8.21
<i>Danthonia spicata</i> <i>pinetorum</i>	100.00	74.60	5.11
<i>Carex</i> spp.	80.54	82.54	2.97
<i>Pinus ponderosa</i> <i>scopulorum</i>	75.36	101.59	1.53
<i>Artemisia ludoviciana</i>	54.73	85.71	0.50
<i>Campanula rotundifolia</i>	52.00	85.71	0.26
<i>Mahonia repens</i>	50.82	58.73	1.53
<i>Penstemon virens</i>	47.24	76.19	0.32
<i>Achillea lanulosa</i>	45.44	74.60	0.24
<i>Harbouria trachyleura</i>	44.95	76.19	0.12
<i>Ribes cereum</i>	43.83	73.02	0.18
<i>Ceanothus fendleri</i>	43.17	63.49	0.61
<i>Poa agassizensis</i>	42.75	60.32	0.73
<i>Drymocallis fissa</i>	42.45	69.84	0.22
<i>Pseudotsuga menziesii</i>	40.22	50.79	0.99
<i>Heterotheca villosa</i> /H. <i>foliosa</i>	39.52	63.49	0.28
<i>Elymus elymoides</i> /E. <i>longifolius</i>	39.49	66.67	0.12
<i>Opuntia macrorhiza</i>	39.22	66.67	0.09
<i>Padus virginiana</i> <i>melanocarpa</i>	39.02	52.38	0.81
<i>Grindelia squarrosa</i> /G. <i>subalpina</i>	36.10	60.32	0.14
<i>Verbascum thapsus</i>	35.23	60.32	0.06
<i>Poa compressa</i>	35.12	53.97	0.38
<i>Allium cernuum</i>	34.87	60.32	0.03
<i>Andropogon gerardii</i>	34.69	49.21	0.58
<i>Cerastium strictum</i>	34.55	57.14	0.16
<i>Achnatherum nelsonii</i>	34.05	53.97	0.28
<i>Ambrosia psilostachya</i> <i>coronopifolia</i>	32.80	52.38	0.25
<i>Tragopogon dubius</i> <i>major</i>	32.79	57.14	0.01
<i>Muhlenbergia montana</i>	30.61	49.21	0.22
<i>Anisantha tectorum</i>	30.44	42.86	0.53
<i>Carduus nutans</i> <i>macrolepis</i>	28.59	49.21	0.04
<i>Rosa woodsii</i> /R. <i>sayi</i>	27.82	46.03	0.13
<i>Antennaria</i> spp.	27.56	46.03	0.11
<i>Leucopoa kingii</i>	26.63	38.10	0.43
<i>Phleum pratense</i>	26.31	39.68	0.32
<i>Bromus japonicus</i>	25.35	41.27	0.15
<i>Liatris punctata</i>	24.56	41.27	0.08
<i>Symphoricarpos</i> <i>albus</i> /S. <i>occidentalis</i>	24.43	31.75	0.56
<i>Bromopsis lanatipes</i>	23.56	39.68	0.07
<i>Schizachyrium</i> <i>scoparium</i>	23.53	38.10	0.15

<Other - Soil>	23.16	31.75	0.44
<i>Rhus aromatica</i> <i>trilobata</i>	23.14	34.92	0.28
<i>Koeleria macrantha</i>	22.83	38.10	0.09
<i>Brexa arvensis</i>	22.66	33.33	0.32
<i>Lathyrus</i> spp.	21.91	30.16	0.41
<i>Phacelia heterophylla</i>	21.86	38.10	0.00
<i>Geranium caespitosum</i>	21.04	36.51	0.01
<i>Oreobatus deliciosus</i>	20.83	34.92	0.07
<i>Hesperostipa comata</i>	20.77	31.75	0.23
<i>Artemisia frigida</i>	20.66	34.92	0.06
<i>Solidago</i> spp.	19.48	33.33	0.03
<i>Monarda fistulosa</i> <i>methifolia</i> /M. <i>pectinata</i>	19.03	26.98	0.32
<i>Sabina scopulorum</i>	18.60	28.57	0.20
<i>Gaillardia aristata</i>	18.22	31.75	0.00
<i>Pulsatilla patens</i> <i>multifida</i>	16.66	28.57	0.03
<i>Psoraleum tenuiflorum</i>	15.79	23.81	0.19
<i>Aster porteri</i>	15.37	25.40	0.07
<Other - Gravel>	13.85	12.70	0.59
<i>Cynoglossum officinale</i>	13.75	23.81	0.01
<i>Juniperus communis</i> <i>alpina</i>	13.67	19.05	0.25
<i>Rubus idaeus</i> <i>melanolasius</i>	13.66	17.46	0.33
<i>Eriogonum umbellatum</i>	12.84	22.22	0.01
<i>Bromopsis inermis</i>	12.62	12.70	0.48
<i>Mertensia lanceolata</i>	12.02	20.63	0.02
<i>Taraxacum officinale</i>	12.02	20.63	0.02
<i>Anaphalis margaritacea</i>	11.93	20.63	0.01
<i>Leymus ambiguus</i>	11.87	17.46	0.17
<i>Elytrigia repens</i>	11.79	17.46	0.16
<i>Elymus trachycaulus</i>	11.63	19.05	0.06
<i>Lactuca serriola</i>	11.54	19.05	0.06
<i>Erigeron</i> spp.	11.37	19.05	0.04
<i>Scutellaria brittonii</i>	11.19	19.05	0.03
<i>Hypericum perforatum</i>	11.19	19.05	0.03
<i>Cystopteris fragilis</i>	11.10	19.05	0.02
<i>Silene antirrhina</i>	10.93	19.05	0.00
<i>Eriogonum flavum</i>	10.37	17.46	0.03
<i>Chlorocrepis albiflora</i>	10.19	17.46	0.02
<i>Packera fendleri</i>	10.19	17.46	0.02
<i>Opuntia polyacantha</i>	10.02	17.46	0.00
<i>Yucca glauca</i>	9.37	15.87	0.03
<i>Cirsium ochrocentrum</i>	9.11	15.87	0.00
<i>Oreocarya virgata</i>	9.11	15.87	0.00
<i>Allium</i> spp.	9.08	14.29	0.08
<i>Sorghastrum</i> <i>avenaceum</i>	8.88	12.70	0.14
<i>Arnica fulgens</i>	8.46	14.29	0.03
<i>Lupinus argenteus</i>	8.46	14.29	0.02

<i>Thermopsis divaricarpa</i>	8.44	12.70	0.10
<i>Corallorhiza maculata</i>	8.20	14.29	0.00
<i>Frasera speciosa</i>	8.20	14.29	0.00
<i>Carex</i> sp. 1	7.88	11.11	0.13
<i>Helianthus pumilus</i>	7.64	12.70	0.03
<i>Arctostaphylos uva-ursi</i>	7.61	11.11	0.11
<i>Eremogone fendleri</i>	7.55	12.70	0.02
<i>Bromus briziformis</i>	7.29	12.70	0.00
<i>Lesquerella montana</i>	7.29	12.70	0.00
<i>Cercocarpus montanus</i>	7.15	9.52	0.15
<i>Galium septentrionale</i>	6.99	11.11	0.06
<i>Elymus lanceolatus</i>	6.82	11.11	0.04
<i>Acer glabrum</i>	6.46	11.11	0.01
<i>Gutierrezia sarothrae</i>	6.46	11.11	0.01
<i>Amerosedum lanceolatum</i>	6.38	11.11	0.00
<i>Achnatherum scribneri</i>	6.35	9.52	0.08
<i>Toxicodendron rydbergii</i>	5.73	9.52	0.02
<i>Elymus canadensis</i>	5.64	9.52	0.02
<i>Iris missouriensis</i>	5.64	9.52	0.02
Unknown forb	5.59	6.35	0.17
<i>Onosmodium molle occidentale</i>	5.55	9.52	0.01
<i>Calochortus gunnisonii</i>	5.47	9.52	0.00
<i>Physalis</i> spp.	5.47	9.52	0.00
<i>Glycyrrhiza lepidota</i>	5.46	3.17	0.33
<i>Carex pensylvanica heliophila</i>	5.08	7.94	0.05
<i>Carex occidentalis</i>	4.99	7.94	0.04
<i>Apocynum androsaemifolium</i>	4.91	7.94	0.03
<i>Muhlenbergia wrightii</i>	4.73	7.94	0.02
Unknown grass	4.70	6.35	0.10
<i>Rhus glabra</i>	4.64	7.94	0.01
<i>Dalea purpurea</i>	4.55	7.94	0.00
<i>Galium</i> spp.	4.55	7.94	0.00
<i>Oxalis dillenii</i>	4.55	7.94	0.00
<i>Solidago nana</i>	4.09	6.35	0.04
<i>Bouteloua curtipendula</i>	3.91	6.35	0.02
<i>Hesperostipa spartea</i>	3.90	6.35	0.02
<i>Sporobolus heterolepis</i>	3.86	3.17	0.18
<i>Sporobolus cryptandrus</i>	3.82	6.35	0.02
<i>Alyssum alyssoides</i>	3.73	6.35	0.01
<i>Apocynum androsaemifolium/A. cannabinum</i>	3.73	6.35	0.01
<i>Fallopia convolvulus</i>	3.73	6.35	0.01
<i>Heterotheca foliosa</i>	3.73	6.35	0.01
<i>Heterotheca villosa</i>	3.73	6.35	0.01
<i>Nassella viridula</i>	3.73	6.35	0.01
<i>Physalis hederifolia comata</i>	3.73	6.35	0.01
<i>Dactylis glomerata</i>	3.64	6.35	0.00

<i>Heuchera</i> spp.	3.64	6.35	0.00
<i>Pterospora andromedea</i>	3.64	6.35	0.00
<Other - Trail>	3.33	3.17	0.13
<i>Selaginella</i> spp.	3.17	4.76	0.04
<i>Prunus americana</i>	2.98	3.17	0.10
<i>Elymus longifolius</i>	2.91	4.76	0.02
<i>Acosta diffusa</i>	2.73	4.76	0.00
<i>Astragalus adsurgens robustior</i>	2.73	4.76	0.00
<i>Chenopodium</i> spp.	2.73	4.76	0.00
<i>Erysimum capitatum</i>	2.73	4.76	0.00
<i>Galium aparine</i>	2.73	4.76	0.00
<i>Neolepia campestre</i>	2.73	4.76	0.00
<i>Oligosporus dracunculus glaucus</i>	2.73	4.76	0.00
<i>Senecio</i> spp.	2.73	4.76	0.00
<i>Viola</i> spp.	2.73	4.76	0.00
<i>Juncus interior</i>	2.53	3.17	0.06
<i>Pascopyrum smithii</i>	2.26	3.17	0.04
<i>Carex petasata</i>	2.24	1.59	0.12
<i>Thinopyrum intermedium</i>	2.18	3.17	0.03
<i>Carex brevior</i>	2.09	3.17	0.02
<i>Tragia ramosa</i>	2.08	3.17	0.02
<i>Agropyron cristatum desertorum</i>	2.00	3.17	0.02
<i>Osmorhiza depauperata</i>	2.00	3.17	0.02
<i>Carex</i> sp. 2	2.00	3.17	0.02
<i>Grindelia squarrosa</i>	2.00	3.17	0.02
<i>Crocanthemum bicknellii</i>	1.98	1.59	0.10
<i>Alyssum parviflorum</i>	1.91	3.17	0.01
<i>Arrhenatherum elatius</i>	1.91	3.17	0.01
<i>Astragalus flexuosus</i>	1.91	3.17	0.01
<i>Cirsium vulgare</i>	1.91	3.17	0.01
<i>Dicanthelium</i> spp.	1.91	3.17	0.01
<i>Pneumonanthe bigelovii</i>	1.91	3.17	0.01
<i>Senecio integerrimus</i>	1.91	3.17	0.01
<i>Alyssum</i> spp.	1.82	3.17	0.00
<i>Amorpha nana</i>	1.82	3.17	0.00
<i>Anisantha/Bromus</i> spp.	1.82	3.17	0.00
<i>Asclepias stenophylla</i>	1.82	3.17	0.00
<i>Bahia dissecta</i>	1.82	3.17	0.00
<i>Camelina microcarpa</i>	1.82	3.17	0.00
<i>Chenopodium leptophyllum</i>	1.82	3.17	0.00
<i>Chondrosium gracile</i>	1.82	3.17	0.00
<i>Collinsia parviflora</i>	1.82	3.17	0.00
<i>Collomia linearis</i>	1.82	3.17	0.00
<i>Colutea arborescens</i>	1.82	3.17	0.00
<i>Comandra umbellata pallida</i>	1.82	3.17	0.00
<i>Corallorhiza</i> spp.	1.82	3.17	0.00
<i>Dichanthellum oligosanthes</i>	1.82	3.17	0.00

scribnerianum			
Eriogonum spp.	1.82	3.17	0.00
Lithospermum incisum	1.82	3.17	0.00
Lithospermum multiflorum	1.82	3.17	0.00
Malanthemum spp.	1.82	3.17	0.00
Nepeta cataria	1.82	3.17	0.00
Paronychia jamesii	1.82	3.17	0.00
Physalis virginiana	1.82	3.17	0.00
Poa cusickii epilis	1.82	3.17	0.00
Pseudognaphalium canescens	1.82	3.17	0.00
Rumex crispus	1.82	3.17	0.00
Acetosella vulgaris	1.35	1.59	0.04
Unknown grass 1	1.35	1.59	0.04
Unknown grass 3	1.26	1.59	0.03
Panicum virgatum	1.18	1.59	0.02
Allium textile	1.09	1.59	0.02
Lathyrus leucanthus	1.09	1.59	0.02
Unknown forb 1	1.09	1.59	0.02
Unknown grass 2	1.09	1.59	0.02
Agrostis gigantea	1.00	1.59	0.01
Astragalus tenellus	1.00	1.59	0.01
Bassia sieversiana	1.00	1.59	0.01
Dichanthelium linearifolium	1.00	1.59	0.01
Elymus glaucus	1.00	1.59	0.01
Holodiscus discolor	1.00	1.59	0.01
Jamesia americana	1.00	1.59	0.01
Ligusticum porteri	1.00	1.59	0.01
Oxytropis lambertii	1.00	1.59	0.01
Pseudognaphalium viscosum	1.00	1.59	0.01
Acosta maculosa	0.91	1.59	0.00
Adenolinum lewisii	0.91	1.59	0.00
Aletes acaulis	0.91	1.59	0.00
Aristida spp.	0.91	1.59	0.00
Aster laevis geyeri	0.91	1.59	0.00
Astragalus agrestis	0.91	1.59	0.00
Brickellia californica	0.91	1.59	0.00
Brickellia grandiflora	0.91	1.59	0.00
Bromopsis spp.	0.91	1.59	0.00
Carex foenea	0.91	1.59	0.00
Cerasus pensylvanica	0.91	1.59	0.00
Chrysothamnus nauseosus	0.91	1.59	0.00
Clematis ligusticifolia	0.91	1.59	0.00
Convolvulus arvensis	0.91	1.59	0.00
Coriflora hirsutissima	0.91	1.59	0.00
Coryphantha missouriensis	0.91	1.59	0.00
Danthonia parryi	0.91	1.59	0.00
Drymocallis arguta	0.91	1.59	0.00
Elymus elymoides	0.91	1.59	0.00

Erigeron colo-mexicanus	0.91	1.59	0.00
Erigeron colo-mexicanus/E. divergens	0.91	1.59	0.00
Erigeron flagellaris	0.91	1.59	0.00
Erigeron speciosus macranthus	0.91	1.59	0.00
Helianthus spp.	0.91	1.59	0.00
Heliomeris multiflora	0.91	1.59	0.00
Hypericum formosum	0.91	1.59	0.00
Juncus acuminatus	0.91	1.59	0.00
Juncus arcticus ater	0.91	1.59	0.00
Linaria genistifolia dalmatica	0.91	1.59	0.00
Lomatium orientale	0.91	1.59	0.00
Maianthemum stellatum	0.91	1.59	0.00
Nothocalais cuspidata	0.91	1.59	0.00
Oligosporus pacificus	0.91	1.59	0.00
Opuntia fragilis	0.91	1.59	0.00
Penstemon spp.	0.91	1.59	0.00
Phlox multiflora	0.91	1.59	0.00
Physocarpus monogynus/P. opulifolius	0.91	1.59	0.00
Poa pratensis	0.91	1.59	0.00
Poa spp.	0.91	1.59	0.00
Polygonum douglasii	0.91	1.59	0.00
Pseudostellaria jamesiana	0.91	1.59	0.00
Pterogonum alatum	0.91	1.59	0.00
Ratibida columnifera	0.91	1.59	0.00
Saponaria officinalis	0.91	1.59	0.00
Scrophularia lanceolata	0.91	1.59	0.00
Senecio spartioides	0.91	1.59	0.00
Silene scouleri hallii	0.91	1.59	0.00
Thalictrum fendleri	0.91	1.59	0.00
Tithymalus myrsinites	0.91	1.59	0.00
Townsendia grandiflora	0.91	1.59	0.00
Toxicoscordion venenosum	0.91	1.59	0.00
Tradescantia occidentalis scopulorum	0.91	1.59	0.00
Turritis glabra	0.91	1.59	0.00
Virgulus falcatus	0.91	1.59	0.00

Appendix 8. All Samples Importance

	Percentage Importance	Constancy	Average Cover %
<Other - Litter>	1080.3201	100.0000	56.577
<Other - Bare Rock>	187.4962	96.7480	7.382
Carex spp.	100.0000	86.9919	2.851
Danthonia spicata pinetorum	84.5308	52.0325	3.070
Pinus ponderosa scopulorum	79.9809	99.1870	1.371
Poa compressa	75.9529	70.7317	2.022
Andropogon gerardii	68.5303	60.9756	1.912
Poa agassizensis	66.3374	73.1707	1.416
Artemisia ludoviciana	62.5143	88.6179	0.731
Penstemon virens	55.6511	80.4878	0.602
Achillea lanulosa	53.0256	82.1138	0.407
Rhus aromatica trilobata	50.0564	54.4715	1.092
Ribes cereum	45.5764	74.7967	0.220
Grindelia squarrosa/G. subalpina	45.4748	73.9837	0.240
Opuntia macrorhiza	44.5559	74.7967	0.164
Mahonia repens	44.5420	48.7805	0.962
Ambrosia psilostachya coronopifolia	41.4229	57.7236	0.515
Drymocallis fissa	41.2784	67.4797	0.208
Padus virginiana melanocarpa	39.8963	47.1545	0.755
Campanula rotundifolia	39.1889	65.0407	0.167
Tragopogon dubius major	38.5837	67.4797	0.059
Achnatherum nelsonii	37.8817	52.0325	0.494
Cerastium strictum	36.0144	59.3496	0.167
Heterotheca villosa/H. foliosa	34.6834	53.6585	0.268
Muhlenbergia montana	34.2947	52.8455	0.271
Symphoricarpos albus/S. occidentalis	33.9151	41.4634	0.600
Elymus elymoides/E. longifolius	33.5495	56.0976	0.130
Bromus japonicus	33.5055	49.5935	0.327
Arnica fulgens	33.5017	27.6423	1.001
Anisantha tectorum	32.8357	43.0894	0.490
Verbascum thapsus	31.4718	54.4715	0.065
Koeleria macrantha	31.2613	51.2195	0.154
<Other - Soil>	30.3872	33.3333	0.654
Hesperostipa comata	30.3443	39.8374	0.452
Rosa woodsii/R. sayi	29.4400	47.1545	0.178
Antennaria spp.	29.3164	43.9024	0.271
Harbouria	29.2057	50.4065	0.065

trachyleura			
Carduus nutans	29.0570	50.4065	0.057
macrolepis			
Ceanothus fendleri	26.6557	37.3984	0.324
Pseudotsuga menziesii	26.3865	30.0813	0.533
Hypericum perforatum	25.9695	40.6504	0.186
Liatris punctata	25.9164	42.2764	0.133
Artemisia frigida	25.8545	43.0894	0.105
Oreobatus deliciosus	25.4614	41.4634	0.133
Phacelia heterophylla	25.2935	43.9024	0.049
Allium cernuum	25.2316	44.7154	0.020
Psoraleidium tenuiflorum	24.9168	34.9593	0.303
Schizachyrium scoparium	24.6089	39.0244	0.161
Aster porteri	23.2926	34.1463	0.238
Lathyrus spp.	22.4372	30.8943	0.290
Gaillardia aristata	21.3680	37.3984	0.032
Taraxacum officinale	21.1796	34.9593	0.096
Phleum pratense	19.5452	29.2683	0.181
Pulsatilla patens multifida	19.2477	33.3333	0.039
Eremogone fendleri	18.9828	26.0163	0.249
Geranium caespitosum	17.5220	30.8943	0.019
Leucopoa kingii	17.3926	23.5772	0.237
Monarda fistulosa methifolia/M. pectinata	17.1231	24.3902	0.197
Sabina scopulorum	17.1172	24.3902	0.196
Bromopsis lanatipes	16.6709	28.4553	0.047
Elymus lanceolatus	16.5300	13.8211	0.488
Breca arvensis	16.0791	23.5772	0.164
Yucca glauca	16.0231	25.2033	0.111
Mertensia lanceolata	15.5460	26.8293	0.035
Erigeron spp.	15.5151	25.2033	0.083
Allium spp.	15.0381	22.7642	0.131
Cynoglossum officinale	14.9452	26.0163	0.027
Leymus ambiguus	14.6952	14.6341	0.362
Anisantha/Bromus spp.	14.3594	17.0732	0.269
Bromus briziformis	14.0839	22.7642	0.079
Cirsium ochrocentrum	13.8217	24.3902	0.014
Unknown grass	13.5541	12.1951	0.374
Eriogonum umbellatum	13.5125	23.5772	0.022
Lactuca serriola	13.4007	21.1382	0.091
Galium spp.	13.0768	19.5122	0.123
<Other - Gravel>	12.1877	8.9431	0.398
Solidago spp.	12.1535	21.1382	0.022
Chondrosium gracile	11.6514	17.8862	0.094

Sorghastrum avenaceum	11.3865	14.6341	0.179
Neolepia campestre	10.7915	18.6992	0.022
Gutierrezia sarthrae	10.7193	18.6992	0.018
Bouteloua curtipendula	10.3262	17.0732	0.046
Eriogonum flavum	10.2408	16.2602	0.066
Cystopteris fragilis	10.1215	17.8862	0.010
Elymus trachycaulus	9.9449	16.2602	0.050
Bromopsis inermis	9.7654	8.9431	0.265
Alyssum alyssoides	9.4177	15.4472	0.046
Senecio integerrimus	9.3986	14.6341	0.070
Dalea purpurea	9.3588	16.2602	0.018
Helianthus pumilus	9.2749	15.4472	0.038
Unknown forb	9.1057	9.7561	0.203
Lomatium orientale	8.9804	15.4472	0.022
Opuntia polyacantha	8.9068	15.4472	0.018
Oxalis dillenii	8.9053	15.4472	0.017
Scutellaria brittonii	8.8346	15.4472	0.014
Cercocarpus montanus	8.7699	11.3821	0.135
Thermopsis divaricarpa	8.7330	13.8211	0.058
Rubus idaeus melanolasius	8.5255	9.7561	0.171
Pneumonanthe bigelovii	8.5254	14.6341	0.021
Carex pennsylvanica	8.2810	13.0081	0.058
Juniperus communis alpina	8.2384	10.5691	0.130
Fraseria speciosa	8.2353	14.6341	0.005
Carex sp. 1	8.2119	8.9431	0.179
Silene antirrhina	8.1632	14.6341	0.001
Camelina microcarpa	8.0719	13.8211	0.021
Pascopyrum smithii	8.0175	10.5691	0.118
Onosmodium molle occidentale	7.9997	13.8211	0.017
Oreocarya virgata	7.9997	13.8211	0.017
Amerosedum lanceolatum	7.8540	13.8211	0.009
Elytrigia repens	7.8143	11.3821	0.082
Lesquerella montana	7.7818	13.8211	0.005
Packera fendleri	7.5448	13.0081	0.017
Corallorhiza maculata	7.2561	13.0081	0.001
Lupinus argenteus	6.8322	9.7561	0.078
Toxicodendron rydbergii	6.7865	11.3821	0.025
Lithospermum multiflorum	6.7143	11.3821	0.021
Anaphalis margaritacea	6.4934	11.3821	0.009
Opuntia fragilis	6.4213	11.3821	0.005
Potentilla recta	6.3919	9.7561	0.053
Sporobolus cryptandrus	6.2329	8.9431	0.070
Unknown grass 1	6.1726	4.8780	0.191

Oligosporus dracunculus glaucus	6.0414	10.5691	0.009
Eriogonum spp.	6.0399	10.5691	0.009
Calochortus gunnisonii	5.8956	10.5691	0.001
Collinsia parviflora	5.8956	10.5691	0.001
Ratibida columnifera	5.5143	9.7561	0.005
Astragalus flexuosus	5.2772	8.9431	0.017
Hesperostipa spartea	5.2772	8.9431	0.017
Nassella viridula	5.2051	8.9431	0.013
Adenolinum lewisii	5.1344	8.9431	0.009
Chlorocrepis albiflora	5.1329	8.9431	0.009
Potentilla hippiana	5.1329	8.9431	0.009
Muhlenbergia wrightii	5.1197	8.1301	0.033
Juncus interior	5.0314	7.3171	0.053
Unknown grass 2	4.8576	5.6911	0.093
Arctostaphylos uva-ursi	4.7987	6.5041	0.065
Comandra umbellata pallida	4.7515	8.1301	0.013
Galium septentrionale	4.7368	7.3171	0.037
Heuchera spp.	4.6072	8.1301	0.005
Virgulus falcatus	4.5057	6.5041	0.049
Elymus canadensis	4.4453	7.3171	0.021
Apocynum adrosaemifolium/A . cannabinum	4.2259	7.3171	0.009
Tradescantia occidentalis	4.1537	7.3171	0.005
Scopolium	4.1038	4.0650	0.102
Sporobolus heterolepis	3.9227	1.6260	0.167
Glycyrrhiza lepidota	3.9005	5.6911	0.041
Tragia ramosa	3.8594	2.4390	0.138
<Other - Trail>	3.8445	6.5041	0.013
Iris missouriensis	3.7002	6.5041	0.005
Acosta diffusa	3.7002	6.5041	0.005
Fallopia convolvulus	3.7002	6.5041	0.005
Senecio spp.	3.6281	6.5041	0.001
Physalis virginiana	3.6281	6.5041	0.001
Achnatherum scribneri	3.4544	4.8780	0.041
Allium textile	3.3660	4.0650	0.061
Alyssum spp.	3.3189	5.6911	0.009
Acer glabrum	3.2467	5.6911	0.005
Heterotheca villosa	3.2335	4.8780	0.029
Erigeron colo- mexicanus/E. divergens	3.2203	4.0650	0.053
Dactylis glomerata	3.1746	5.6911	0.001
Selaginella spp.	3.1569	4.8780	0.025
Unknown forb 1	3.1334	3.2520	0.073
Rhus glabra	2.9390	4.8780	0.013
Acetosella vulgaris	2.9258	4.0650	0.037
Chenopodium leptophyllum	2.7211	4.8780	0.000
Erysimum capitatum	2.7211	4.8780	0.000

Physalis spp.	2.7211	4.8780	0.000
Viola spp.	2.7211	4.8780	0.000
Thinopyrum intermedium	2.6327	4.0650	0.021
Carex occidentalis	2.6298	4.0650	0.020
Apocynum androsaemifolium	2.5591	4.0650	0.017
Galium aparine	2.4855	4.0650	0.012
Alyssum parviflorum	2.4840	4.0650	0.012
Physocarpus monogynus/P. opulifolius	2.4517	1.6260	0.085
Convolvulus arvensis	2.4119	4.0650	0.008
Heterotheca foliosa	2.4119	4.0650	0.008
Prunus americana	2.3883	2.4390	0.057
Dichanthelium linearifolium	2.3869	2.4390	0.057
Nepeta cataria	2.3397	4.0650	0.004
Physalis hederifolia comata	2.3397	4.0650	0.004
Asclepias stenophylla	2.2675	4.0650	0.000
Rumex crispus	2.2675	4.0650	0.000
Turritis glabra	2.2675	4.0650	0.000
Linaria vulgaris	2.2293	1.6260	0.073
Solidago nana	2.1807	3.2520	0.021
Carex sp. 2	2.1763	3.2520	0.020
Dichanthelium oligosanthes scribnerianum	2.1056	3.2520	0.016
Carex brevior	2.0334	3.2520	0.012
Oligosporus pacificus	2.0320	3.2520	0.012
Celtis reticulata	1.8862	3.2520	0.004
Colutea arborescens	1.8862	3.2520	0.004
Juncus spp.	1.8862	3.2520	0.004
Noccaea montana	1.8862	3.2520	0.004
Panicum virgatum	1.8715	2.4390	0.028
Amorpha nana	1.8140	3.2520	0.000
Aster laevis geyeri	1.8140	3.2520	0.000
Chenopodium spp.	1.8140	3.2520	0.000
Echinocereus viridiflorus	1.8140	3.2520	0.000
Paronychia jamesii	1.8140	3.2520	0.000
Penstemon secundiflorus	1.8140	3.2520	0.000
Pseudognaphalium canescens	1.8140	3.2520	0.000
Pterospora andromedea	1.8140	3.2520	0.000
Townsendia grandiflora	1.8140	3.2520	0.000
Agrostis spp.	1.7242	2.4390	0.020
Sporobolus spp.	1.7140	1.6260	0.045
Crataegus spp.	1.6521	2.4390	0.016
Grindelia squarrosa	1.6506	2.4390	0.016
Carex petasata	1.5564	0.8130	0.061
Agropyron cristatum desertorum	1.5063	2.4390	0.008
Collomia linearis	1.5063	2.4390	0.008
Ribes inerme	1.5063	2.4390	0.008

Elymus longifolius	1.5048	2.4390	0.008
Poa spp.	1.4945	1.6260	0.033
Oxytropis lambertii	1.4327	2.4390	0.004
Oxytropis sericea	1.4327	2.4390	0.004
Phlox multiflora	1.4327	2.4390	0.004
Aristida spp.	1.3605	2.4390	0.000
Asclepias spp.	1.3605	2.4390	0.000
Asclepias viridiflora	1.3605	2.4390	0.000
Astragalus adsurgens robustior	1.3605	2.4390	0.000
Astragalus agrestis	1.3605	2.4390	0.000
Coriflora hirsutissima	1.3605	2.4390	0.000
Coryphantha missouriensis	1.3605	2.4390	0.000
Juncus arcticus ater	1.3605	2.4390	0.000
Leucocrinum montanum	1.3605	2.4390	0.000
Linaria genistifolia dalmatica	1.3605	2.4390	0.000
Lithospermum inclisum	1.3605	2.4390	0.000
Nothocalais cuspidata	1.3605	2.4390	0.000
Penstemon spp.	1.3605	2.4390	0.000
Poa cusickii epilis	1.3605	2.4390	0.000
Thlaspi arvense	1.3605	2.4390	0.000
Crocianthemum bicknellii	1.3355	0.8130	0.049
Agrostis gigantea	1.2722	1.6260	0.020
Erigeron vetensis	1.1264	1.6260	0.012
Lathyrus leucanthus	1.0528	1.6260	0.008
Saponaria officinalis	1.0528	1.6260	0.008
Arrhenatherum elatus	0.9792	1.6260	0.004
Bassia sieversiana	0.9792	1.6260	0.004
Cirsium vulgare	0.9792	1.6260	0.004
Dichanthelium spp.	0.9792	1.6260	0.004
Aristida purpurea	0.9070	1.6260	0.000
Bahia dissecta	0.9070	1.6260	0.000
Castilleja sessiliflora	0.9070	1.6260	0.000
Claytonia rosea	0.9070	1.6260	0.000
Clematis ligusticifolia	0.9070	1.6260	0.000
Corallorhiza spp.	0.9070	1.6260	0.000
Erigeron colo- mexicanus	0.9070	1.6260	0.000
Erigeron speciosus macranthus	0.9070	1.6260	0.000
Helianthus spp.	0.9070	1.6260	0.000
Heuchera bracteata	0.9070	1.6260	0.000
Oligoneuron rigidum	0.9070	1.6260	0.000
Packera cana	0.9070	1.6260	0.000
Plantago patagonica	0.9070	1.6260	0.000
Poa pratensis	0.9070	1.6260	0.000
Polygonum douglasii	0.9070	1.6260	0.000

Scrophularia lanceolata	0.9070	1.6260	0.000
Sisyrinchium montanum	0.9070	1.6260	0.000
Toxicoscordion venenosum	0.9070	1.6260	0.000
Unknown grass 3	0.7465	0.8130	0.016
Asclepias pumila	0.6729	0.8130	0.012
Danthonia spp.	0.6729	0.8130	0.012
Bromus spp.	0.5993	0.8130	0.008
Osmorhiza depauperata	0.5993	0.8130	0.008
Poa fendleriana longiligula	0.5993	0.8130	0.008
Poa nervosa	0.5993	0.8130	0.008
Silene dichotoma	0.5993	0.8130	0.008
Tithymalus spathulatus	0.5993	0.8130	0.008
Unknown forb 3	0.5993	0.8130	0.008
Antennaria parvifolia	0.5257	0.8130	0.004
Astragalus tenellus	0.5257	0.8130	0.004
Calylophus serrulatus	0.5257	0.8130	0.004
Delphinium nuttallianum	0.5257	0.8130	0.004
Elymus glaucus	0.5257	0.8130	0.004
Holodiscus discolor	0.5257	0.8130	0.004
Jamesia americana	0.5257	0.8130	0.004
Ligusticum porteri	0.5257	0.8130	0.004
Phlox spp.	0.5257	0.8130	0.004
Poa secunda	0.5257	0.8130	0.004
Pseudognaphalium viscosum	0.5257	0.8130	0.004
Acosta maculosa	0.4535	0.8130	0.000
Aletes acaulis	0.4535	0.8130	0.000
Amelanchier alnifolia	0.4535	0.8130	0.000
Antennaria neglecta	0.4535	0.8130	0.000
Asparagus officinalis	0.4535	0.8130	0.000
Astragalus spp.	0.4535	0.8130	0.000
Brickellia californica	0.4535	0.8130	0.000
Brickellia grandiflora	0.4535	0.8130	0.000
Brickellia rosmarinifolia	0.4535	0.8130	0.000
chlorolepis	0.4535	0.8130	0.000
Bromopsis canadensis/B. porteri	0.4535	0.8130	0.000
Bromopsis spp.	0.4535	0.8130	0.000
Bromus commutatus	0.4535	0.8130	0.000
Carex foenea	0.4535	0.8130	0.000
Castilleja miniata	0.4535	0.8130	0.000
Ceanothus herbaceus	0.4535	0.8130	0.000
Cerasus pensylvanica	0.4535	0.8130	0.000
Chrysothamnus nauseosus	0.4535	0.8130	0.000
nauseosus	0.4535	0.8130	0.000
Danthonia parryi	0.4535	0.8130	0.000
Descurainia incisa	0.4535	0.8130	0.000

Dianthus armeria	0.4535	0.8130	0.000
Dichanthellium spp.	0.4535	0.8130	0.000
Drymocallis arguta	0.4535	0.8130	0.000
Eleocharis elliptica compressa	0.4535	0.8130	0.000
Elymus elymoides	0.4535	0.8130	0.000
Erigeron flagellaris	0.4535	0.8130	0.000
Heliomeris multiflora	0.4535	0.8130	0.000
Hypericum formosum	0.4535	0.8130	0.000
Juncus acuminatus	0.4535	0.8130	0.000
Maianthemum spp.	0.4535	0.8130	0.000
Maianthemum stellatum	0.4535	0.8130	0.000
Negundo aceroides interius	0.4535	0.8130	0.000
Oenothera villosa strigosa	0.4535	0.8130	0.000
Opuntia spp.	0.4535	0.8130	0.000
Oxybaphus hirsutus	0.4535	0.8130	0.000
Oxybaphus spp.	0.4535	0.8130	0.000
Packera plattensis	0.4535	0.8130	0.000
Prunella vulgaris	0.4535	0.8130	0.000
Pseudostellaria jamesiana	0.4535	0.8130	0.000
Pterogonum alatum	0.4535	0.8130	0.000
Quercus spp.	0.4535	0.8130	0.000
Senecio spartioides	0.4535	0.8130	0.000
Silene scouleri hallii	0.4535	0.8130	0.000
Solidago missouriensis	0.4535	0.8130	0.000
Stenactis strigosa	0.4535	0.8130	0.000
Thalictrum fendleri	0.4535	0.8130	0.000
Tithymalus myrsinites	0.4535	0.8130	0.000
Trifolium pratense	0.4535	0.8130	0.000
Triodanis perfoliata	0.4535	0.8130	0.000
Verbena bracteata	0.4535	0.8130	0.000
Viola nuttallii	0.4535	0.8130	0.000

Appendix 9. Acronyms for environmental vectors, sites, and species.

ENVIRONMENTAL ACRONYMS

SLOPE % Slope
 ASPE Aspect
 LITDEP Avg Duff/Litter Depth
 CLAY Soil Texture - Clay
 SAND Soil Texture - Sand
 REGE Major Dist - Regeneration activities
 TIMB Major Dist - Timber stand impro
 WILD Major Dist - Wildlife activities
 INSECT Major Dist - Insect infestations
 RECR Major Dist - Recreation activities
 BURN Major Dist - Burn scenarios
 HARV Major Dist - Harvest methods
 GRAZ Major Dist - Grazing systems
 WEAT Major Dist - Weather conditions
 OTHER Major Dist - Other event type

SITE ACRONYMS

D101 D-1 #01
 D105 D-1 #05
 D110 D-1 #10
 D1/8101 D-1/81 #01
 D1/8105 D-1/81 #05
 D201 D-2 #01
 D205 D-2 #05
 D210 D-2 #10
 D3D401 D-3 AND D-4 #01
 D3D405 D-3 AND D-4 #05
 D3D410 D-3 AND D-4 #10
 D3D415 D-3 AND D-4 #15
 D3D420 D-3 AND D-4 #20
 D3D425 D-3 AND D-4 #25
 D3D430 D-3 AND D-4 #30
 DAKR01 DAKR #01
 DAKR05 DAKR #05
 DAKR10 DAKR #10
 ELDE01 ELDO-E #01
 ELDE05 ELDO-E #05
 ELDE10 ELDO-E #10
 ELDE15 ELDO-E #15
 LINN01 LIND-N #01
 LINN05 LIND-N #05
 LINN10 LIND-N #10
 LINS01 LIND-S #01
 LINS05 LIND-S #05
 LINS10 LIND-S #10
 LINS15 LIND-S #15
 LJNE01 LJC-NE #01
 LJNE05 LJC-NE #05
 LJNE10 LJC-NE #10
 LJNW01 LJC-NW #01
 LJNW05 LJC-NW #05
 LJNW10 LJC-NW #10
 LJNW15 LJC-NW #15
 LJSE01 LJC-SE #01
 LJSE05 LJC-SE #05
 LJSE10 LJC-SE #10
 LJSE15 LJC-SE #15
 LJSE20 LJC-SE #20
 LJSW01 LJC-SW #01

LJSW05
 LJSW10
 LOSH01
 LOSH05
 LOSH10
 MRL01
 MRL05
 MRL10
 MRL15
 MRL20
 PNBK01
 PNBK05
 PNBK10
 PWRL01
 PWRL05
 PWRL10
 PWRL15
 PWRL20
 PWRL25
 S1001
 S1005
 S1010
 S301
 S305
 S310
 S315
 S320
 S325
 S401
 S405
 S410
 S501
 S505
 S510
 S901
 S905
 S910
 ST101
 ST105
 ST110
 ST115
 ST1001
 ST1005
 ST301
 ST305
 ST310
 ST501
 ST505
 ST601
 ST605
 ST610
 ST615
 ST701
 ST705
 ST801
 ST805
 ST901
 ST905
 STG201
 STG205
 STG210
 STG215
 STG220
 SNSH01

LJC-SW #05
 LJC-SW #10
 LOWER SHANAHAN #01
 LOWER SHANAHAN #05
 LOWER SHANAHAN #10
 MRL #01
 MRL #05
 MRL #10
 MRL #15
 MRL #20
 PNBK #01
 PNBK #05
 PNBK #10
 POWERLINE #01
 POWERLINE #05
 POWERLINE #10
 POWERLINE #15
 POWERLINE #20
 POWERLINE #25
 S-10 #01
 S-10 #05
 S-10 #10
 S-3 #01
 S-3 #05
 S-3 #10
 S-3 #15
 S-3 #20
 S-3 #25
 S-4 #01
 S-4 #05
 S-4 #10
 S-5 #01
 S-5 #05
 S-5 #10
 S-9 #01
 S-9 #05
 S-9 #10
 ST-1 #01
 ST-1 #05
 ST-1 #10
 ST-1 #15
 ST-10 #01
 ST-10 #05
 ST-3 #01
 ST-3 #05
 ST-3 #10
 ST-5 #01
 ST-5 #05
 ST-6 #01
 ST-6 #05
 ST-6 #10
 ST-6 #15
 ST-7 #01
 ST-7 #05
 ST-8 #01
 ST-8 #05
 ST-9 #01
 ST-9 #05
 STGL-II #01
 STGL-II #05
 STGL-II #10
 STGL-II #15
 STGL-II #20
 SUNSHINE #01

SNSH05	SUNSHINE #05
WTRT01	WATERTANK #01
WTRT05	WATERTANK #05
WTRT10	WATERTANK #10
WTRT15	WATERTANK #15
WTRT20	WATERTANK #20
WITE01	WITT-E #01
WITE05	WITT-E #05
WITE10	WITT-E #10
WITNE01	WITT-NE #01
WITNE05	WITT-NE #05
WITNE10	WITT-NE #10
WITNE15	WITT-NE #15
WITNE20	WITT-NE #20
WITNE25	WITT-NE #25
WITNE30	WITT-NE #30
WITNW01	WITT-NW #01
WITNW05	WITT-NW #05
WITNW10	WITT-NW #10
WITNW15	WITT-NW #15
WITNW20	WITT-NW #20
WITS01	WITT-S #01
WITS05	WITT-S #05
WITS10	WITT-S #10
WITW01	WITT-W #01
WITW05	WITT-W #05
WITW10	WITT-W #10

SPECIES ACRONYMS

ROCK	<Other - Bare Rock>
GRAVEL	<Other - Gravel>
LITTER	<Other - Litter>
SOIL	<Other - Soil>
TRAIL	<Other - Trail>
ACGL	Acer glabrum
ACVU	Acetosella vulgaris
ACLA5	Achillea lanulosa
ACHNEL	Achnatherum nelsonii
ACHSCR	Achnatherum scribneri
ACDI2	Acosta diffusa
ACMA9	Acosta maculosa
ADLE	Adenolinum lewisii
ACGRD	Agropyron cristatum
	desertorum
AGGI2	Agrostis gigantea
AGSP	Agrostis sp.
ALAC2	Aletes acaulis
ALCE2	Allium cernuum
ALSP	Allium sp.
ALTE	Allium textile
ALAL3	Alyssum alyssoides
ALPA7	Alyssum parviflorum
ALYSP	Alyssum sp.
AMPSC2	Ambrosia psilostachya
	coronopifolia
AMAL2	Amelanchier alnifolia
AMLA6	Amerosedum lanceolatum
AMNA	Amorpha nana
ANMA	Anaphalis margaritacea
ANGE	Andropogon gerardii
ANST4	Anisantha sterilis
ANTE6	Anisantha tectorum
ABSP	Anisantha/Bromus sp.
ANNE	Antennaria neglecta
ANPA4	Antennaria parvifolia
ANSP	Antennaria sp.
ANSP1	Antennaria sp. 1
ANSP2	Antennaria sp. 2
APANC	Apocynum adrosaemifolium/A.
	cannabinum
APAN2	Apocynum androsaemifolium
ARUV	Arctostaphylos uva-ursi
ARPU2	Aristida purpurea
ARISP	Aristida sp.
ARFU3	Arnica fulgens
AREL3	Arrhenatherum elatius
ARFR4	Artemisia frigida
ARLU	Artemisia ludoviciana
ASPU	Asclepias pumila
ASSP2	Asclepias sp.
ASST	Asclepias stenophylla
ASVI	Asclepias viridiflora
ASOF	Asparagus officinalis
ASLAG	Aster laevis geyeri
ASPO5	Aster porteri
ASADR	Astragalus adsurgens
	robustior
ASAG2	Astragalus agrestis
ASFL	Astragalus flexuosus
ASSP3	Astragalus sp.
ASTE5	Astragalus tenellus
BADI	Bahia dissecta

BASI *Bassia sieversiana*
 BOCU *Bouteloua curtipendula*
 BRAR *Breea arvensis*
 BRCA3 *Brickellia californica*
 BRGR *Brickellia grandiflora*
 BRROC *Brickellia rosmarinifolia*
 chlorolepis
 BRSP *Brickellia* sp.
 BRPO *Bromopsis canadensis*/B.
 porteri
 BRIN7 *Bromopsis inermis*
 BRLA10 *Bromopsis lanatipes*
 BRSP2 *Bromopsis* sp.
 BRBR5 *Bromus briziformis*
 BRCO4 *Bromus commutatus*
 BRJA *Bromus japonicus*
 BRSP3 *Bromus* sp.
 CAGU *Calochortus gunnisonii*
 CASE12 *Calylophus serrulatus*
 CAMI2 *Camelina microcarpa*
 CARO2 *Campanula rotundifolia*
 CANUM3 *Carduus nutans macrolepis*
 CABR10 *Carex brevior*
 CAFO3 *Carex foenea*
 CAOC2 *Carex occidentalis*
 CAPEH *Carex pensylvanica*
 heliophila
 CAPE7 *Carex petasata*
 CASP *Carex* sp.
 CASP1 *Carex* sp. 1
 CASP2 *Carex* sp. 2
 CAMI12 *Castilleja miniata*
 CASE5 *Castilleja sessiliflora*
 CEFE *Ceanothus fendleri*
 CEHE *Ceanothus herbaceus*
 CERE2 *Celtis reticulata*
 CEST3 *Cerastium strictum*
 CEPE *Cerasus pensylvanica*
 CEMO2 *Cercocarpus montanus*
 CHLE *Chenopodium leptophyllum*
 CHSP *Chenopodium* sp.
 CHAL16 *Chlorocrepis albiflora*
 CHGR15 *Chondrosom gracile*
 CHNAN3 *Chrysothamnus nauseosus*
 nauseosus
 CIOC2 *Cirsium ochrocentrum*
 CIVU *Cirsium vulgare*
 CLRO5 *Claytonia rosea*
 CLI12 *Clematis ligusticifolia*
 COPA3 *Collinsia parviflora*
 COLI2 *Collomia linearis*
 COAR6 *Colutea arborescens*
 COUMP *Comandra umbellata pallida*
 COAR4 *Convolvulus arvensis*
 COMA *Corallorhiza maculata*
 COSP *Corallorhiza* sp.
 COHI5 *Coriflora hirsutissima*
 COCO6 *Corylus cornuta*
 COMI5 *Coryphantha missouriensis*
 CRSP *Crataegus* sp.
 CRBI6 *Crocianthemum bicknellii*
 CYOF *Cynoglossum officinale*
 CYFR2 *Cystopteris fragilis*
 DAGL *Dactylis glomerata*
 DAPU5 *Dalea purpurea*

DAPA2 *Danthonia parryi*
 DASP *Danthonia* sp.
 DASPP *Danthonia spicata pinetorum*
 DENU2 *Delphinium nuttallianum*
 DEIN *Descurainia incisa*
 DIAR *Dianthus armeria*
 DICSP *Dicanthelium* sp.
 DILI2 *Dichantheium linearifolium*
 DIOLS *Dichantheium oligosanthos*
 scribnerianum
 DISP *Dichantheium* sp.
 DRYARG *Dryocallis arguta*
 DRFI3 *Dryocallis fissa*
 ECVI2 *Echinocereus viridiflorus*
 ELELC *Eleocharis elliptica*
 compressa
 ELCA4 *Elymus canadensis*
 ELEL5 *Elymus elymoides*
 ELEL2 *Elymus elymoides*/E.
 longifolius
 ELGL *Elymus glaucus*
 ELLA3 *Elymus lanceolatus*
 ELLO3 *Elymus longifolius*
 ELTR *Elymus trachycaulus*
 ELRE3 *Elytrigia repens*
 ERFE3 *Eremogone fendleri*
 ERCO *Erigeron colo-mexicanus*
 ERCO2 *Erigeron colo-mexicanus*/E.
 divergens
 ERFL *Erigeron flagellaris*
 ERSP *Erigeron* sp.
 ERSPM *Erigeron speciosus*
 macranthus
 ERVE2 *Erigeron vetensis*
 ERFL2 *Eriogonum flavum*
 ERSP2 *Eriogonum* sp.
 ERUM *Eriogonum umbellatum*
 ERCA14 *Erysimum capitatum*
 FACO *Fallopia convolvulus*
 FRSP *Frasera speciosa*
 GAAR *Gaillardia aristata*
 GAAP2 *Galium aparine*
 GASE6 *Galium septentrionale*
 GASL *Galium* sp.
 GECA *Geranium caespitosum*
 GLLE3 *Glycyrrhiza lepidota*
 GRSQ *Grindelia squarrosa*
 GRSQ2 *Grindelia squarrosa*/G.
 subalpina
 GASA2 *Gutierrezia sarothrae*
 HATR *Harbouria trachypleura*
 HEPU3 *Helianthus pumilus*
 HESP *Helianthus* sp.
 HEMU3 *Heliomeris multiflora*
 HECO *Hesperostipa comata*
 HESP2 *Hesperostipa spartea*
 HEFO *Heterotheca foliosa*
 HEVI *Heterotheca villosa*
 HEVI2 *Heterotheca villosa*/H.
 foliosa
 HEBR2 *Heuchera bracteata*
 HESP3 *Heuchera* sp.
 HODID2 *Holodiscus discolor*
 HYPFOR *Hypericum formosum*
 HYPE *Hypericum perforatum*

IRMI	<i>Iris missouriensis</i>	PESE11	<i>Penstemon secundiflorus</i>
JAAM	<i>Jamesia americana</i>	PESE12	<i>Penstemon</i> sp.
JUNACU	<i>Juncus acuminatus</i>	PEVI3	<i>Penstemon virens</i>
JUARA4	<i>Juncus arcticus ater</i>	PHHE2	<i>Phacelia heterophylla</i>
JUIN2	<i>Juncus interior</i>	PHPR3	<i>Phleum pratense</i>
JUSP	<i>Juncus</i> sp.	PHMU3	<i>Phlox multiflora</i>
JUCOA8	<i>Juniperus communis alpina</i>	PHLSP	<i>Phlox</i> sp.
KOMA	<i>Koeleria macrantha</i>	PHHEC	<i>Physalis hederifolia comata</i>
LASE	<i>Lactuca serriola</i>	PHSP	<i>Physalis</i> sp.
LATLEU	<i>Lathyrus leucanthus</i>	PHVI5	<i>Physalis virginiana</i>
LATSP	<i>Lathyrus</i> sp.	PHMO5	<i>Physocarpus monogynus</i> /P.
LEMO3	<i>Lesquerella montana</i>	opulifolius	
LEMO4	<i>Leucocrinum montanum</i>	PIPOS	<i>Pinus ponderosa scopulorum</i>
LEKI2	<i>Leucopoa kingii</i>	PIPOOV	<i>Pinus ponderosa scopulorum</i>
LEYAMB	<i>Leymus ambiguus</i>	OS	
LIPU	<i>Liatris punctata</i>	PLPA2	<i>Plantago patagonica</i>
LIPO	<i>Ligusticum porteri</i>	PNBI	<i>Pneumonanthe bigelovii</i>
LIGED	<i>Linaria genistifolia</i>	POAG	<i>Poa agassizensis</i>
dalmatica		POCO	<i>Poa compressa</i>
LIVU2	<i>Linaria vulgaris</i>	POACUS	<i>Poa cusickii epilis</i>
LIIN2	<i>Lithospermum incisum</i>	POFE	<i>Poa fendleriana longiligula</i>
LIMU3	<i>Lithospermum multiflorum</i>	PONE2	<i>Poa nervosa</i>
LOOR	<i>Lomatium orientale</i>	POPR	<i>Poa pratensis</i>
LUAR3	<i>Lupinus argenteus</i>	POASEC	<i>Poa secunda</i>
MARE3	<i>Mahonia repens</i>	POSP	<i>Poa</i> sp.
MAAM6	<i>Maianthemum amplexicaule</i>	PODO4	<i>Polygonum douglasii</i>
MASP	<i>Maianthemum</i> sp.	POHI6	<i>Potentilla hippiana</i>
MAST4	<i>Maianthemum stellatum</i>	PORE5	<i>Potentilla recta</i>
MELA	<i>Mertensia lanceolata</i>	PRVU	<i>Prunella vulgaris</i>
MOFI	<i>Monarda fistulosa</i>	PRAM	<i>Prunus americana</i>
methifolia/M. pectinata		PSCA	<i>Pseudognaphalium canescens</i>
MUMO	<i>Muhlenbergia montana</i>	PSVI	<i>Pseudognaphalium viscosum</i>
MUWR	<i>Muhlenbergia wrightii</i>	PSJA2	<i>Pseudostellaria jamesiana</i>
NAVI	<i>Nassella viridula</i>	PSME	<i>Pseudotsuga menziesii</i>
NEAC1	<i>Negundo aceroides interius</i>	PSMEOV	<i>Pseudotsuga menziesii</i> OS
NEOCAM	<i>Neolepia campestre</i>	PSTE5	<i>Psoralidium tenuiflorum</i>
NECA2	<i>Nepeta cataria</i>	PTEALA	<i>Pterogonum alatum</i>
NOMO2	<i>Noccaea montana</i>	PTAN2	<i>Pterospora andromedea</i>
NOCU	<i>Nothocalais cuspidata</i>	PUPAM	<i>Pulsatilla patens multifida</i>
OEVIS	<i>Oenothera villosa strigosa</i>	QUSP	<i>Quercus</i> sp.
OLRI	<i>Oligoneuron rigidum</i>	RACO3	<i>Ratibida columnifera</i>
OLDRG	<i>Oligosporus dracunculus</i>	RHART	<i>Rhus aromatica trilobata</i>
glaucus		RHUGLA	<i>Rhus glabra</i>
OLPA	<i>Oligosporus pacificus</i>	RICE	<i>Ribes cereum</i>
ONMOO2	<i>Onosmodium molle occidentale</i>	RIIN2	<i>Ribes inerme</i>
OPFR	<i>Opuntia fragilis</i>	ROWO2	<i>Rosa woodsii</i> /R. sayi
OPMA2	<i>Opuntia macrorhiza</i>	RUIDM8	<i>Rubus idaeus melanolasius</i>
OPPH	<i>Opuntia phaeacantha</i>	RUCR	<i>Rumex crispus</i>
OPPO	<i>Opuntia polyacantha</i>	SASC5	<i>Sabina scopulorum</i>
OPSP	<i>Opuntia</i> sp.	SASCOV	<i>Sabina scopulorum</i> OS
ORDE2	<i>Oreobatus deliciosus</i>	SAOF4	<i>Saponaria officinalis</i>
ORVI	<i>Oreocarya virgata</i>	SCSC	<i>Schizachyrium scoparium</i>
OSDE	<i>Osmorhiza depauperata</i>	SCLA	<i>Scrophularia lanceolata</i>
OXDI2	<i>Oxalis dillenii</i>	SCBR3	<i>Scutellaria brittonii</i>
OXYHIR	<i>Oxybaphus hirsutus</i>	SESP	<i>Selaginella</i> sp.
OXSP	<i>Oxybaphus</i> sp.	SEIN2	<i>Senecio integerrimus</i>
OXLA3	<i>Oxytropis lambertii</i>	SESP2	<i>Senecio</i> sp.
OXSE	<i>Oxytropis sericea</i>	SESP3	<i>Senecio spartioides</i>
PACA15	<i>Packera cana</i>	SIAN2	<i>Silene antirrhina</i>
PAFE4	<i>Packera fendleri</i>	SIDI2	<i>Silene dichotoma</i>
PAPL	<i>Packera plattensis</i>	SILSCO	<i>Silene scouleri hallii</i>
PADVIR	<i>Padus virginiana melanocarpa</i>	SIM02	<i>Sisyrinchium montanum</i>
PAVI2	<i>Panicum virgatum</i>	SOGI	<i>Solidago gigantea</i>
PAJA	<i>Paronychia jamesii</i>	SOMI2	<i>Solidago missouriensis</i>
PASM	<i>Pascopyrum smithii</i>	SONA	<i>Solidago nana</i>

SOSIN	Solidago simplex nana
SOSP	Solidago sp.
SOSP1	Solidago sp. 1
SOSP2	Solidago sp. 2
SOAV2	Sorghastrum avenaceum
SPAS	Sporobolus asper
SPCR	Sporobolus cryptandrus
SPHE	Sporobolus heterolepis
SPSP	Sporobolus sp.
STST	Stenactis strigosa
SYAL2	Symphoricarpos albus/S.
occidentalis	
TAOF	Taraxacum officinale
THFE	Thalictrum fendleri
THDI4	Thermopsis divaricarpa
THIN6	Thinopyrum intermedium
THAR5	Thlaspi arvense
TIMY	Tithymalus myrsinites
TISP	Tithymalus spathulatus
TOGR	Townsendia grandiflora
TORY	Toxicodendron rydbergii
TOVE2	Toxicoscordion venenosum
TROC4	Tradescantia occidentalis
scopulorum	
TRRA5	Tragia ramosa
TRDUM	Tragopogon dubius major
TRPR2	Trifolium pratense
TRPE4	Triodanis perfoliata
TUGL	Turritis glabra
UNBR	Unknown brassicaceae
UNBR2	Unknown brassicaceae 2
UNCH	Unknown chenopod
UNCO	Unknown composite
UNCO2	Unknown composite 1
UNCO3	Unknown composite 2
UNCY	Unknown cyperaceae
UNFE	Unknown fern
UNFO	Unknown forb
UNFO2	Unknown forb 1
UNFO3	Unknown forb 2
UNFO4	Unknown forb 3
UNFO5	Unknown forb 4
UNFO6	Unknown forb 5
UNGRAM	Unknown graminoid
UNGR	Unknown grass
UNGR2	Unknown grass 1
UNGR3	Unknown grass 2
UNGR4	Unknown grass 3
UNLE	Unknown legume
UNSH	Unknown shrub
UNTR	Unknown tree
VETH	Verbascum thapsus
VEBR	Verbena bracteata
VINU2	Viola nuttallii
VISP	Viola sp.
VIFA2	Virgulus falcatus
YUGL	Yucca glauca

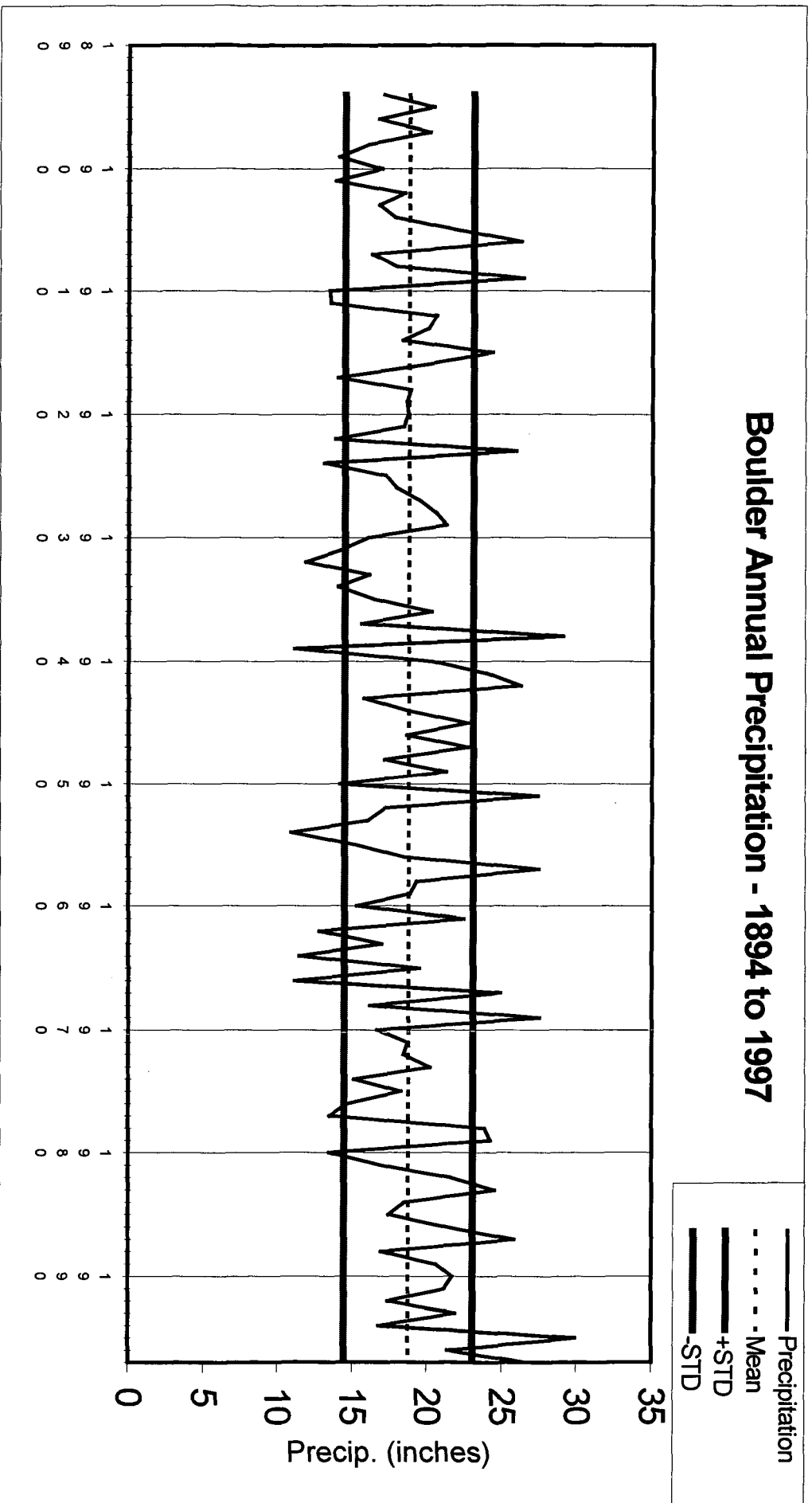
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Appendix 10. Climate Diagrams

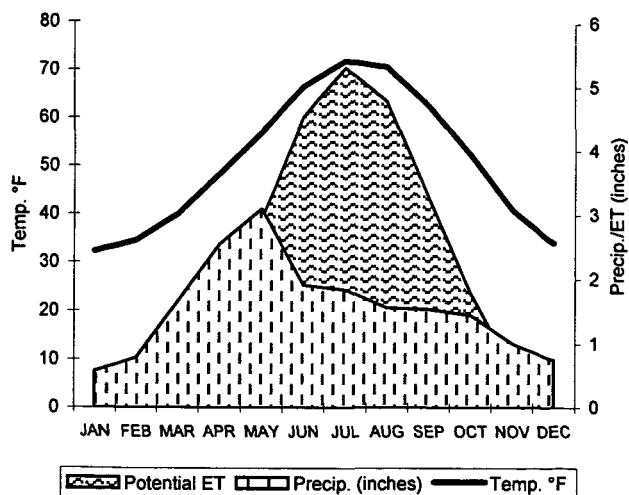
Boulder Annual Precipitation for 1894 to 1997.

104 Thornthwaite Diagrams for Boulder, Long term and 1894 to 1997

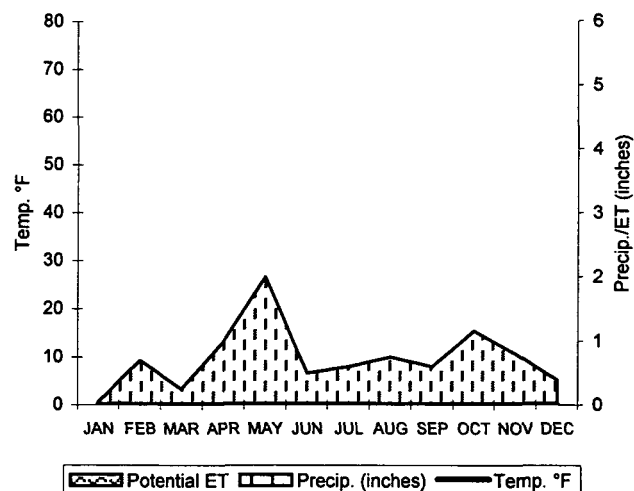
Boulder Annual Precipitation - 1894 to 1997



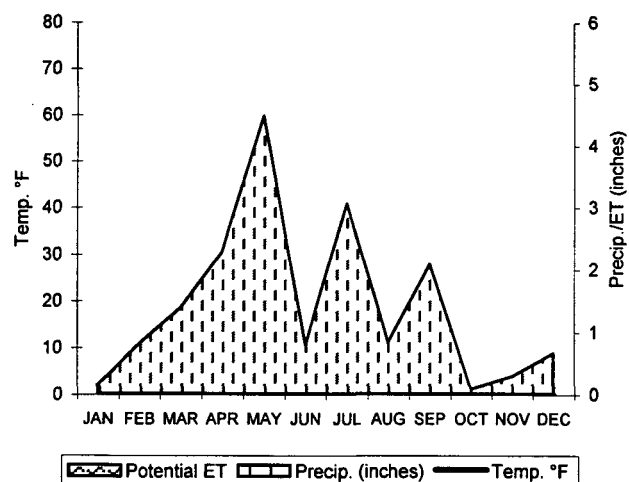
Long Term >100 years



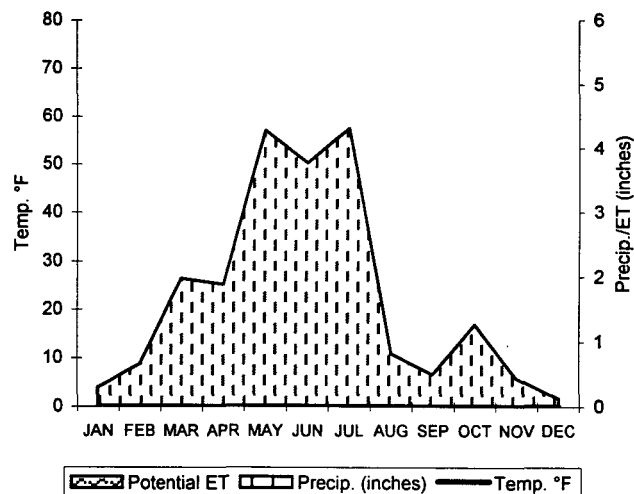
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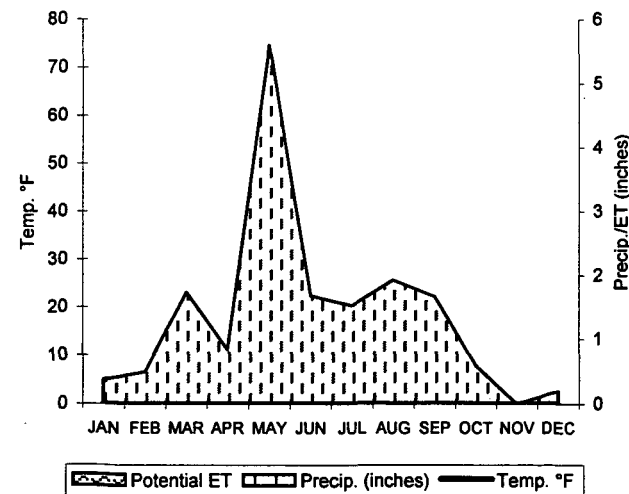
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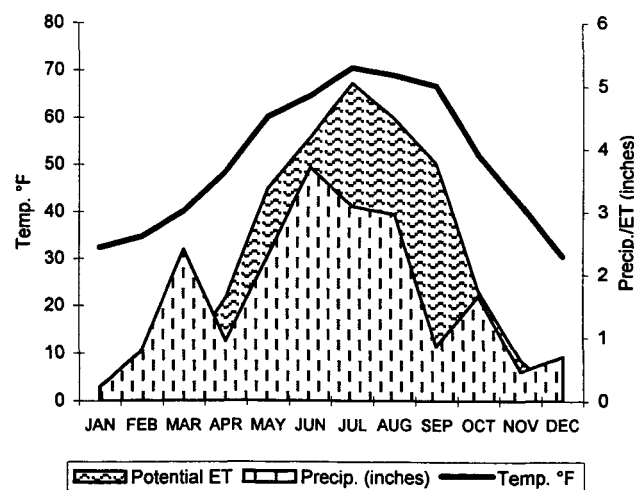
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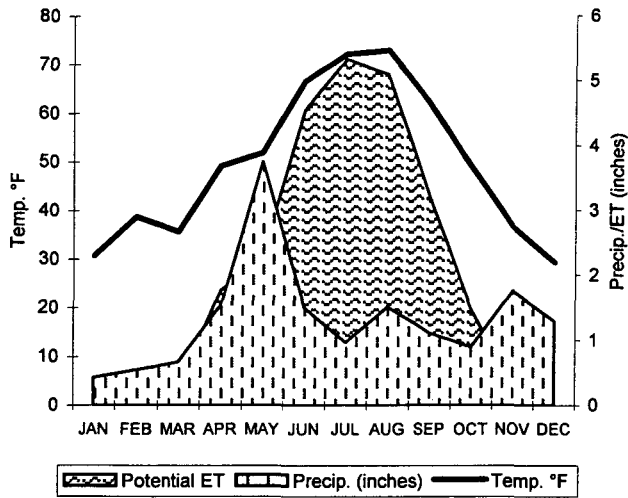
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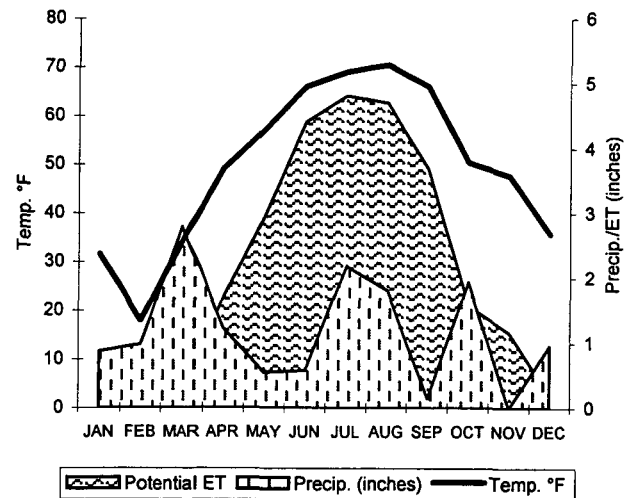
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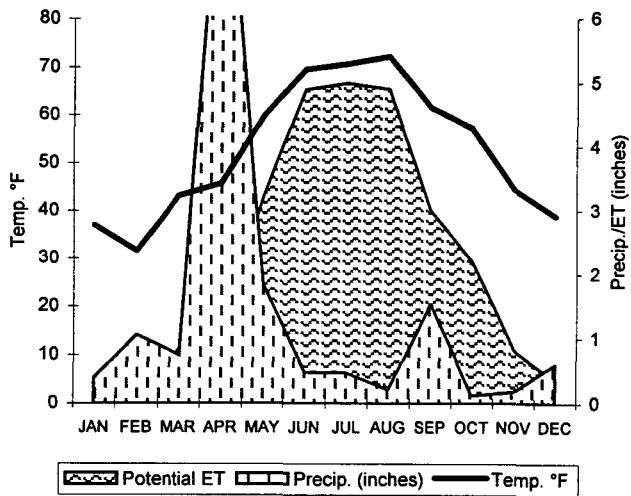
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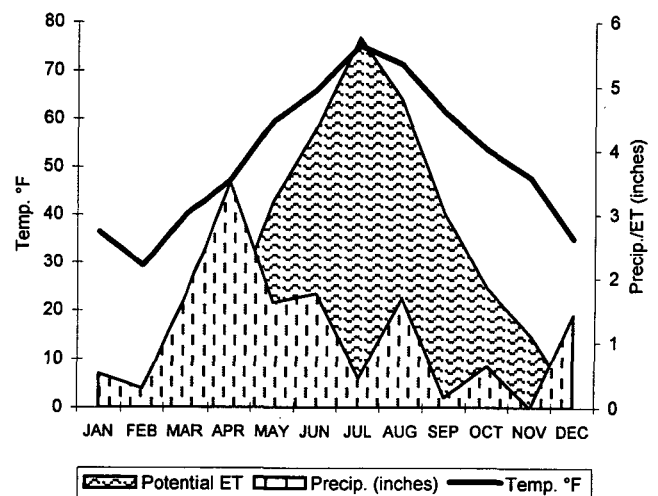
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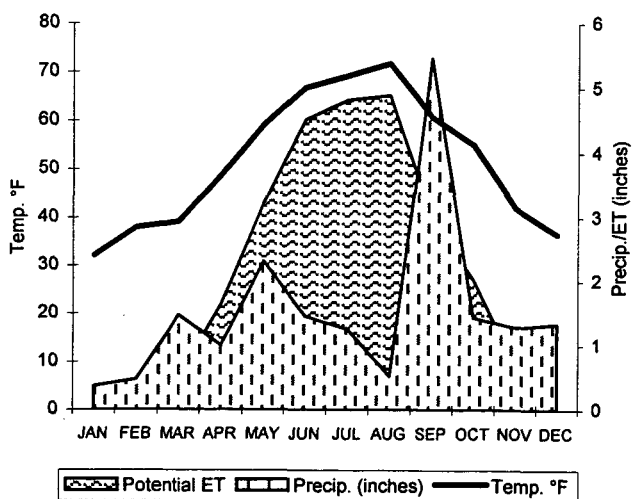
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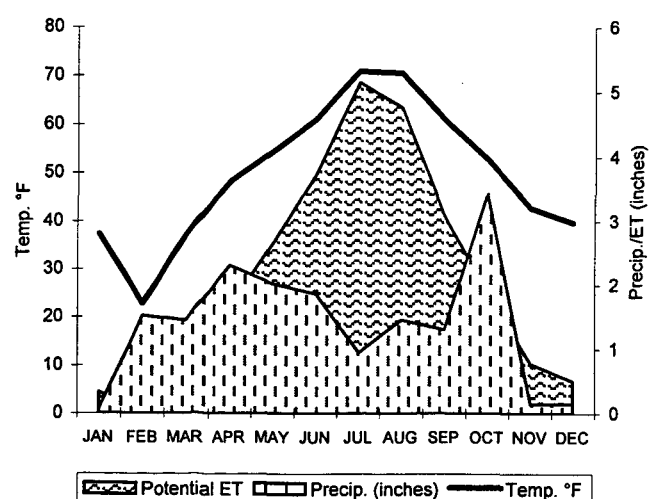
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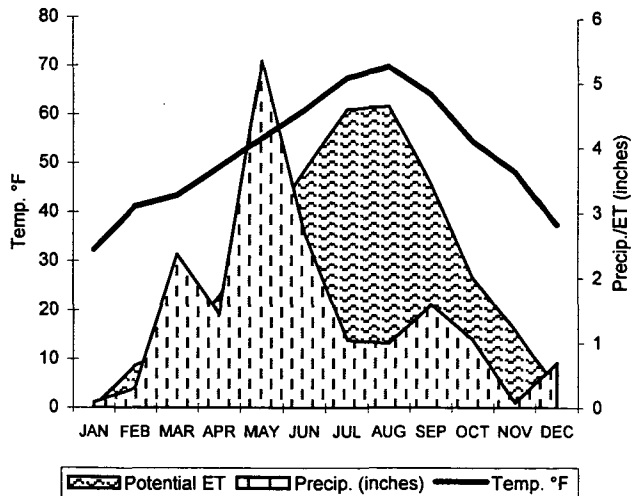
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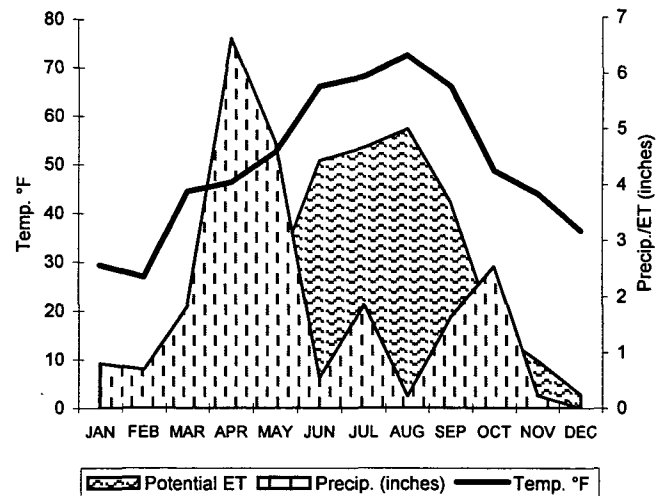
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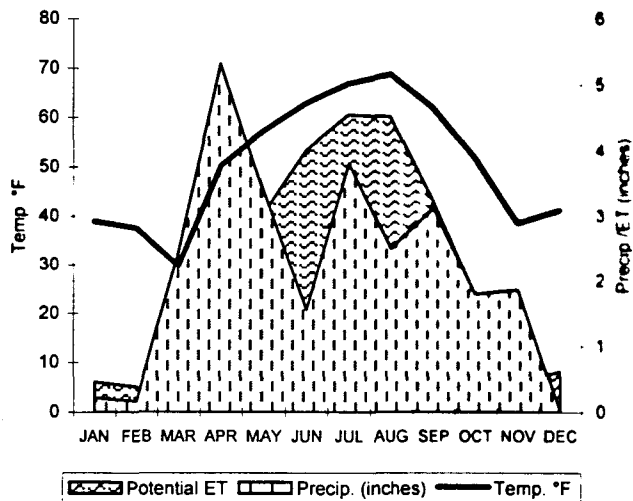
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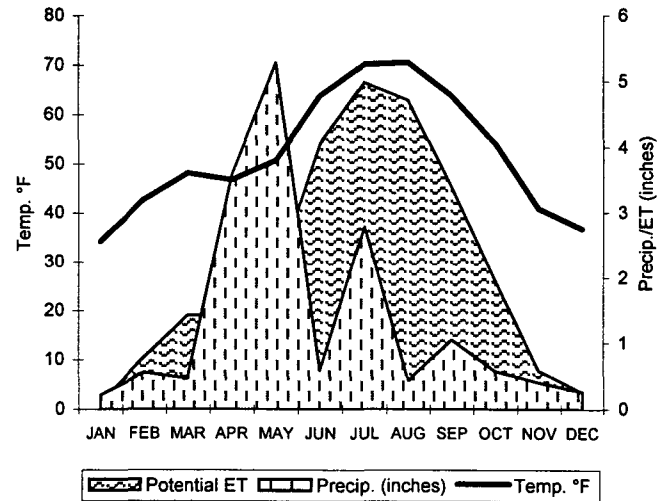
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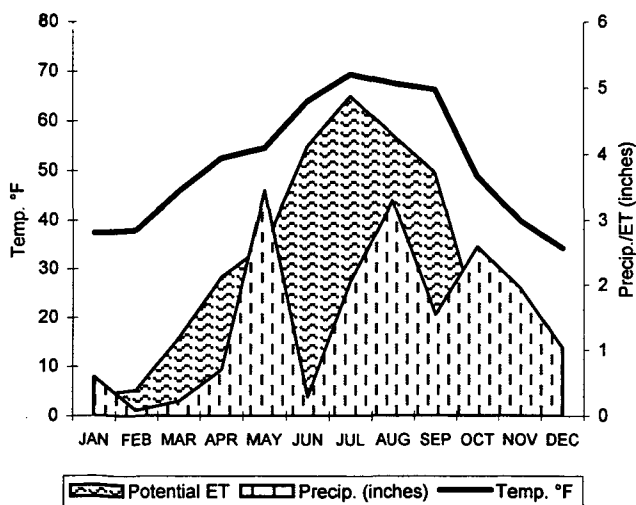
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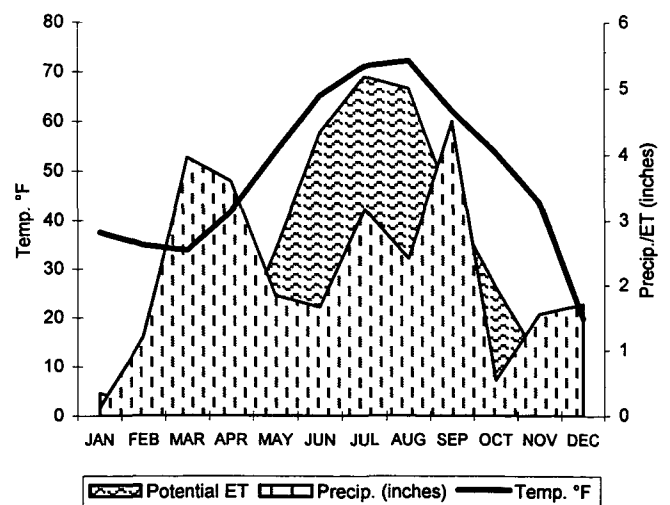
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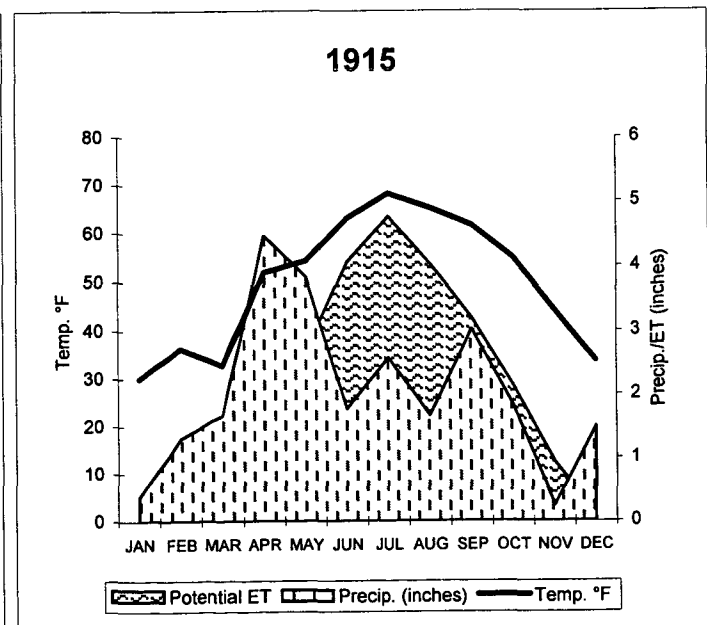
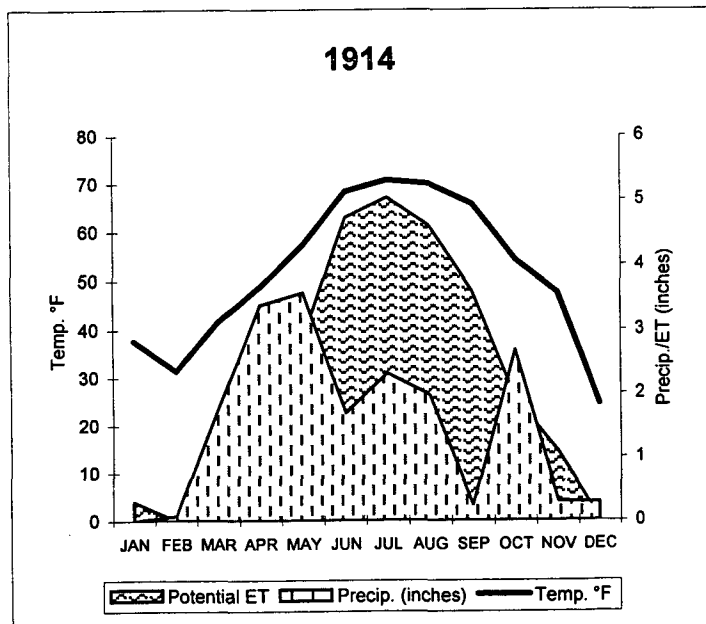
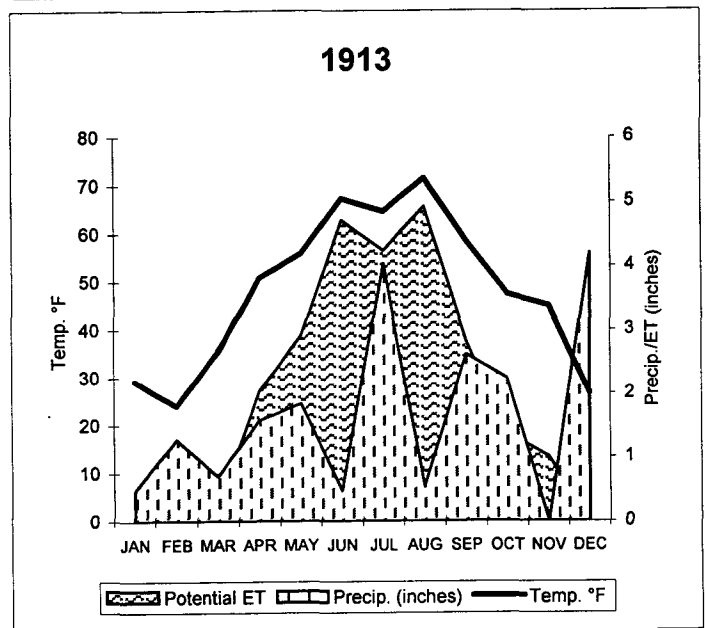
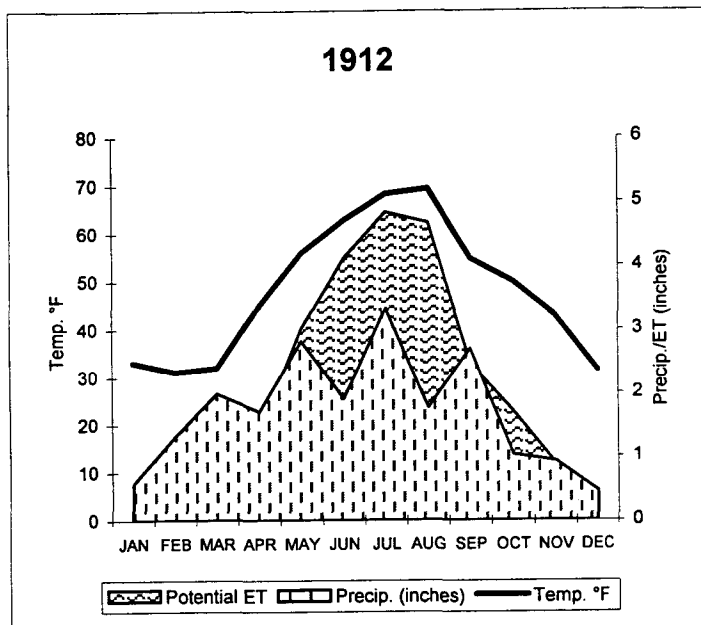
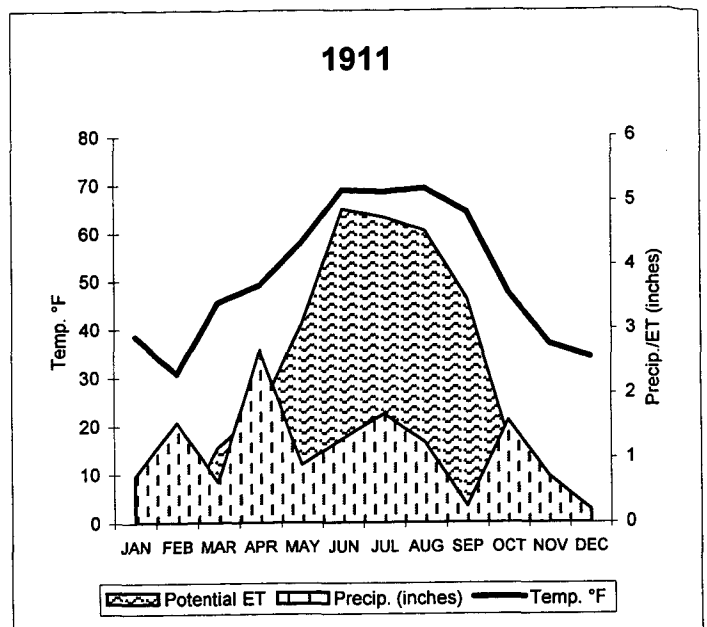
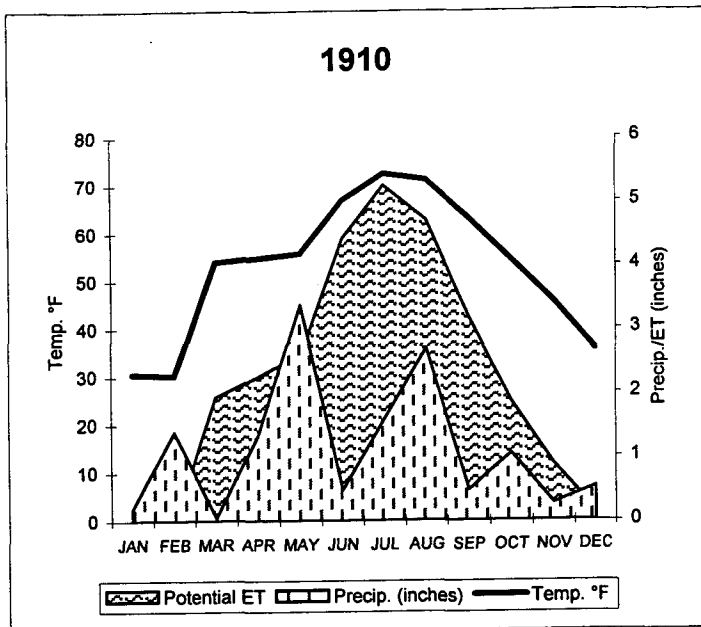


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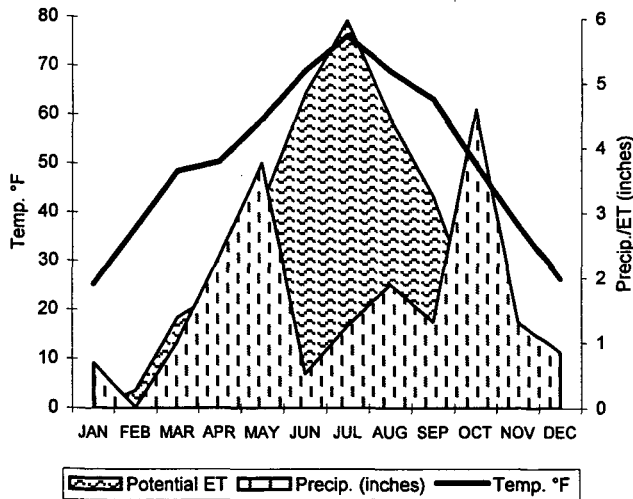


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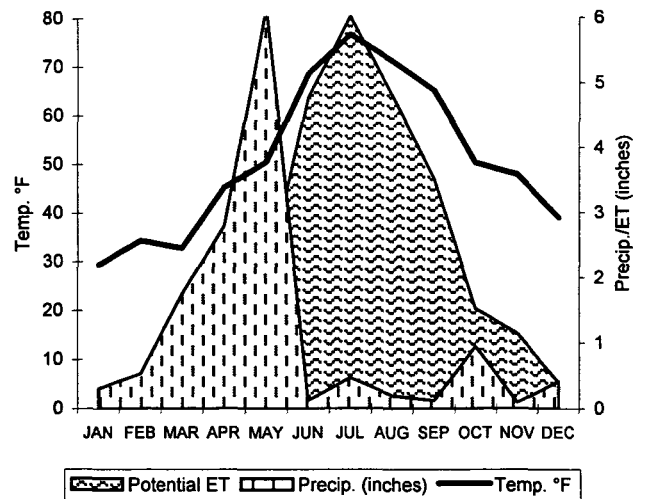




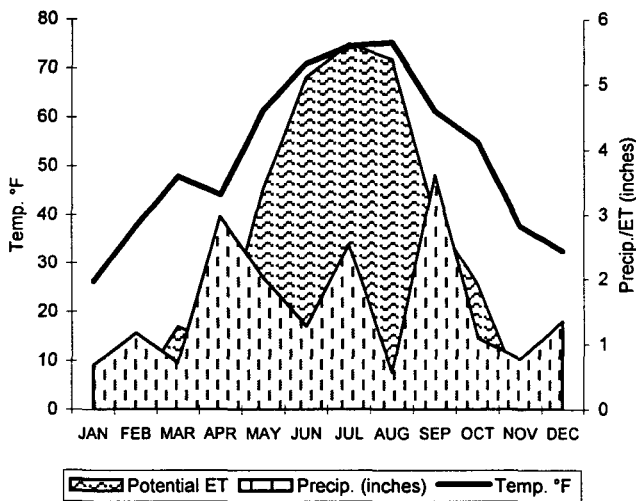
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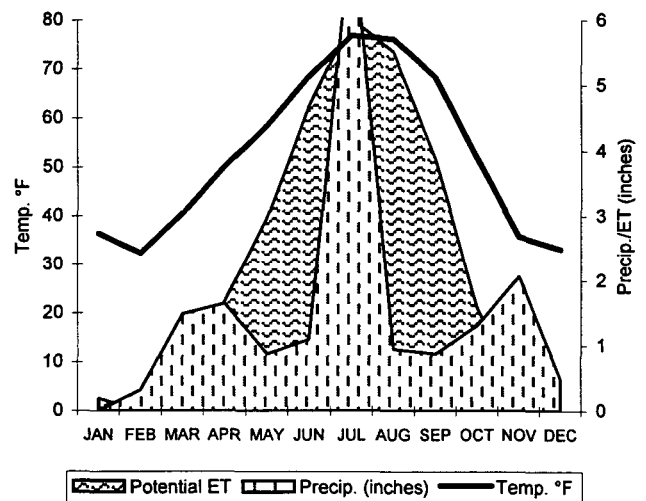
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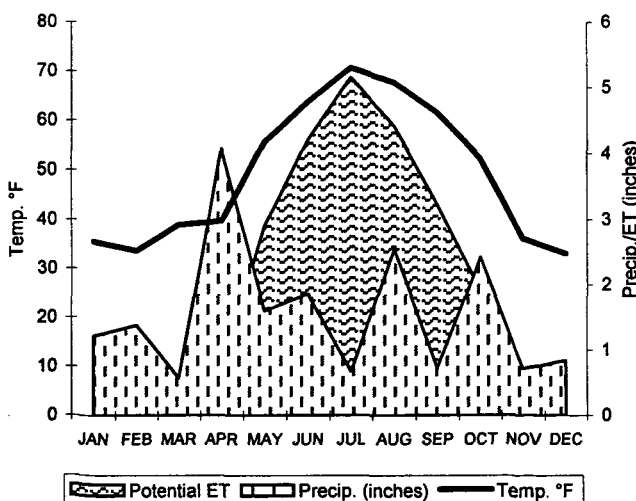
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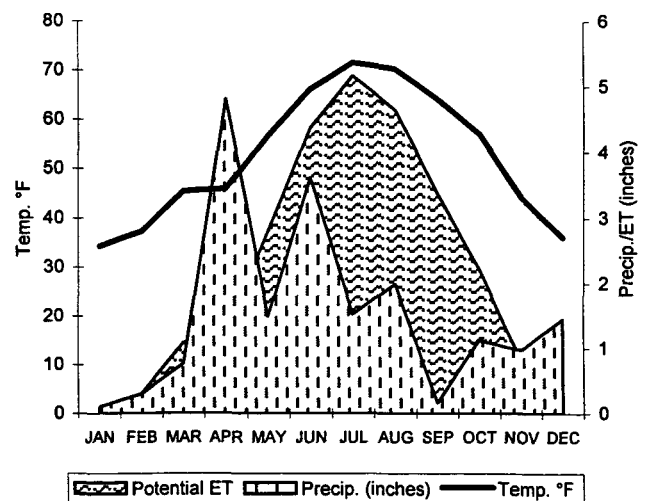
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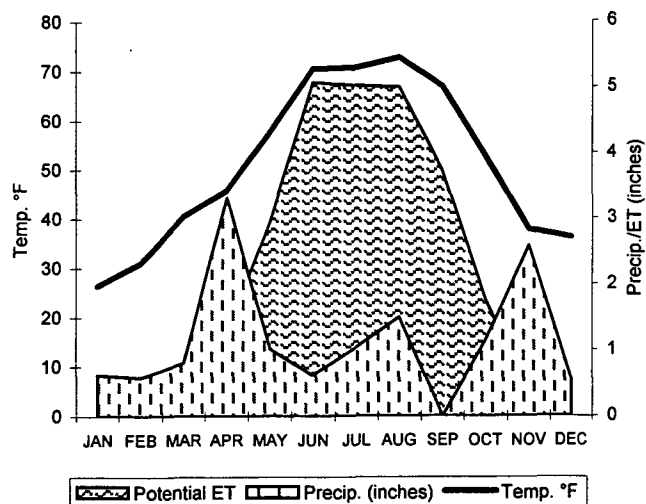
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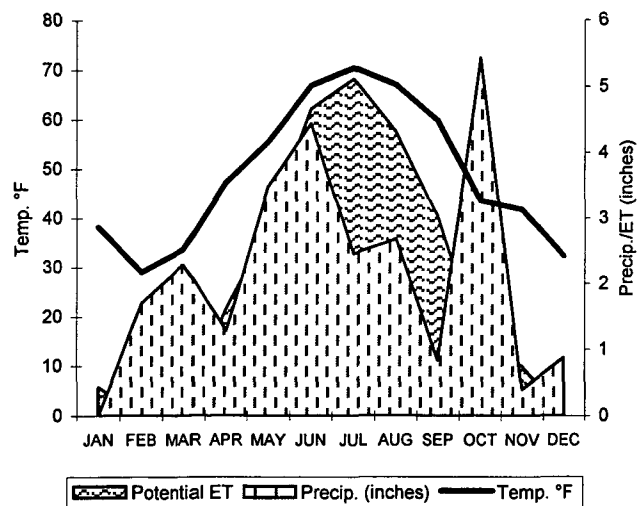
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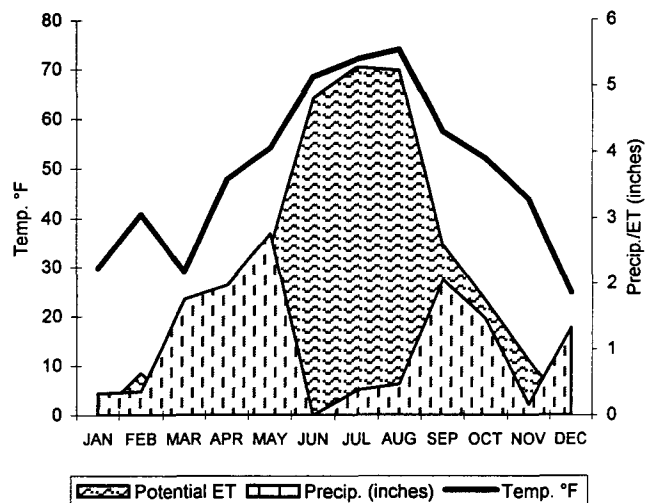
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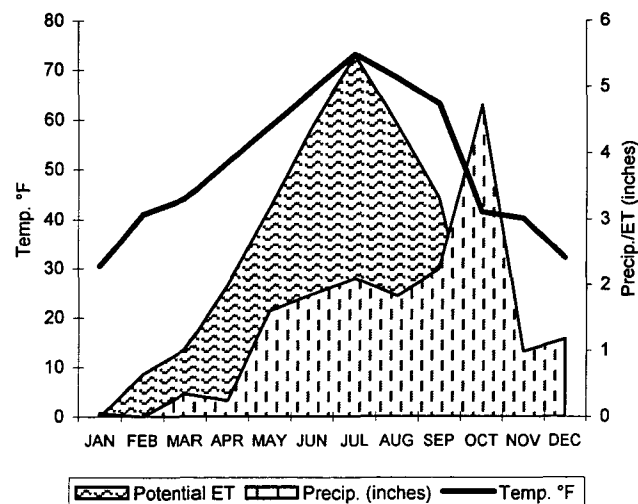
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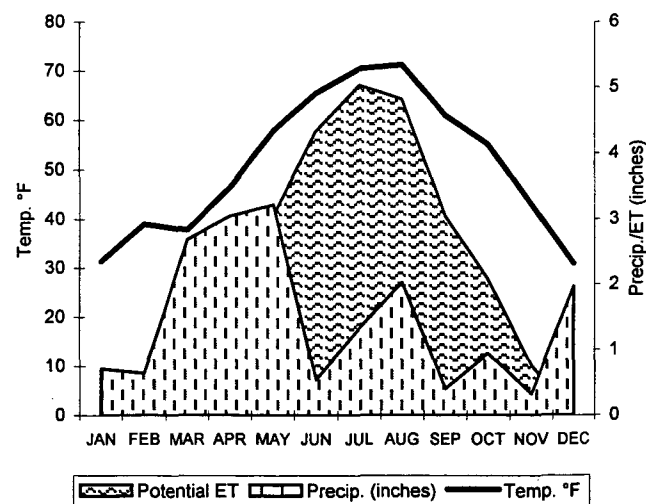
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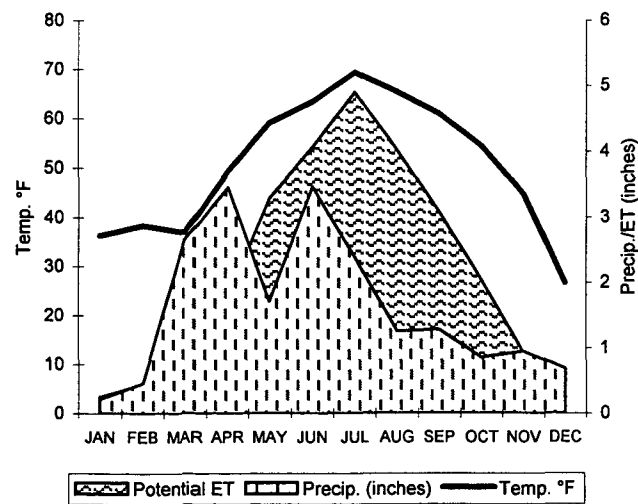
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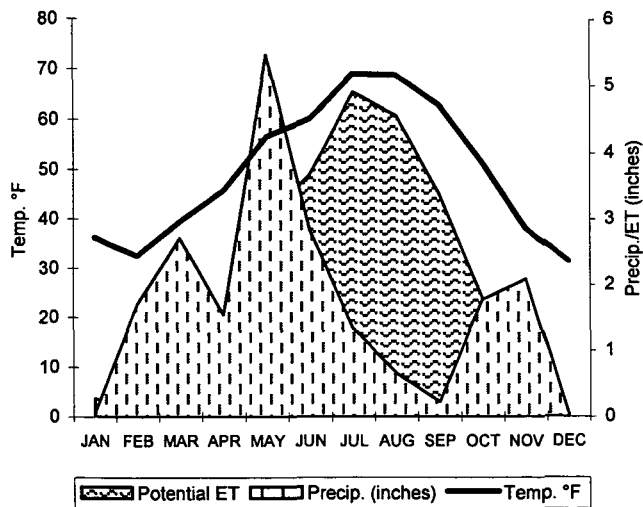
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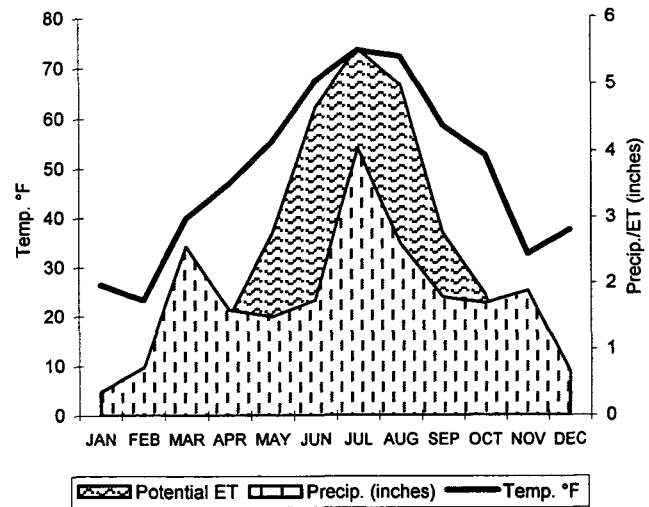
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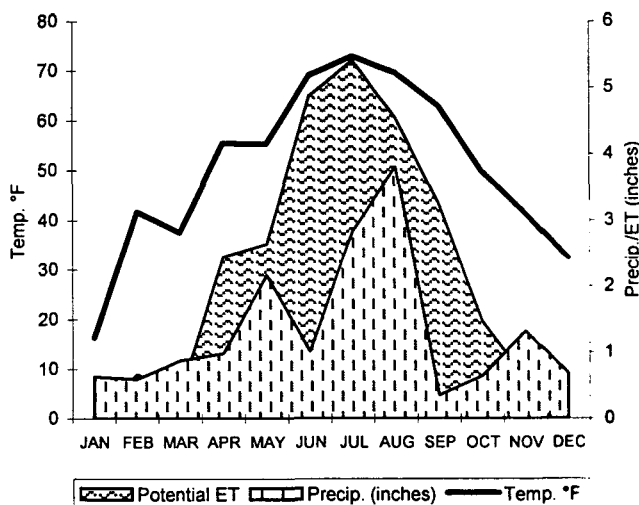
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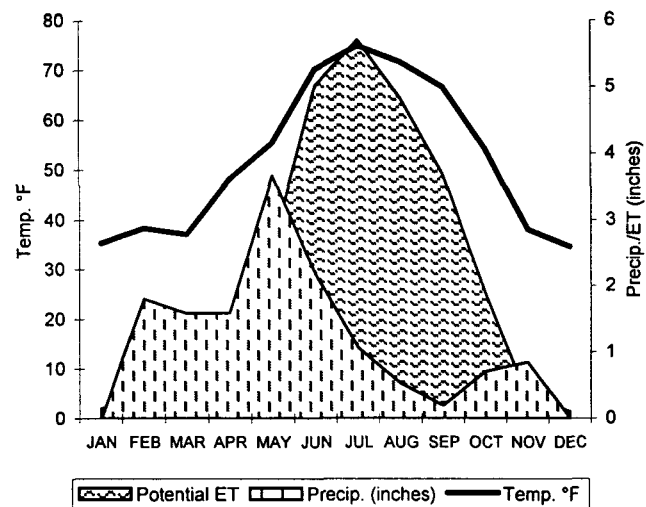
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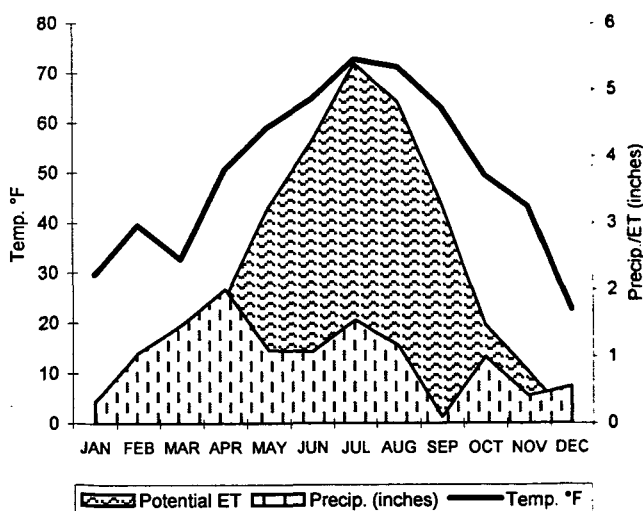
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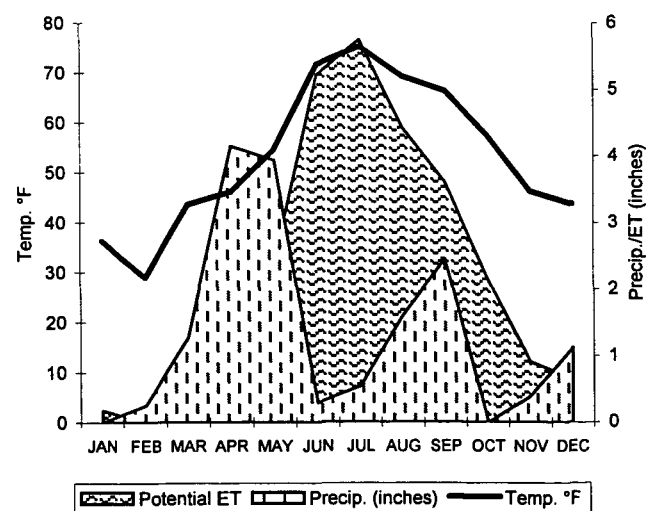
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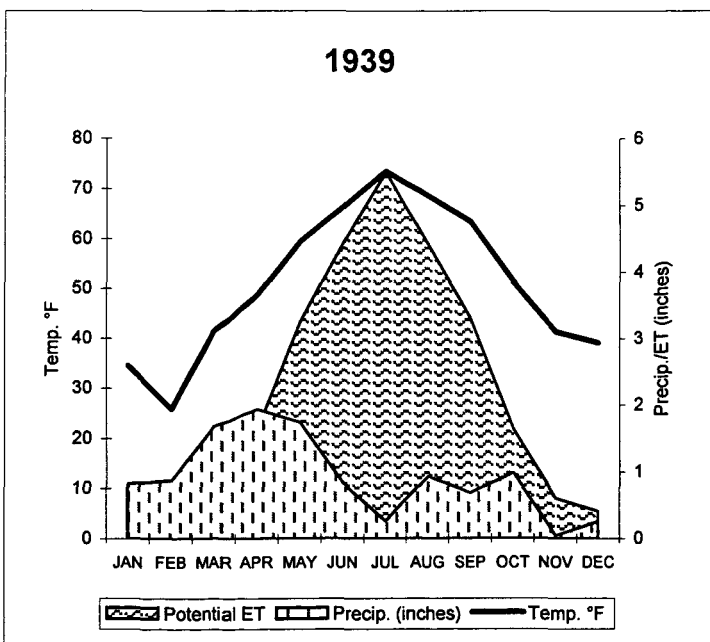
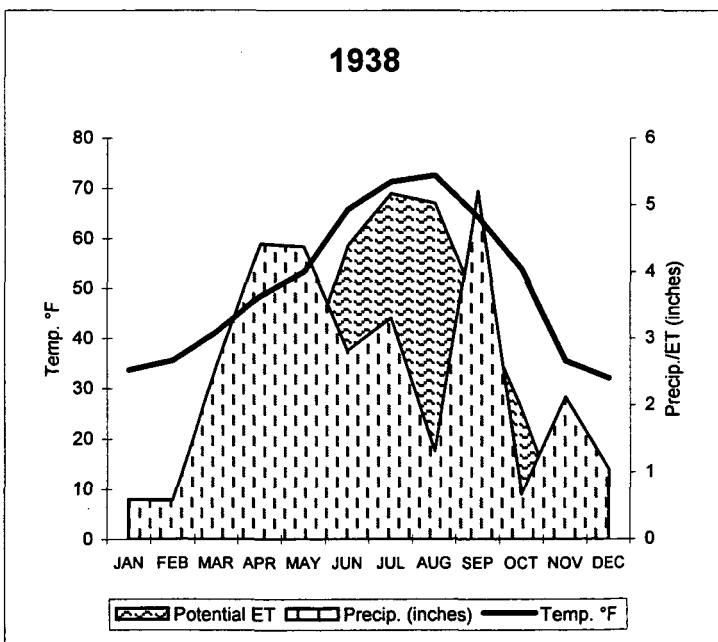
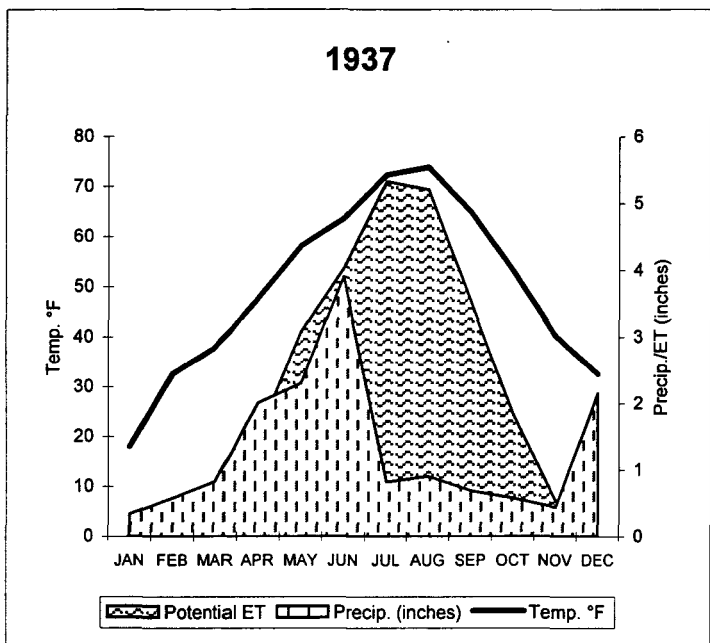
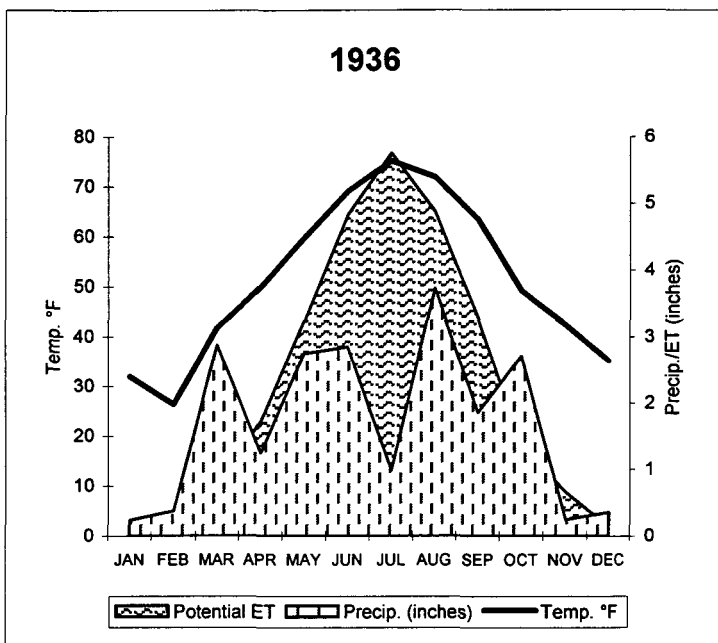
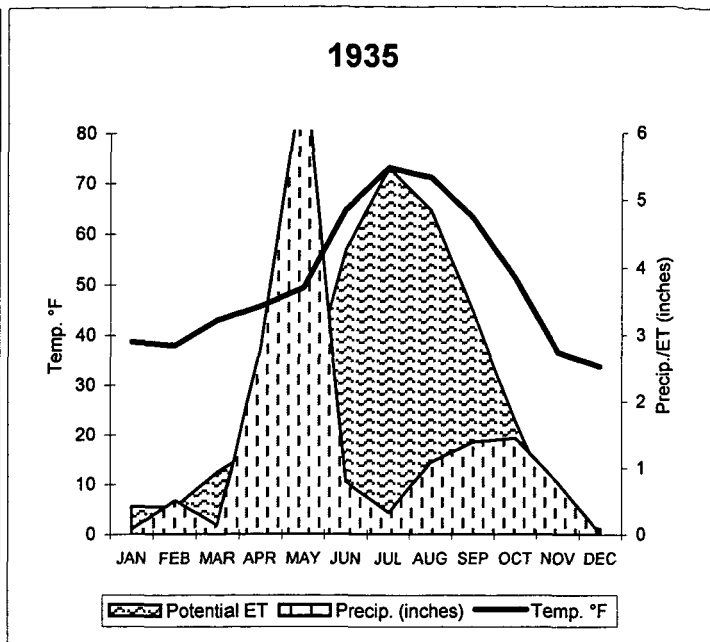
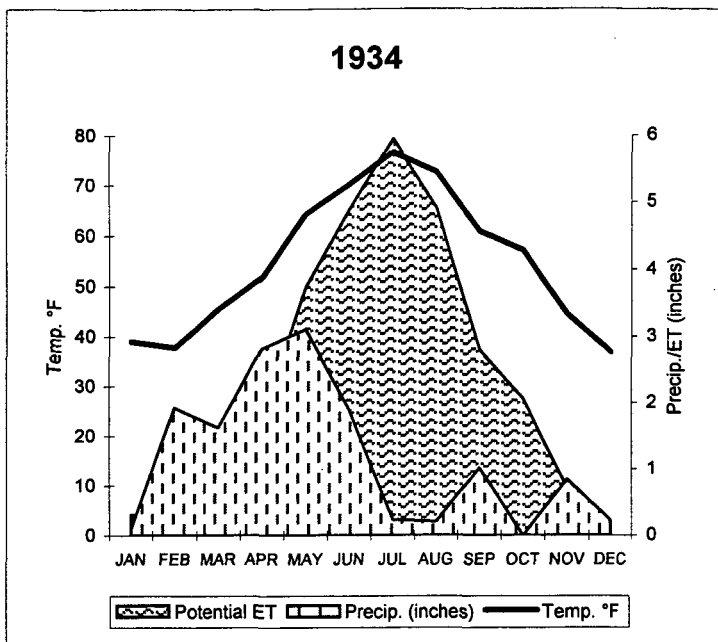


1932

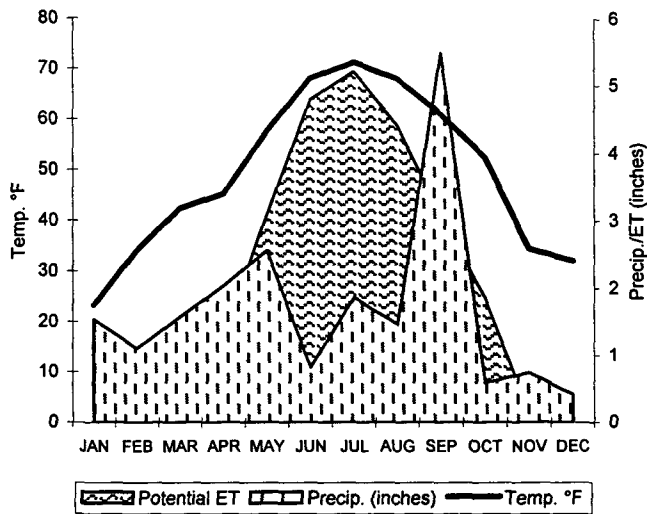


1933

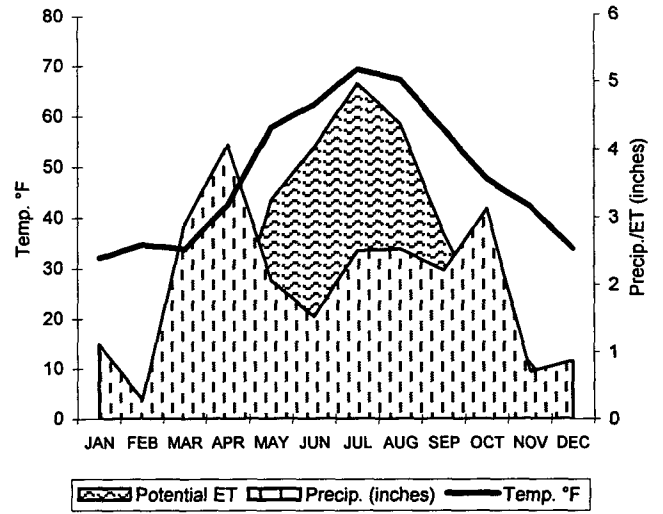




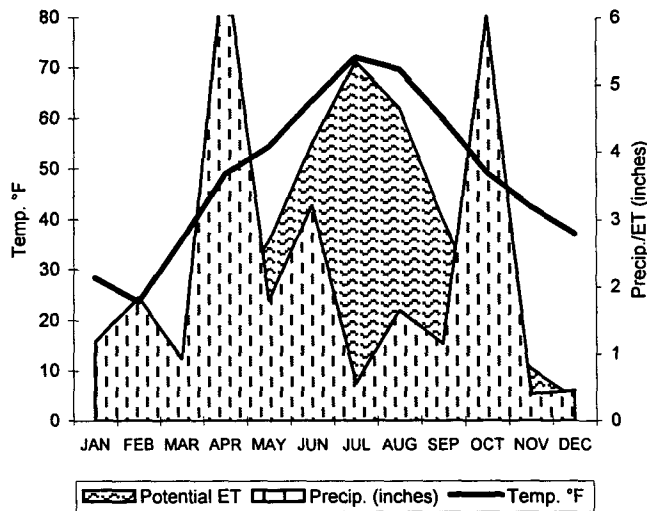
1940



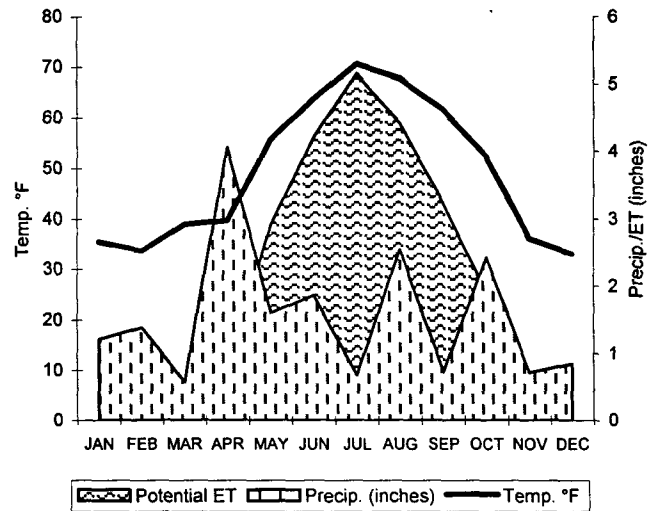
1941



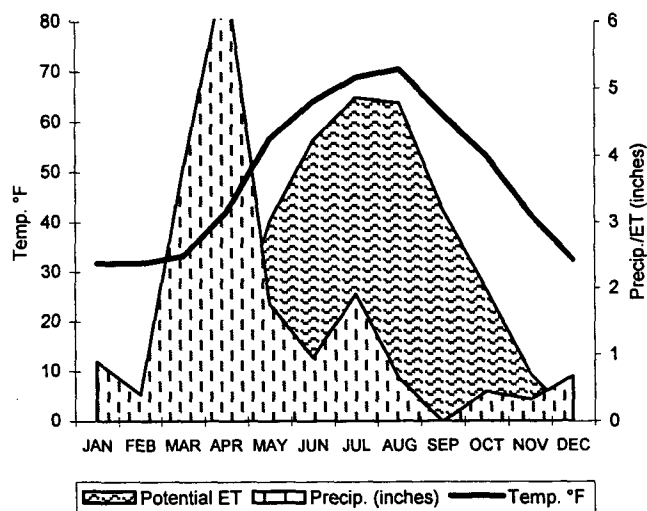
1942



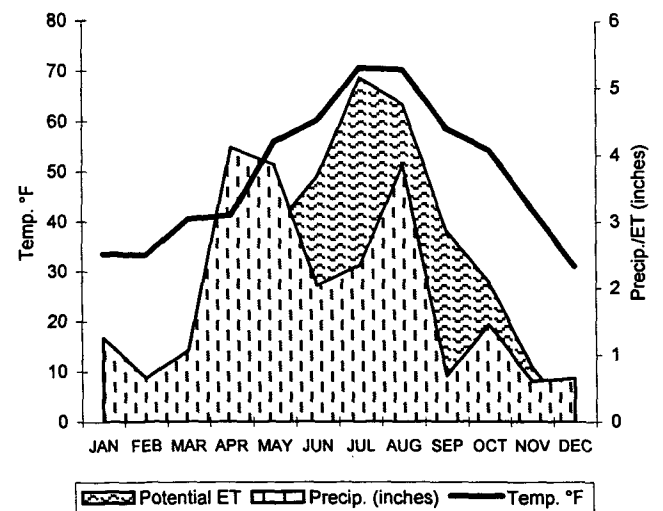
1943



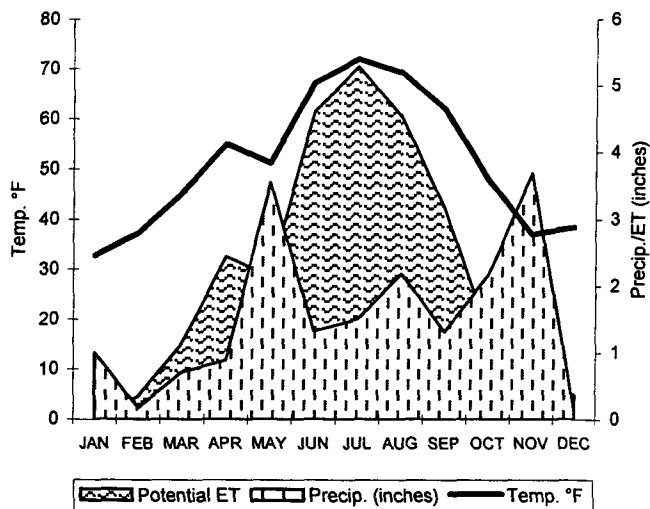
1944



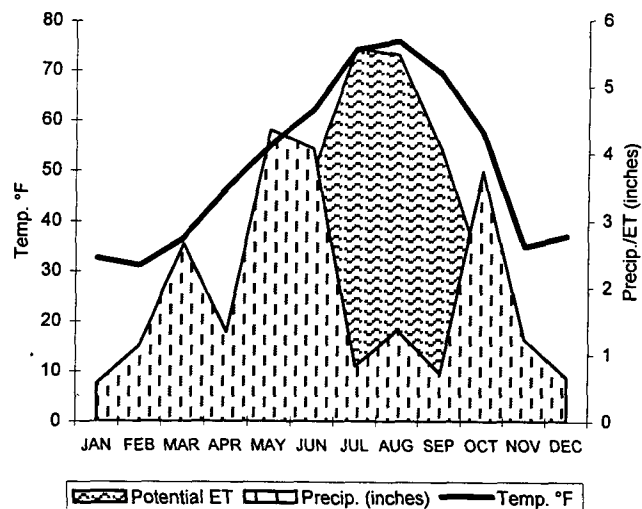
1945



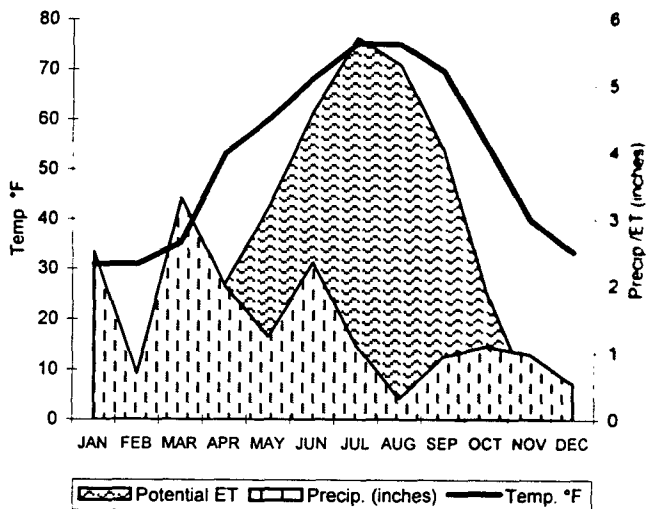
1946



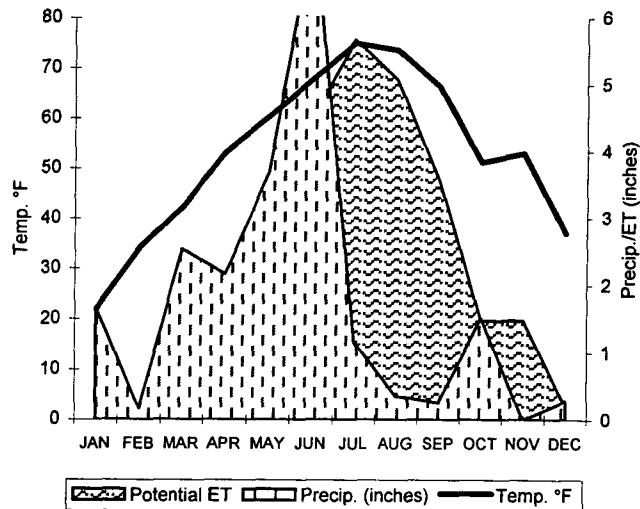
1947



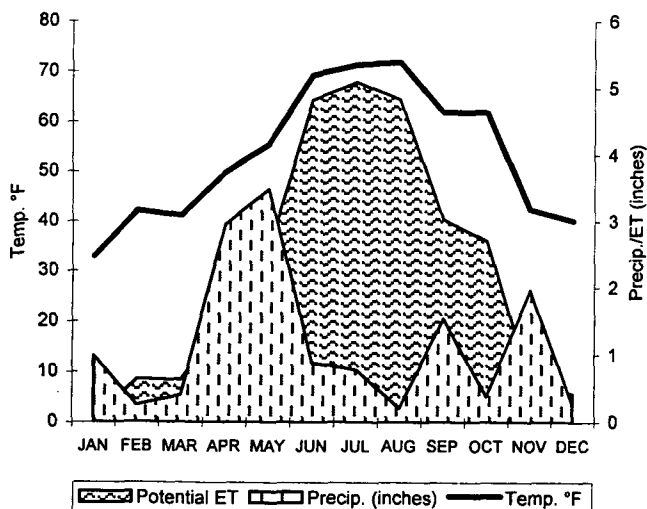
1948



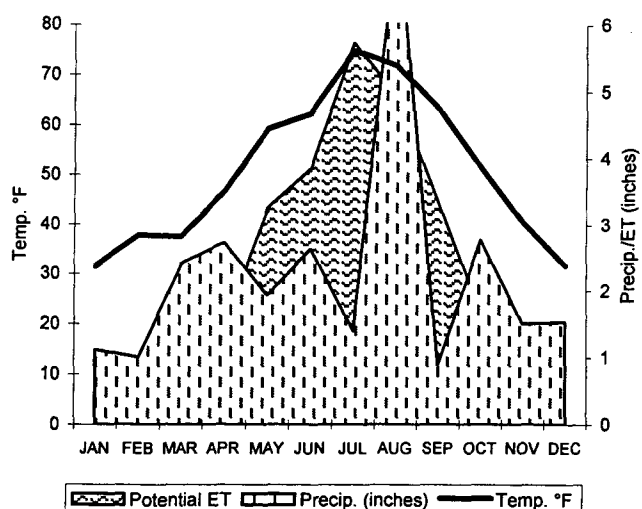
1949



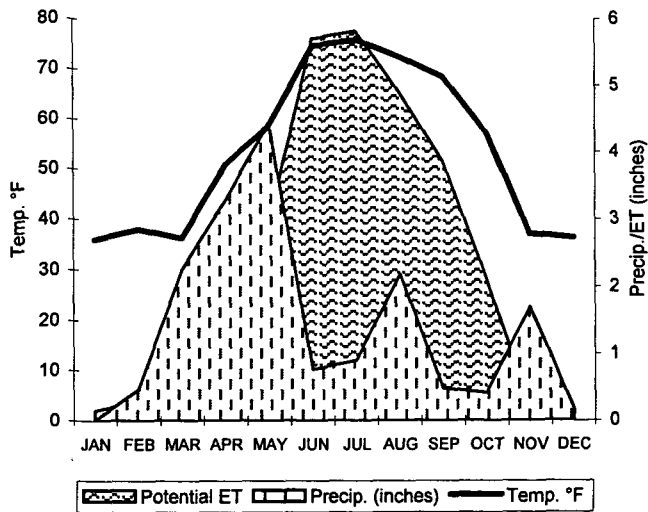
1950



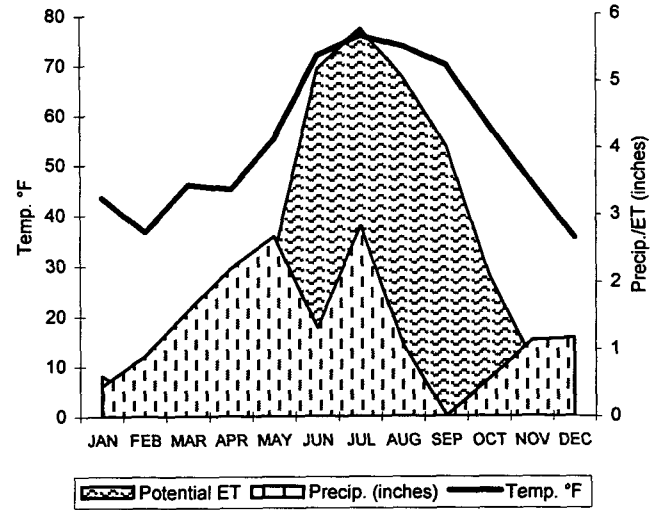
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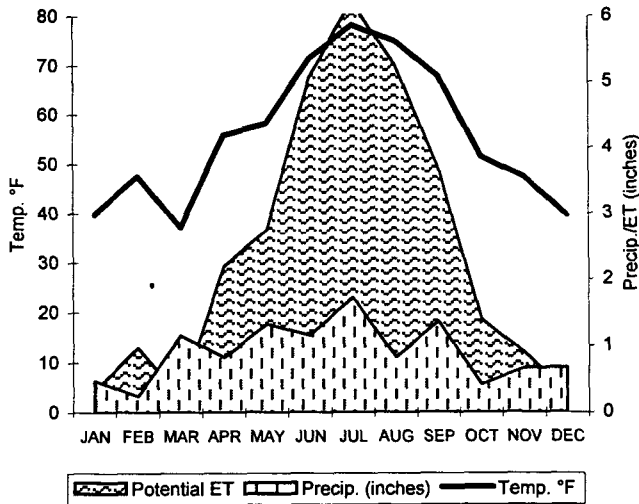
1952



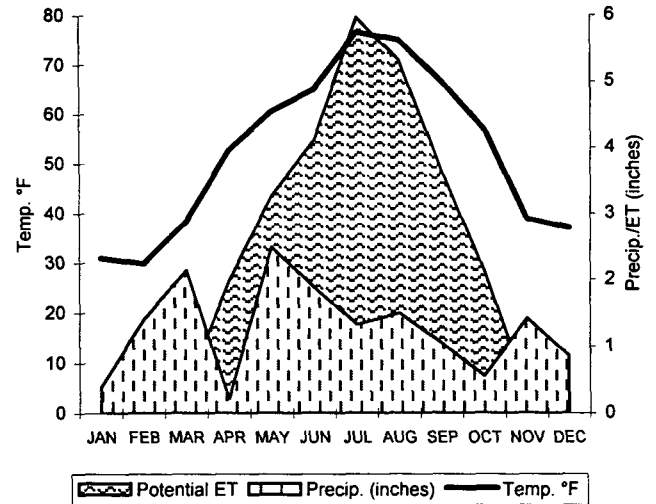
1953



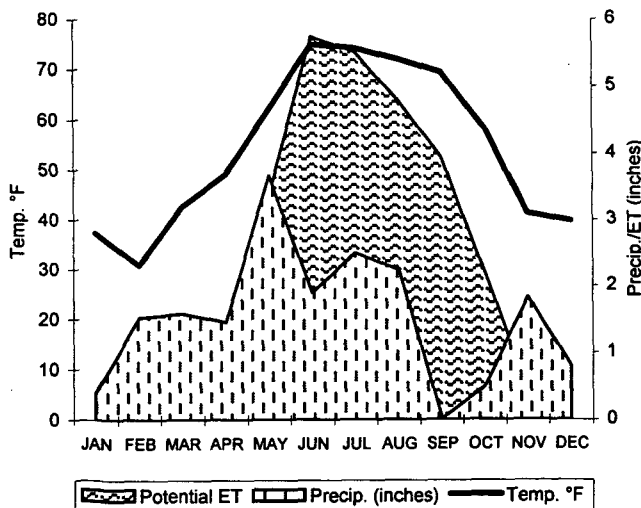
1954



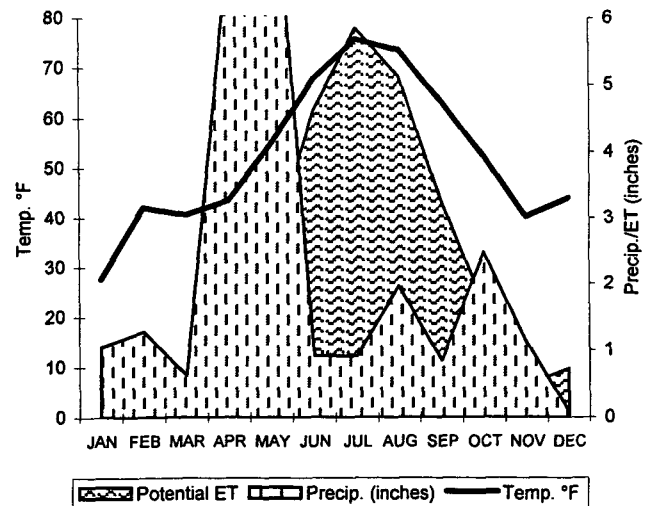
1955



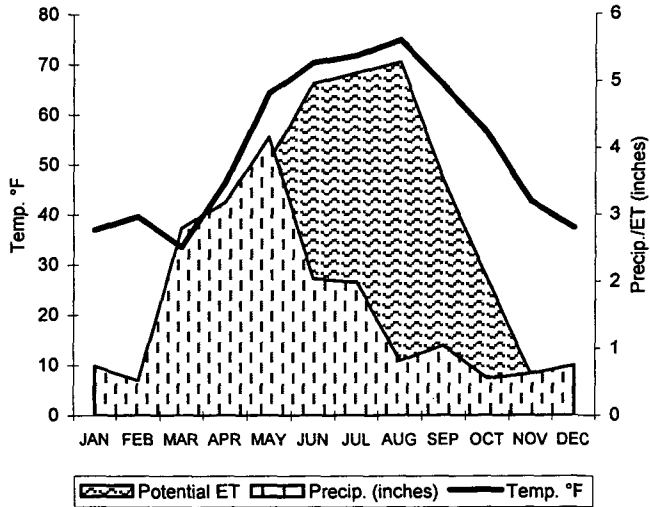
1956



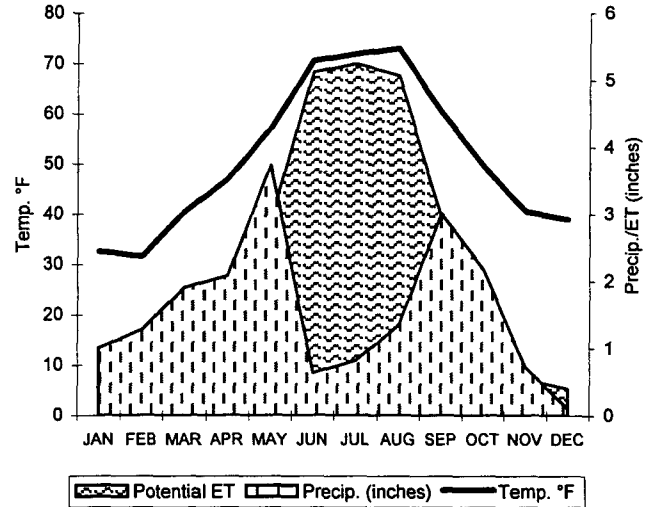
1957



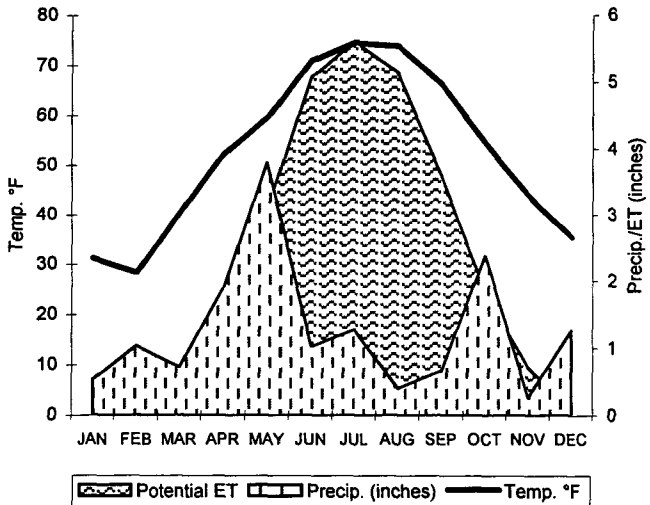
1958



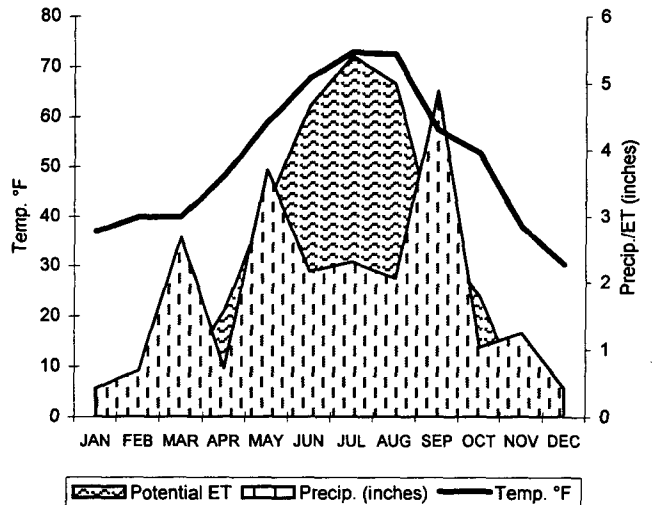
1959



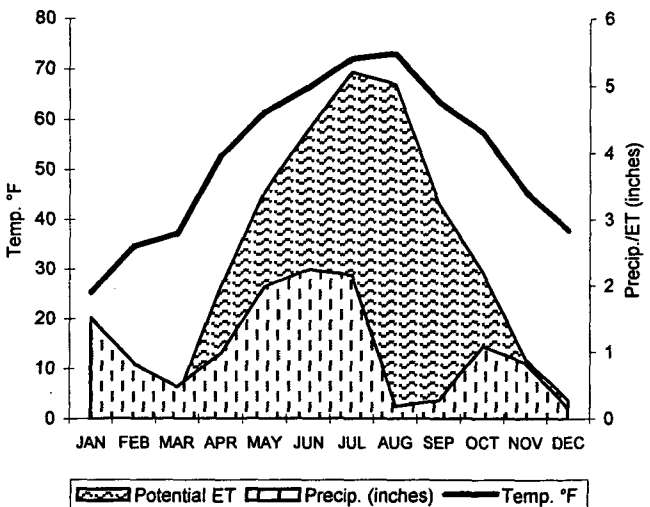
1960



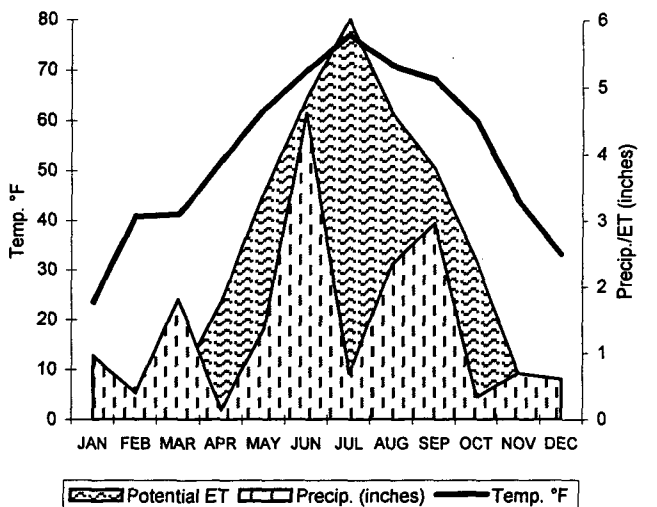
1961



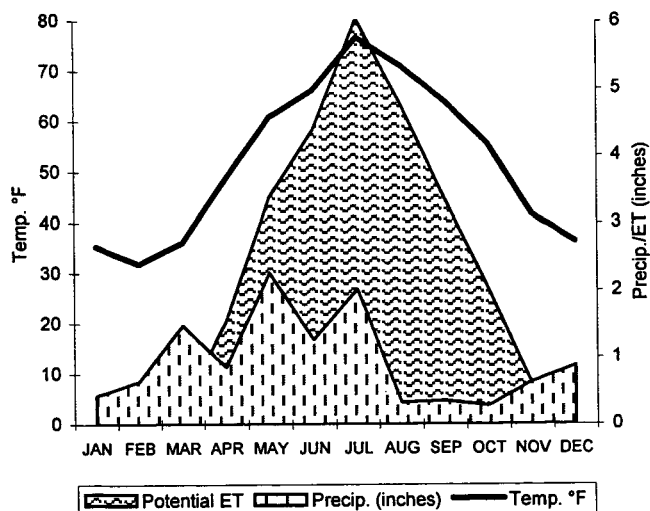
1962



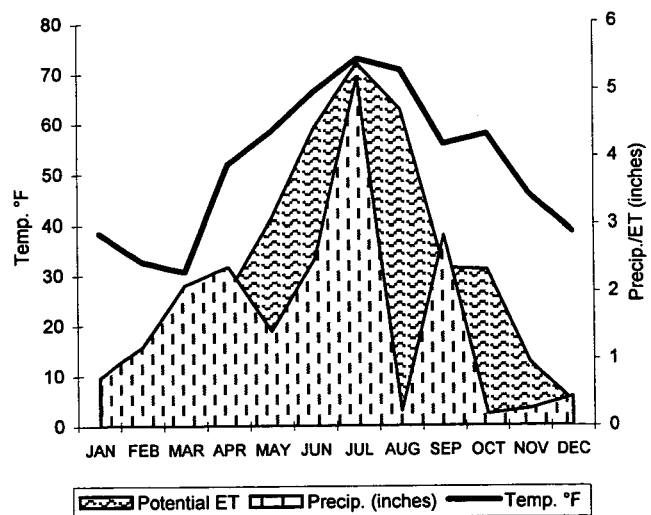
1963



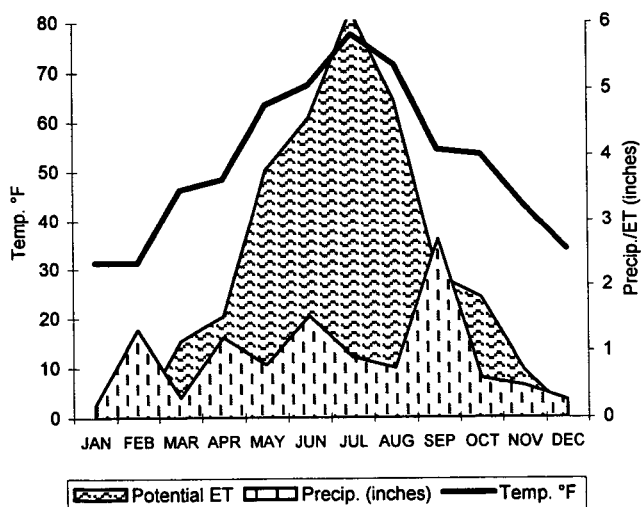
1964



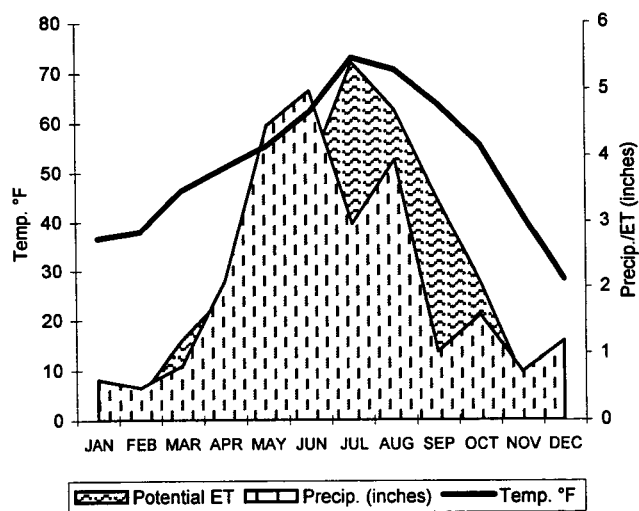
1965



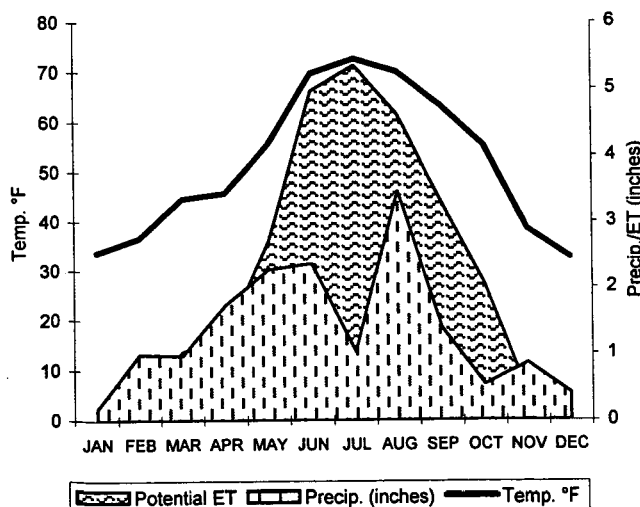
1966



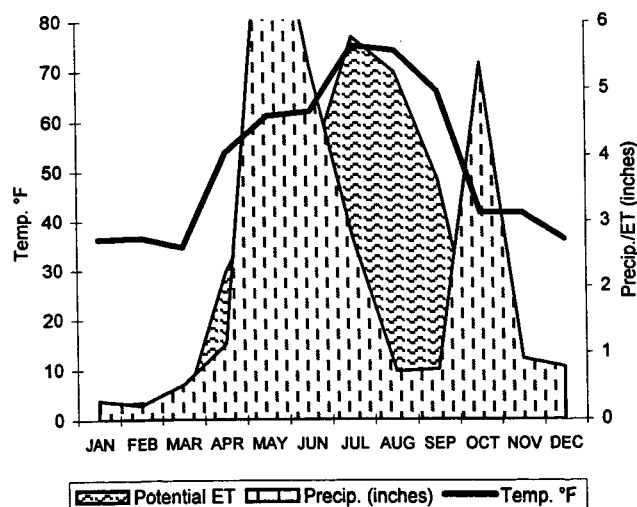
1967

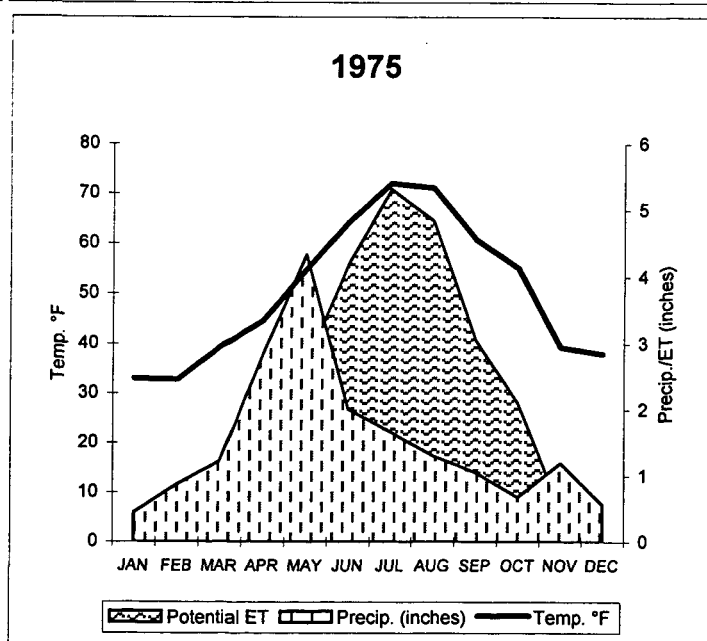
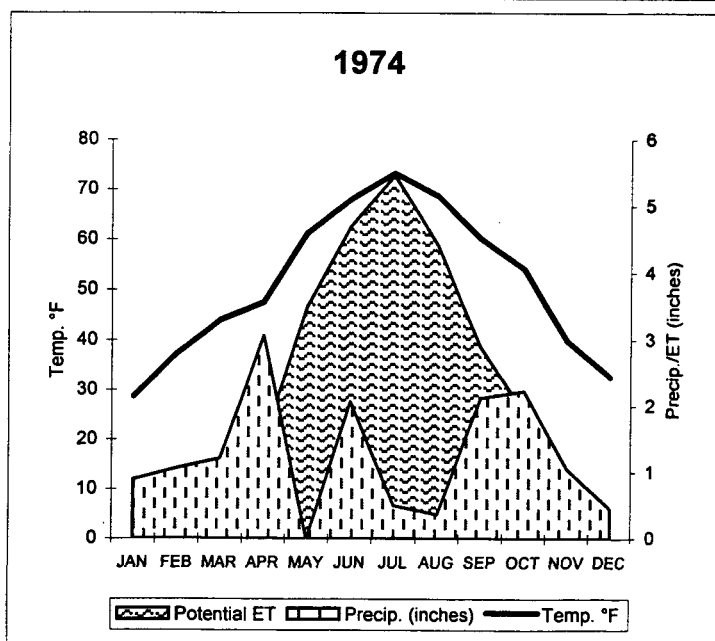
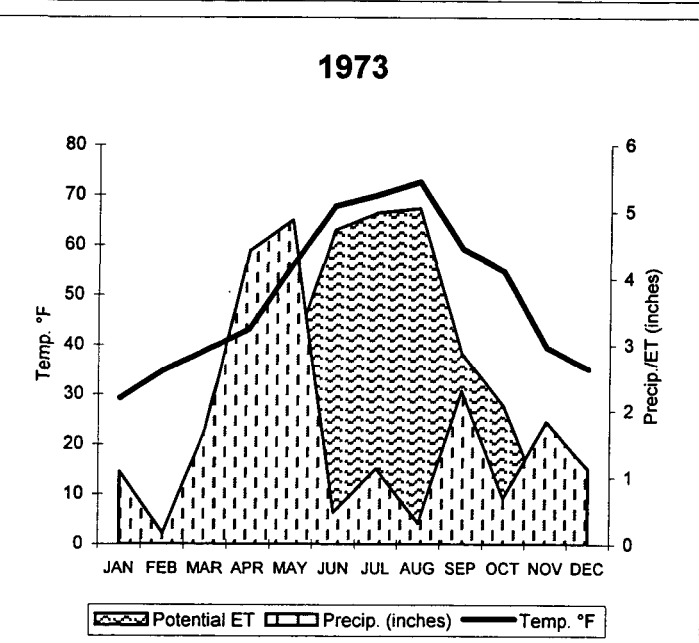
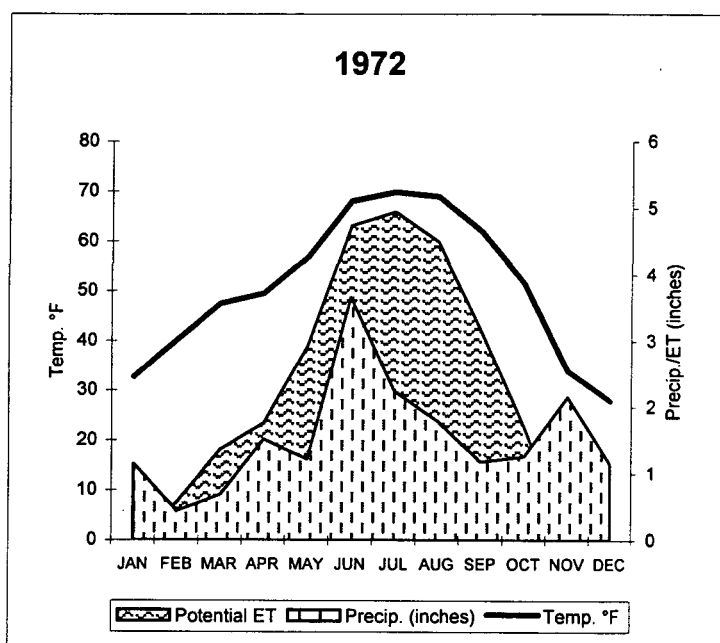
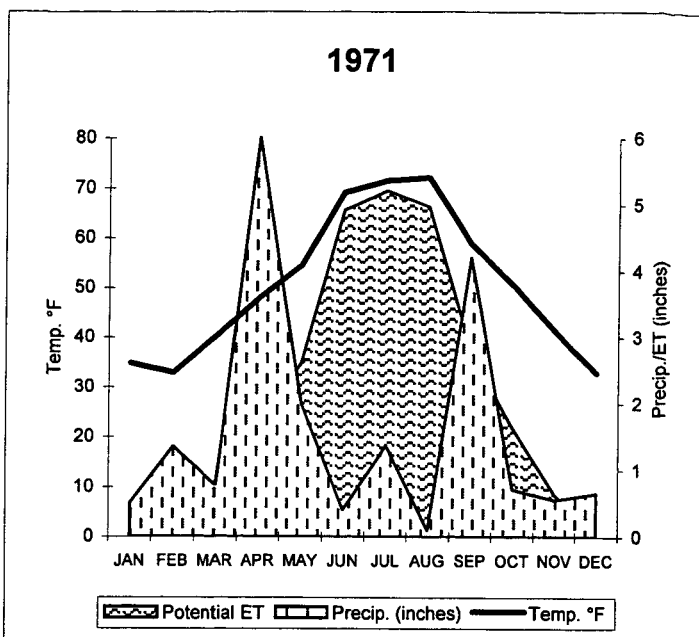
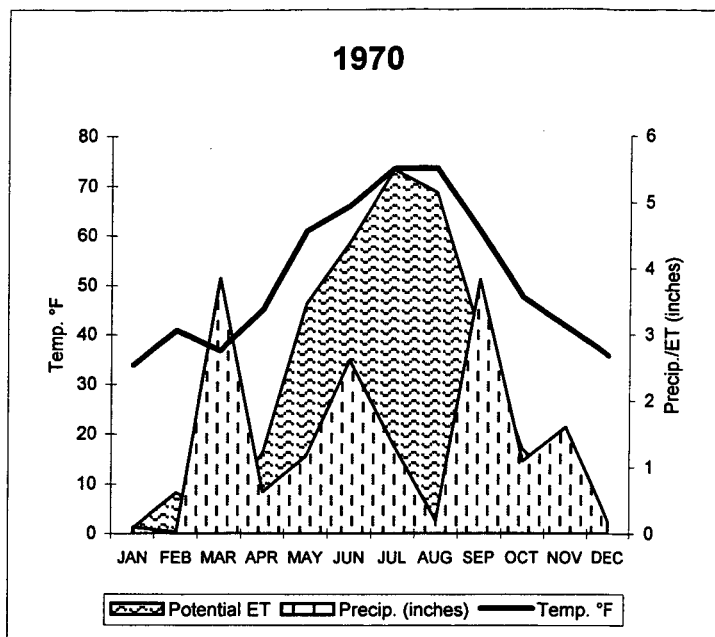


1968

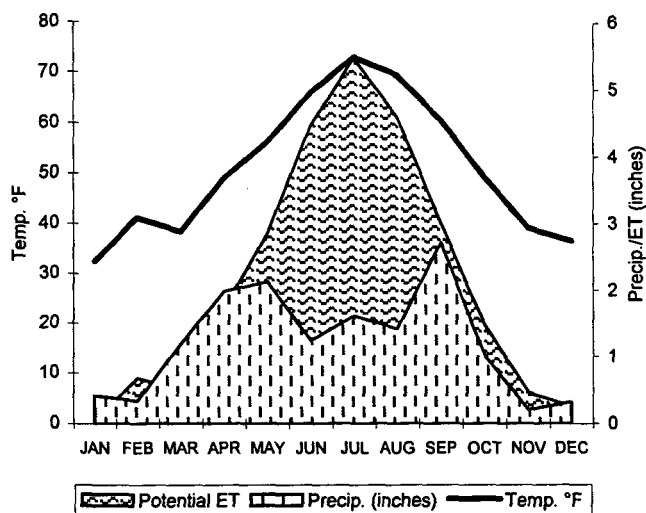


1969

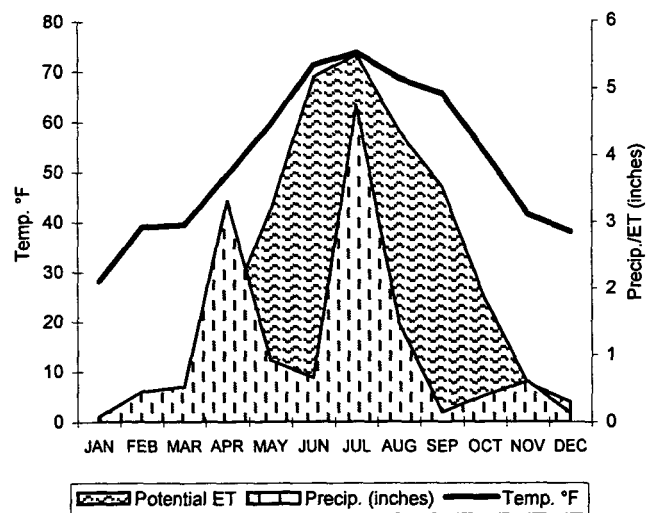




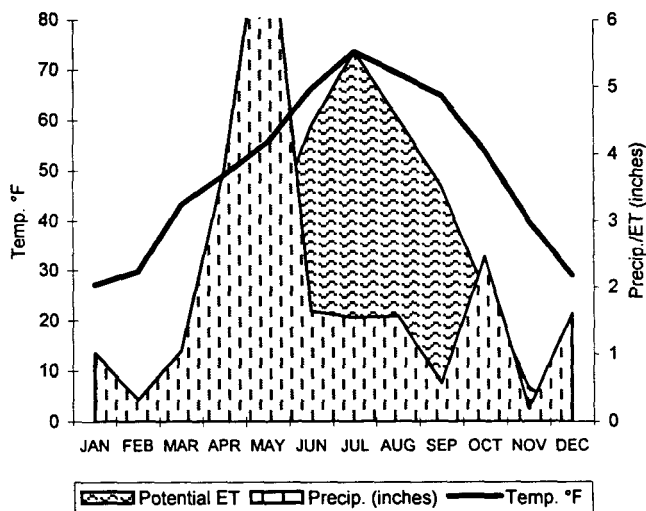
1976



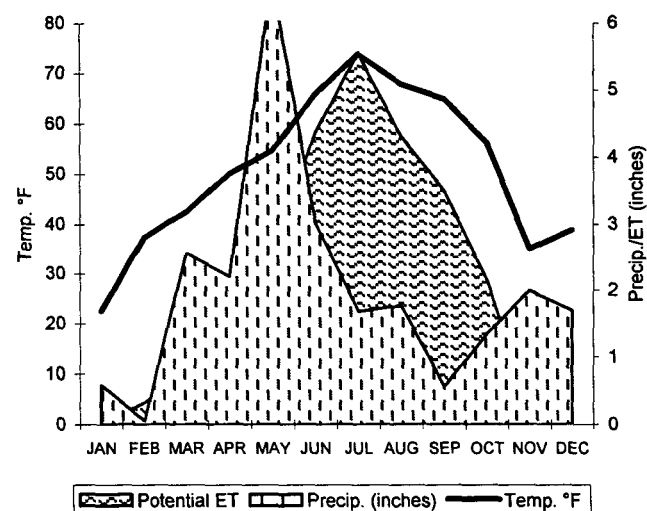
1977



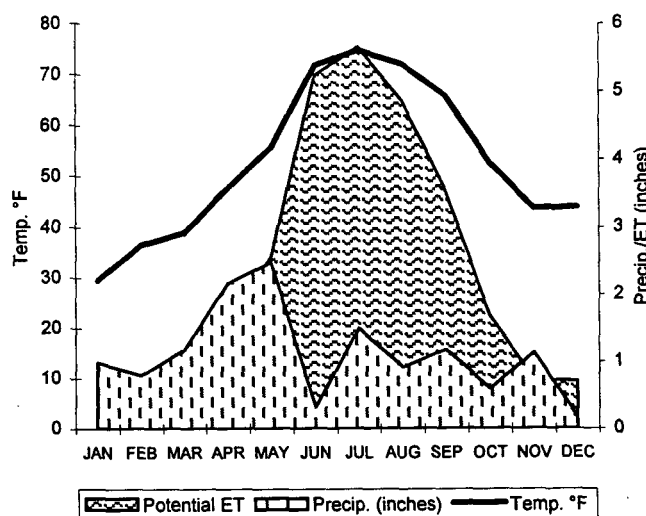
1978



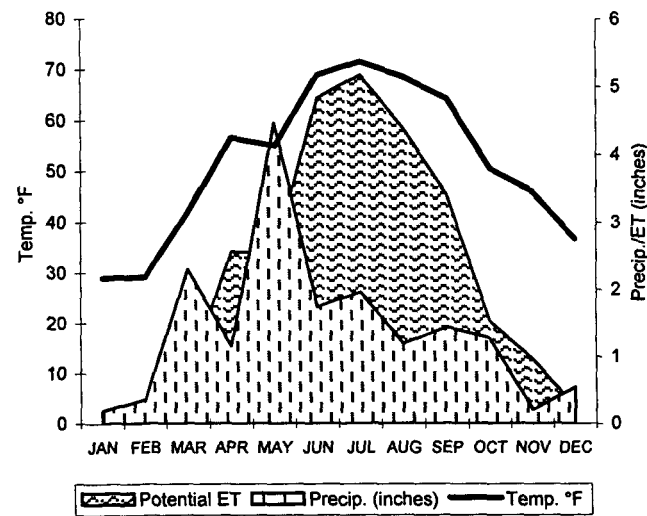
1979



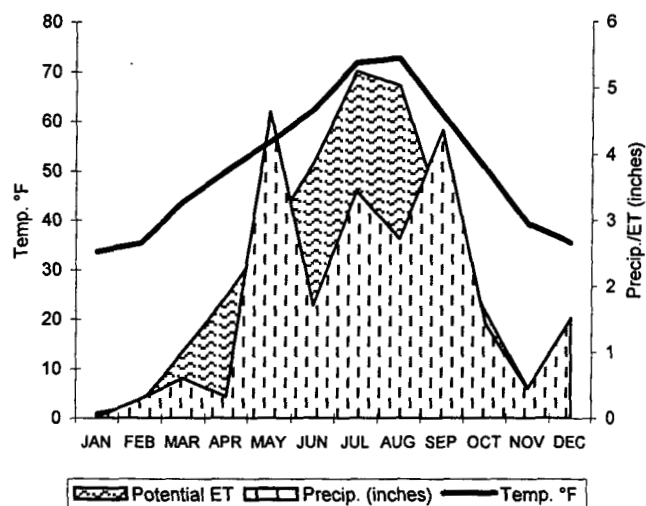
1980



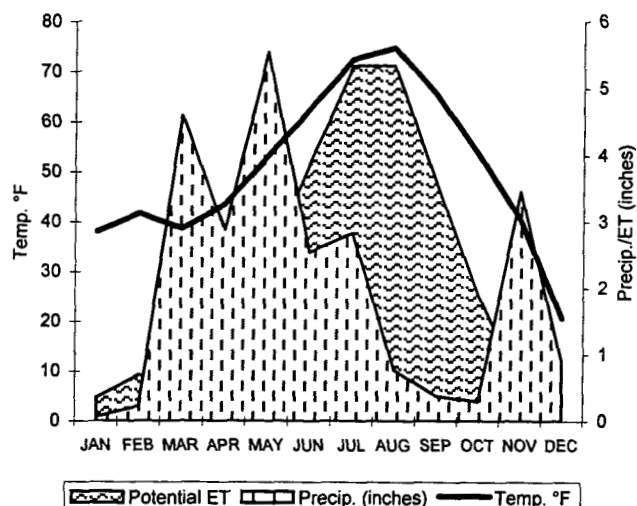
1981



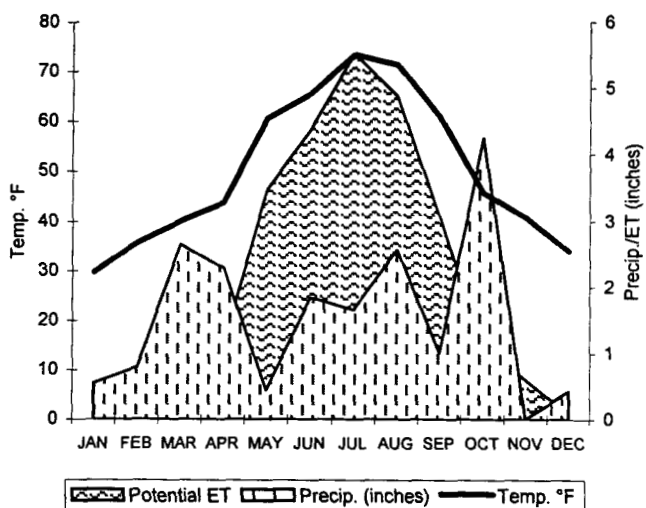
1982



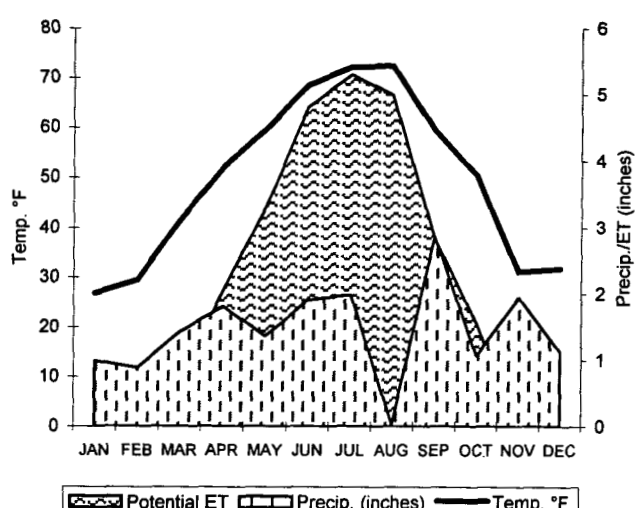
1983



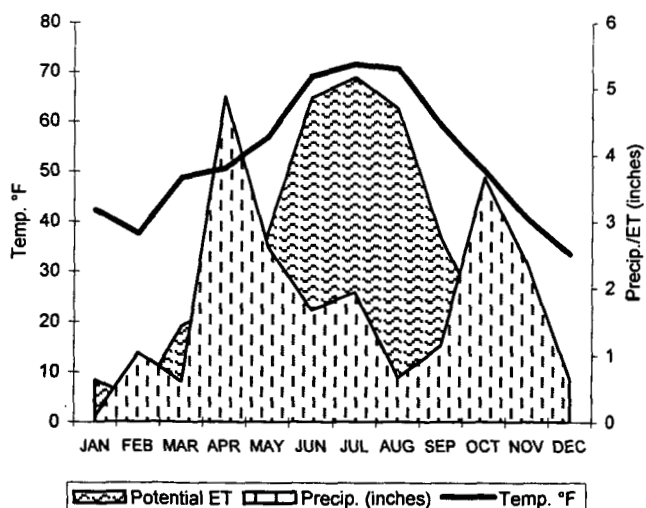
1984



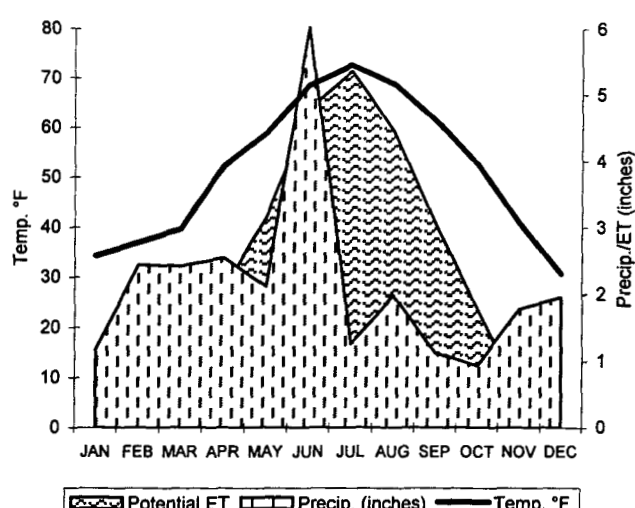
1985

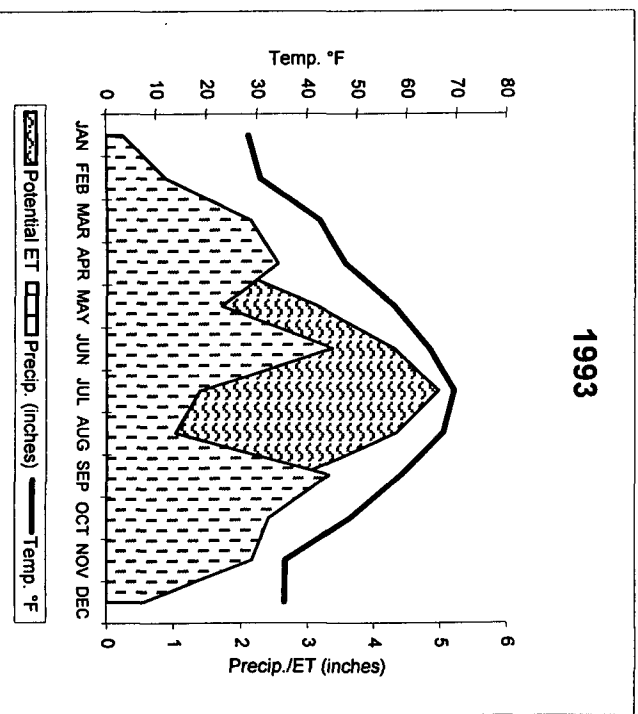
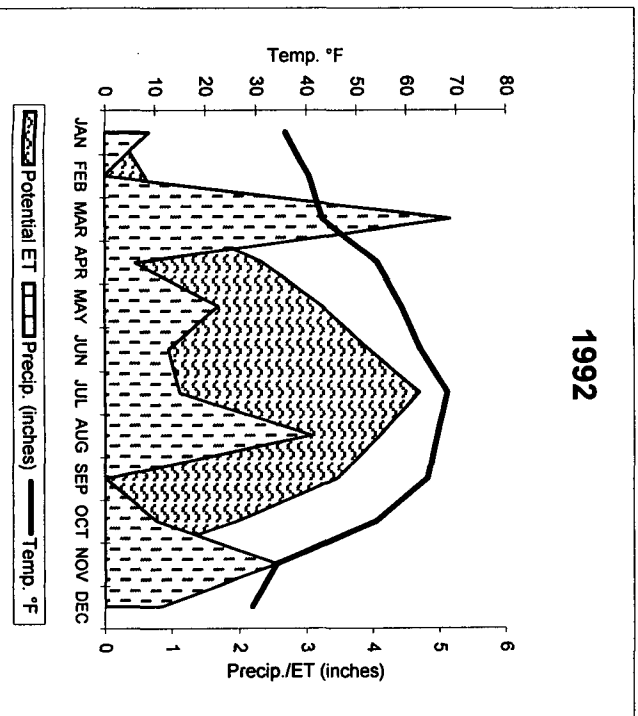
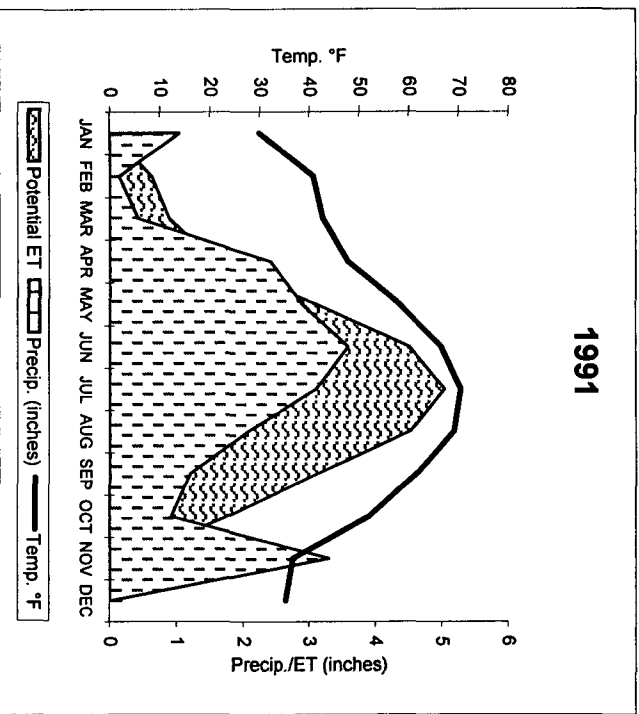
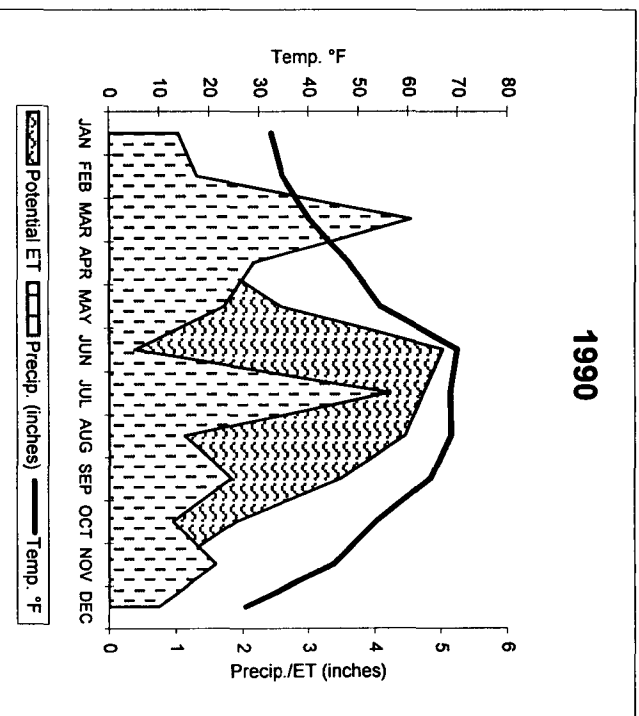
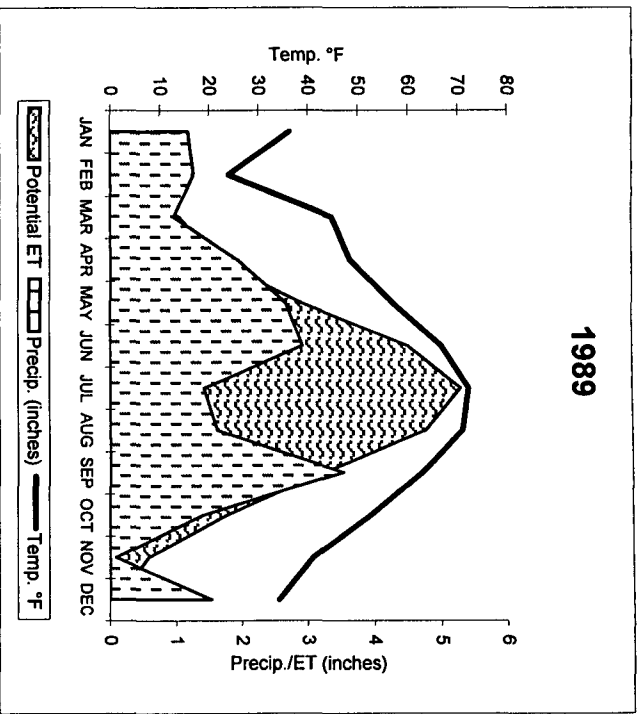
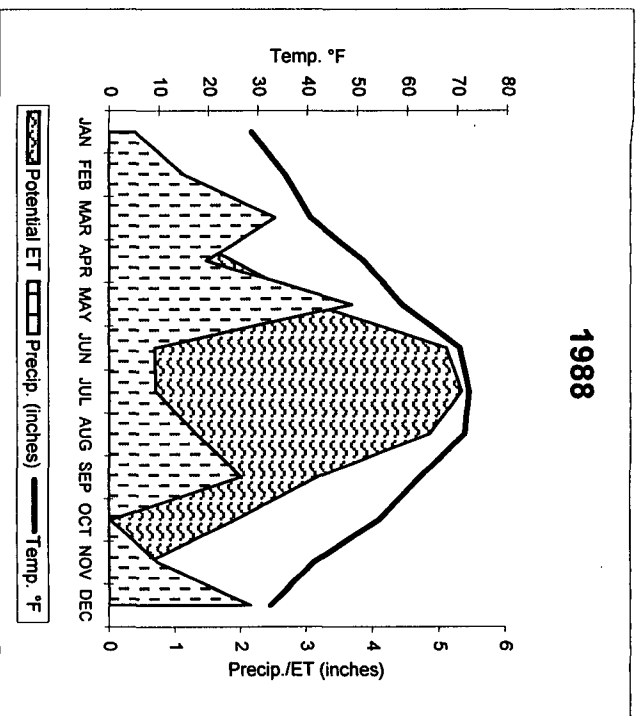


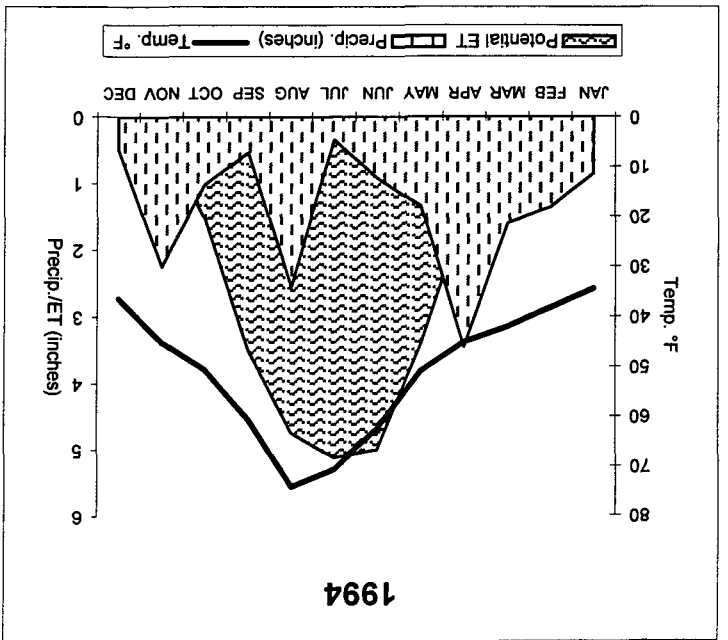
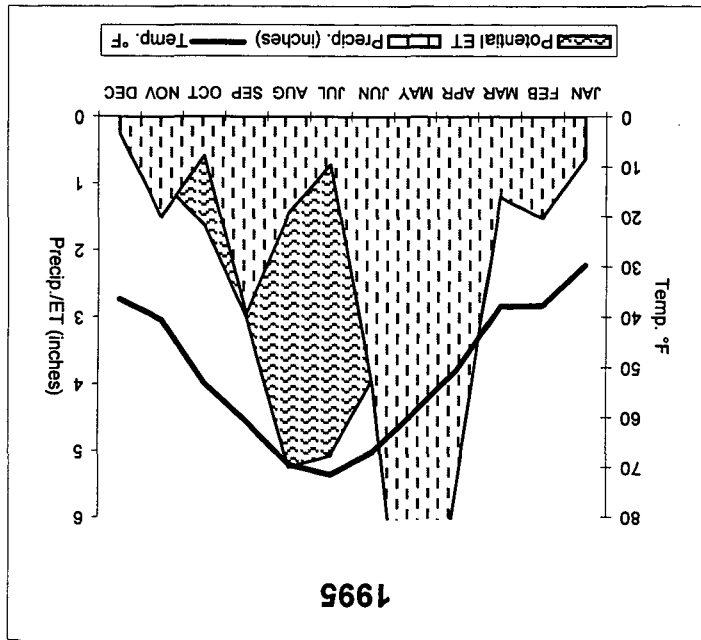
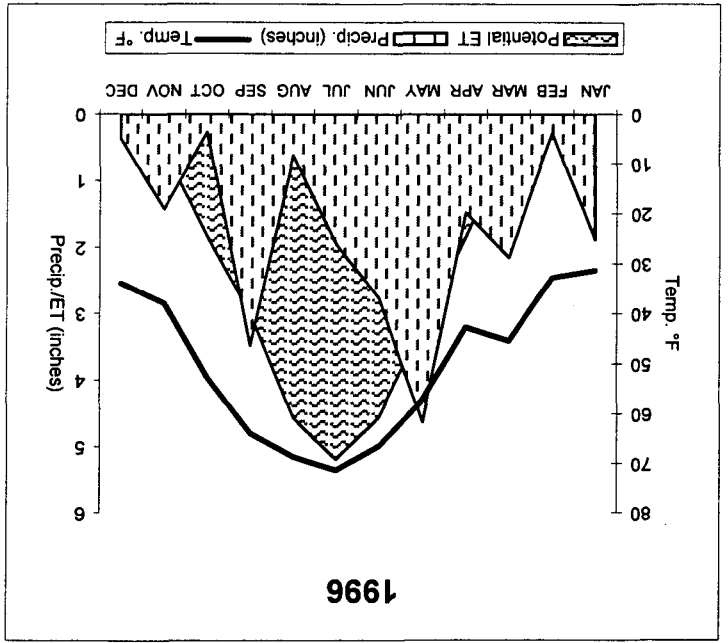
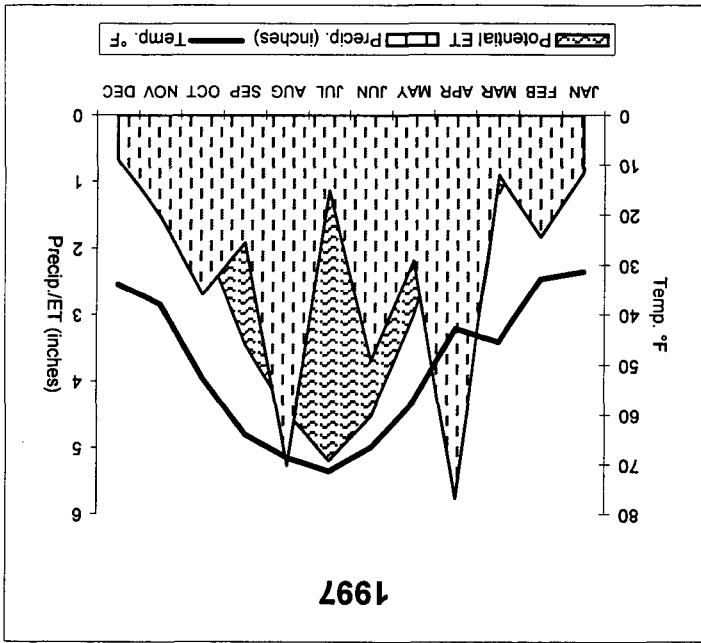
1986



1987







Appendix 11. Computer files

File inventory:

All of the data files have been compressed in a self-extracting file called FEWGDATA.EXE on the diskette. Approximately 5MB of disk space is required to expand this file. This report is found on a separate diskette with the file name of FEWGREPT.DOC, and is in WORD97 format.

All of these data sets have 123 sites (the 10 sites with zero cover were excluded), the missing soil texture at 15 sites were changed to the mean value in order to minimize their influence on the environmental vectors. There were 9 cut levels used in TWINSPAN(0-0.02-1-5-10-20-30-40-60) for all of the data runs. These cut levels result in a *de facto* positive weighting of the low values, and a negative weighting of the high values, but because the TWINSPAN program allows weighting to be directly applied, as it was in the D set, sets A-C are referred to as "NOT" weighted. The weighting that was applied to the D set neutralized the *de facto* weighting, so cover is approximately proportional to the weighting. So, to clarify the data manipulation, the weighted D set has actually been deweighted and is most representative of the actual vegetation cover conditions. The elevation data were received late in the analysis, and are only included in the D set of data.

A set

Combined Overstory & Understory Data - 350 species, 17 enviro

Species Data Input: COMCOND3.TXT

Environmental Data: ENVCOMB3.TXT

TWINSpan Output: COM3TWN.OUT

CANOCO Output: COMB3.OUT, COMB3.SOL, COMB3.CON

B set

Understory Data - 347 species, 17 enviro

Species Data Input: UNDCND4.TXT

Environmental Data: ENVUND4.TXT

TWINSpan Output: UND4TWN.OUT

CANOCO Output: UNDER4.OUT, UNDER4.SOL, UNDER4.CON

C set

Understory Data w/o weighting, w/o rock, litter ... -

342 species, 20 enviro

Species Data Input: UNDCND5.TXT

Environmental Data: ENVCON72.TXT

TWINSpan Output: UND5TWN.OUT

CANOCO Output: ENVCON72.OUT, .SOL, .CON

D set

Understory Data w/weighting, w/o rock, litter ... -

342 species, 20 enviro with elevation

Species Data Input: UNDCND5.TXT (Same as C set)

Environmental Data: ENVCON72.TXT (Same as C set)

TWINSpan Output: UND5TWNW.OUT

CANOCO Output: ENVCON72.OUT, .SOL, .CON (Same as C set)

DISCRIM

20 enviro modified to 40 classes

The DISCRIM program uses the sample classification output of TWINSpan, and uses the environmental factors as "species" to find indicator environmental factors that best explain the TWINSpan divisions. Because the pseudospecies concept may not work well with environmental factors that are always present to some degree (i.e. aspect, slope), many of the environmental factors were broken down into classes prior to data processing, and all continuous values were transformed to percentages based on the range of the respective value.

Environmental Data Input: ENVPCT72.CON

TWINSpan Classification Data: UNDCND5.LST

DISCRIM Output: ENVDSR.OUT

Appendix 12. Environmental data.

SITE	ELEV	SPEC	NODE	NORTH	EAST	ROCK	GRAVEL	CLAY	SAND	REG	TIME	WIND	INSECT	REG	BURN	HARM	GRZ	WEED	OTHER
D101	6015	4	0	0.000	1.000	9.0	0.0	15.0	20.0	0	0	1	0	0	0	0	0	0	0
D105	6015	8	42	1.000	0.000	27.5	0.0	25.0	60.0	0	0	1	0	0	0	0	0	0	0
D110	6015	4	9	0.000	1.000	4.5	0.0	40.0	55.0	0	1	1	0	0	0	0	0	0	0
D18101	6387	6	39	0.707	0.707	2.0	0.0	45.0	5.0	0	0	1	0	0	0	0	0	0	0
D18105	6387	4	20	0.000	1.000	2.5	0.0	0.0	0.0	0	0	1	0	0	0	0	0	0	0
D201	5919	3	7	0.707	0.707	6.5	0.0	5.0	85.0	0	0	1	0	0	0	0	0	0	0
D205	5919	2	12	-0.707	0.707	10.0	0.0	56.0	5.0	0	1	1	0	1	0	0	0	0	0
D210	5919	2	6	-0.707	0.707	12.5	0.0	73.5	5.0	0	1	1	0	0	0	0	0	0	0
D3D401	6406	2	26	-0.707	0.707	4.5	0.0	33.0	60.0	0	0	1	0	0	0	0	0	0	0
D3D405	6406	4	14	0.000	1.000	7.5	0.0	79.5	0.0	0	1	1	0	0	1	0	0	0	0
D3D410	6406	4	20	0.000	1.000	2.0	0.0	32.5	10.0	0	1	1	0	0	0	0	0	0	0
D3D415	6406	4	12	0.000	1.000	1.5	0.0	37.5	5.0	0	0	1	0	0	0	0	0	0	0
D3D420	6406	4	19	0.000	1.000	3.5	0.0	44.0	10.0	0	0	1	0	0	0	0	0	0	0
D3D425	6406	2	40	-0.707	0.707	3.0	0.0	32.5	60.0	0	0	1	0	0	0	0	0	0	0
D3D430	6406	1	16	-1.000	0.000	10.0	0.0	62.5	65.0	0	1	1	0	0	0	0	0	0	0
DAKR10	5882	5	51	0.000	1.000	15.0	0.0	36.0	20.0	0	0	1	0	1	0	0	0	0	0
ELDE01	6604	4	20	0.000	1.000	3.5	0.0	72.5	60.0	0	0	1	0	0	0	0	0	0	0
ELDE05	6604	6	14	0.707	0.707	1.5	0.0	39.5	15.0	0	0	1	0	0	0	0	0	0	0
ELDE10	6604	4	14	0.000	1.000	1.5	0.0	73.0	60.0	0	0	1	0	0	0	0	0	0	0
ELDE15	6604	8	38	1.000	0.000	5.5	0.0	65.5	5.0	0	0	1	0	0	0	0	0	0	0
LINN01	6173	5	34	0.000	-1.000	16.0	0.0	77.5	85.0	0	0	1	1	0	0	0	1	0	0
LINN05	6173	6	16	0.707	0.707	2.0	0.0	73.0	65.0	0	0	1	0	1	0	0	1	0	0
LINN10	6173	8	16	1.000	0.000	9.5	0.0	69.5	25.0	0	0	1	0	0	1	1	1	0	0
LINS01	6331	8	12	1.000	0.000	6.0	0.0	80.0	65.0	0	0	1	0	0	0	0	0	0	0
LINS05	6331	5	10	0.707	0.707	1.5	0.0	75.0	30.0	0	0	1	1	0	0	0	1	0	0
LINS10	6331	6	12	0.707	0.707	2.0	0.0	71.5	30.0	0	0	1	0	0	0	0	0	0	0
LINS15	6331	6	10	0.707	0.707	3.0	0.0	45.0	60.0	0	0	1	0	0	0	0	1	0	0
LJNE01	6346	4	14	0.000	1.000	4.0	0.0	38.5	25.0	0	0	1	0	0	0	0	0	0	0
LJNE05	6346	4	18	0.000	1.000	3.5	0.0	28.5	10.0	0	0	1	0	0	0	0	0	0	0
LJNE10	6346	4	9	0.000	1.000	1.0	0.0	42.5	60.0	0	0	1	0	0	0	0	0	0	0
LJNW01	6574	2	36	0.707	0.707	22.5	0.0	35.0	60.0	0	0	1	0	0	0	0	0	0	0
LJNW05	6574	4	35	0.000	1.000	6.0	0.0	61.0	45.0	0	0	1	0	0	0	0	0	0	0
LJNW10	6574	4	35	0.000	1.000	5.0	0.0	45.0	30.0	0	0	1	0	0	0	0	0	0	0
LJNW15	6574	4	61	0.000	1.000	12.0	0.0	47.5	10.0	0	0	1	0	0	0	0	0	0	0
LJSE01	6359	6	5	0.707	0.707	0.0	0.0	56.0	45.0	0	0	1	0	0	0	0	0	0	0
LJSE05	6359	6	5	0.707	0.707	1.0	0.0	55.5	30.0	0	0	1	0	0	0	0	0	0	0
LJSE10	6359	6	9	0.707	0.707	3.0	0.0	46.0	30.0	0	0	1	0	0	0	0	0	0	0
LJSE15	6359	8	7	0.707	0.707	3.0	0.0	58.0	30.0	0	0	1	0	0	0	0	0	0	0
LJSE20	6359	6	5	0.707	0.707	1.0	0.0	58.5	30.0	0	0	1	0	0	0	0	0	0	0
LJSW01	6412	7	28	0.707	0.707	14.5	0.0	46.5	65.0	0	0	1	0	0	0	0	0	0	0
LJSW05	6412	6	22	0.707	0.707	1.5	0.0	48.5	5.0	0	0	1	0	0	0	0	0	0	0

SITE	ELEV	ASPECT	SLOPE	NORTH	EAST	ROCK	GRAVEL	LITTER	SOIL	LITDEPTH	CLAY	SAND	REG	TIME	WILD	INSECT	REQ	BURN	HARV	GRAZ	WEATH	OTHER
LJWSW10	8412	4	17	0.000	1.000	4.0	0.0	55.0	1.500	1.300	35.0	30.0	1	0	1	0	0	0	0	0	0	0
LOSH01	5891	4	8	0.000	1.000	8.0	0.0	53.5	0.000	0.400	25.0	60.0	1	1	1	0	0	0	0	0	0	0
LOSH05	5891	4	10	0.000	1.000	1.0	0.0	62.0	2.000	1.500	25.0	60.0	0	1	0	0	1	0	0	0	0	0
LOSH10	5891	4	9	0.000	1.000	1.0	0.0	56.5	0.000	1.100	40.0	55.0	0	1	1	0	0	1	0	0	0	0
MRL01	6341	6	20	0.707	0.707	19.0	0.0	27.5	0.000	1.600	35.0	30.0	1	0	1	0	0	0	1	0	0	0
MRL10	6341	2	25	-0.707	0.707	8.5	0.0	62.0	0.000	1.800	35.0	30.0	1	0	1	1	0	0	0	1	0	0
MRL15	6341	7	41	0.707	-0.707	7.0	0.0	74.5	0.000	1.800	5.0	85.0	0	0	1	1	0	0	1	0	0	0
PNBK01	6243	6	57	0.707	0.707	12.0	0.0	30.0	0.000	1.300	35.0	30.0	0	0	1	0	0	0	1	0	0	0
PNBK05	6243	7	52	0.707	-0.707	12.5	0.0	42.5	0.500	2.100	35.0	30.0	0	0	1	0	0	0	1	0	0	0
PNBK10	6243	7	53	0.707	-0.707	16.5	0.0	36.5	0.000	2.800	0.0	0.0	0	0	1	0	0	0	1	0	0	0
PWRL01	6193	4	14	0.000	1.000	7.5	0.0	66.0	0.000	0.500	0.0	0.0	0	1	1	0	0	1	0	0	0	0
PWRL05	6193	6	15	0.707	0.707	4.5	0.0	73.5	0.000	1.100	25.0	60.0	0	1	1	0	0	0	0	0	0	0
PWRL10	6193	6	21	0.707	0.707	3.5	0.0	67.5	0.000	3.700	35.0	30.0	0	1	1	0	0	1	0	0	1	0
PWRL15	6193	2	8	-0.707	0.707	8.0	0.0	68.0	0.000	1.400	35.0	30.0	0	1	1	0	0	1	0	0	0	0
PWRL20	6193	6	13	0.707	0.707	5.0	0.0	78.0	0.500	1.100	25.0	60.0	0	1	1	0	0	0	0	0	0	0
PWRL25	6193	2	14	-0.707	0.707	11.0	0.0	20.0	0.000	1.500	0.0	0.0	0	1	0	0	0	0	0	0	0	0
S1001	6215	6	25	0.707	0.707	5.0	0.0	70.0	0.000	1.300	35.0	30.0	0	1	1	0	0	0	0	0	0	0
S1005	6215	6	53	0.707	0.707	4.0	0.0	60.0	0.000	2.700	5.0	85.0	0	1	1	0	0	0	0	0	0	0
S1010	6215	4	12	0.000	1.000	8.5	0.0	77.0	0.000	0.700	35.0	30.0	1	1	1	0	0	0	0	0	0	0
S301	6215	8	12	1.000	0.000	15.0	0.0	73.0	0.500	1.300	0.0	0.0	0	1	1	0	0	0	0	0	0	0
S305	6215	4	9	0.000	1.000	1.0	0.0	59.0	0.000	0.900	5.0	85.0	0	1	1	0	0	0	0	0	0	0
S310	6215	4	12	0.000	1.000	1.0	0.0	75.0	0.000	1.400	25.0	60.0	0	1	1	0	0	0	0	0	0	0
S315	6215	2	17	-0.707	0.707	8.0	0.0	76.5	0.000	0.600	5.0	85.0	0	1	1	0	0	0	0	0	0	0
S320	6215	4	30	0.000	1.000	12.5	0.0	62.0	0.000	2.500	20.0	45.0	1	1	1	0	0	0	0	0	0	0
S325	6215	6	28	0.707	0.707	11.5	0.0	48.5	0.000	0.300	0.0	0.0	0	1	1	0	0	0	0	0	0	0
S401	6247	4	7	0.000	1.000	3.0	0.0	70.0	2.000	1.600	5.0	85.0	0	1	0	0	0	0	0	0	0	0
S405	6247	1	30	-1.000	0.000	16.5	0.0	80.5	1.000	1.300	15.0	65.0	0	1	1	0	0	0	0	0	0	0
S501	6197	4	12	0.000	1.000	7.0	0.0	62.0	2.000	0.900	15.0	65.0	0	1	1	0	0	0	0	0	0	0
S505	6197	4	12	0.000	1.000	8.5	0.0	71.5	0.000	2.400	15.0	65.0	0	1	0	0	0	0	0	0	0	0
S510	6197	4	14	0.000	1.000	3.5	0.0	66.0	3.000	0.900	25.0	60.0	0	1	0	0	1	0	1	0	0	0
S901	6118	6	16	0.707	0.707	14.0	0.0	71.5	0.500	2.700	5.0	85.0	0	1	1	0	0	0	0	0	0	0
S905	6118	2	11	-0.707	0.707	8.5	0.0	26.5	0.000	2.000	5.0	85.0	0	0	1	0	0	0	1	0	0	0
S910	6118	4	9	0.000	1.000	2.0	0.0	45.5	0.000	0.400	5.0	85.0	0	1	1	0	0	1	0	0	0	0
ST101	6473	4	17	0.000	1.000	6.5	0.0	47.5	8.500	1.200	5.0	85.0	0	1	1	0	1	1	0	0	0	0
ST105	6473	6	35	1.000	0.000	20.5	0.0	69.0	1.000	2.600	15.0	65.0	0	1	1	0	0	0	0	0	0	0
ST110	6473	4	16	0.000	1.000	4.0	0.0	61.5	0.000	1.300	15.0	65.0	0	1	0	0	0	1	0	0	0	0
ST115	6473	4	12	0.000	1.000	3.0	0.0	54.5	0.500	0.800	35.0	30.0	0	1	1	0	0	0	0	0	0	0
ST1001	6254	7	34	0.707	-0.707	0.0	0.0	32.0	0.000	2.900	35.0	30.0	0	1	0	0	0	0	0	0	0	0
ST1005	6254	5	75	0.000	1.000	43.5	0.0	41.5	4.000	0.500	0.0	0.0	0	1	1	0	0	1	0	0	0	0
ST305	6514	6	23	0.707	0.707	8.5	0.0	48.5	0.000	2.000	0.0	0.0	0	1	1	0	0	1	0	0	0	0
ST310	6514	6	19	0.707	0.707	1.0	0.0	57.0	0.000	1.300	35.0	30.0	0	1	1	0	0	1	0	0	0	0
ST501	6475	2	35	-0.707	0.707	28.0	0.0	53.0	0.000	1.100	5.0	85.0	0	1	1	0	0	1	0	0	0	0
ST505	6475	8	31	1.000	0.000	5.5	0.0	82.0	0.000	5.700	0.0	0.0	0	1	1	0	0	1	0	0	0	0
ST501	6446	5	6	0.000	-1.000	2.5	0.0	71.0	0.500	2.500	25.0	60.0	0	1	0	0	0	1	0	0	0	0

SITE	ELEV	ASPECT	SLOPE	NORTH	EAST	ROCK	GRAVEL	LITTER	SOIL	LITDEPTH	CLAY	SAND	REG	TMB	WLD	INSECT	REC	BURN	HARV	GRAZ	WEATH	OTHER
ST605	6448	2	23	-0.707	0.707	3.5	0.0	70.0	0.000	2.000	35.0	30.0	0	1	1	0	0	1	0	0	0	0
ST610	6446	3	21	-0.707	-0.707	12.0	0.0	49.5	5.500	1.300	0.0	0.0	0	1	1	0	1	1	0	0	0	0
ST615	6446	2	14	-0.707	0.707	5.0	0.0	90.5	1.500	1.400	5.0	90.0	0	1	1	0	0	1	0	0	0	0
ST701	6455	7	24	0.707	-0.707	2.5	0.0	37.0	0.500	0.600	35.0	30.0	0	1	0	1	0	0	0	0	0	0
ST705	6455	3	18	-0.707	-0.707	4.5	0.0	66.5	0.000	2.400	20.0	45.0	0	1	1	0	0	0	0	0	0	0
ST801	6522	2	43	-0.707	0.707	4.5	0.0	38.5	0.000	2.400	35.0	10.0	0	1	1	0	0	1	0	0	0	0
ST805	6522	4	23	0.000	1.000	5.0	0.0	74.0	0.500	3.000	20.0	45.0	0	1	1	0	0	0	0	0	0	0
ST901	6510	4	8	0.000	1.000	0.0	0.0	48.0	0.000	0.900	25.0	60.0	0	1	1	0	0	0	0	0	0	0
ST905	6510	6	25	0.707	0.707	6.5	0.0	50.0	1.000	3.000	20.0	45.0	0	1	1	0	1	0	0	0	0	0
STG201	6131	6	4	0.707	0.707	2.0	0.0	38.5	6.000	0.500	60.0	20.0	0	0	0	0	0	0	0	1	0	0
STG205	6131	6	4	0.707	0.707	0.0	0.0	45.5	6.000	0.600	35.0	30.0	0	0	0	0	0	0	0	1	0	0
STG210	6131	6	3	0.707	0.707	0.5	0.0	45.5	6.500	0.500	40.0	55.0	0	1	1	0	0	0	0	1	0	0
STG215	6131	6	2	0.707	0.707	3.0	0.0	35.5	10.000	0.600	40.0	55.0	0	1	0	0	0	0	0	1	0	0
STG220	6131	6	4	0.707	0.707	1.0	0.0	44.0	1.500	1.100	40.0	55.0	0	1	0	0	0	0	0	1	0	0
SNSH01	5991	8	48	1.000	0.000	1.5	0.0	69.5	1.500	1.800	25.0	60.0	0	1	1	0	0	0	0	0	0	0
SNSH05	5991	8	38	1.000	0.000	4.0	0.0	59.0	0.000	1.800	40.0	55.0	0	1	1	0	0	0	0	0	0	0
WTRT01	5888	2	3	-0.707	0.707	12.0	0.0	36.5	0.000	1.300	20.0	45.0	0	0	1	0	0	0	1	0	0	0
WTRT05	5888	8	25	1.000	0.000	4.0	0.0	54.5	0.000	1.900	35.0	30.0	0	1	1	0	0	0	0	0	0	0
WTRT10	5888	4	7	0.000	1.000	13.5	0.0	60.5	8.500	1.500	20.0	45.0	0	1	1	0	1	0	0	0	0	0
WTRT15	5888	4	6	0.000	1.000	6.5	0.0	48.5	3.500	0.300	40.0	55.0	0	0	0	0	0	0	0	0	0	0
WTRT20	5888	4	14	0.000	1.000	5.0	0.0	55.0	0.000	0.900	40.0	55.0	0	1	1	0	0	0	0	0	0	0
WITE05	6224	3	44	-0.707	-0.707	18.5	0.0	62.5	0.500	2.100	25.0	60.0	0	0	1	0	0	0	0	0	0	0
WITE10	6224	1	35	-1.000	0.000	16.5	1.5	65.0	0.000	1.900	5.0	90.0	0	0	1	0	0	1	0	0	0	0
WITNE01	6593	3	36	-0.707	-0.707	20.5	0.5	71.0	0.000	1.500	5.0	85.0	0	1	1	0	0	1	0	0	0	0
WITNE05	6593	3	48	-0.707	-0.707	11.0	3.0	76.5	0.000	2.500	5.0	85.0	0	0	1	0	0	0	0	0	0	0
WITNE10	6593	3	34	-0.707	-0.707	5.0	3.5	60.5	0.000	1.500	15.0	65.0	0	1	1	0	0	1	1	0	0	0
WITNE15	6593	3	36	-0.707	-0.707	14.0	9.0	69.0	0.500	0.900	25.0	60.0	0	0	1	0	0	0	0	0	0	0
WITNE20	6593	3	25	-0.707	-0.707	10.0	3.5	71.5	0.000	0.800	0.0	0.0	0	1	1	0	0	1	0	0	0	0
WITNE25	6593	5	32	0.000	-1.000	6.5	2.5	48.5	0.000	2.200	5.0	85.0	1	1	0	0	0	1	1	0	0	0
WITNE30	6593	3	22	-0.707	-0.707	7.0	12.0	62.5	0.000	0.900	45.0	5.0	0	0	1	0	0	1	0	0	0	0
WITNW01	6542	3	34	-0.707	-0.707	4.0	0.0	45.0	1.000	1.300	25.0	60.0	0	0	1	0	0	0	0	0	0	0
WITNW15	6542	3	33	-0.707	-0.707	6.0	0.0	73.5	2.000	1.500	5.0	85.0	0	0	1	0	0	0	1	0	0	0
WITNW20	6542	5	30	0.000	-1.000	6.0	0.0	77.5	0.500	2.000	5.0	85.0	0	0	1	1	0	1	1	0	0	0
WITS01	6215	3	38	-0.707	-0.707	11.0	7.0	66.0	0.000	2.200	15.0	65.0	0	0	1	0	0	1	0	0	0	0
WITS05	6215	5	50	0.000	-1.000	10.5	5.0	69.0	0.000	1.200	5.0	85.0	0	0	1	0	0	1	1	0	0	0
WITS10	6215	1	48	-1.000	0.000	29.0	1.5	53.0	0.000	1.400	0.0	0.0	1	0	1	0	0	0	0	0	0	0
WITW01	6260	5	40	0.000	-1.000	1.0	0.0	64.5	0.000	0.800	20.0	45.0	0	0	1	0	0	0	0	0	0	0
WITW05	6260	5	28	0.000	-1.000	2.0	0.0	73.0	0.000	1.100	20.0	45.0	0	1	1	0	0	0	0	0	0	0

Appendix 13. Group summary data with sample data.

Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
NATIVE ANNUAL & BIENNIAL FORBS			
<i>Chenopodium</i> spp.	0.00	4.35	0.00
<i>Collinsia parviflora</i>	0.00	43.48	0.00
<i>Collomia linearis</i>	0.04	4.35	0.11
<i>Descurainia incisa</i>	0.00	4.35	0.00
<i>Frasera speciosa</i>	0.00	17.39	0.00
<i>Grindelia squarrosa</i>	0.15	86.96	0.40
<i>Oreocarya virgata</i>	0.00	8.70	0.00
<i>Plantago patagonica</i>	0.00	4.35	0.00
<i>Polygonum douglasii</i>	0.00	4.35	0.00
<i>Silene antirrhina</i>	0.00	8.70	0.00
TOTAL NATIVE ANN. & BIEN. FORBS	0.2	100.0	0.5
INTRODUCED ANNUAL & BIENNIAL FORBS			
<i>Alyssum alyssoides</i>	0.00	26.09	0.00
<i>Alyssum parviflorum</i>	0.00	4.35	0.00
<i>Alyssum</i> spp.	0.00	17.39	0.00
<i>Camelina microcarpa</i>	0.04	39.13	0.11
<i>Carduus nutans</i> ssp. <i>macrolepis</i>	0.00	39.13	0.00
<i>Cynoglossum officinale</i>	0.00	26.09	0.00
<i>Fallopia convolvulus</i>	0.00	4.35	0.00
<i>Lactuca serriola</i>	0.28	8.70	0.74
<i>Neolepia campestre</i>	0.00	65.22	0.00
<i>Noccaea montana</i>	0.00	17.39	0.00
<i>Thlaspi arvense</i>	0.00	13.04	0.00
<i>Tragopogon dubius</i> ssp. <i>major</i>	0.09	73.91	0.23
<i>Turritis glabra</i>	0.00	13.04	0.00
<i>Verbascum thapsus</i>	0.00	13.04	0.00
TOTAL INTRO. ANN. & BIEN. FORBS	0.4	95.7	1.1
INTRODUCED ANNUAL GRASSES			
<i>Anisantha tectorum</i>	1.59	78.26	4.13
<i>Bromus briziformis</i>	0.13	30.43	0.34
<i>Bromus commutatus</i>	0.00	4.35	0.00
<i>Bromus japonicus</i>	0.33	30.43	0.85
TOTAL INTRO. ANN. GRASSES	2.0	87.0	5.3
NATIVE PERENNIAL FORBS			
<i>Acetosella vulgaris</i>	0.07	13.04	0.17
<i>Achillea lanulosa</i>	0.93	100.00	2.43
<i>Aletes acaulis</i>	0.11	8.70	0.28
<i>Allium cernuum</i>	0.00	8.70	0.00
<i>Allium</i> spp.	0.24	60.87	0.62
<i>Allium textile</i>	0.26	17.39	0.68
<i>Ambrosia psilostachya</i> var. <i>coronopifolia</i>	0.35	30.43	0.91
<i>Amerosedum lanceolatum</i>	0.00	26.09	0.00
<i>Anaphalis margaritacea</i>	0.00	4.35	0.00
<i>Antennaria neglecta</i>	0.00	8.70	0.00
<i>Antennaria parvifolia</i>	0.00	4.35	0.00
<i>Antennaria</i> spp.	0.91	73.91	2.38
<i>Apocynum androsaemifolium</i>	0.00	8.70	0.00
<i>Arnica fulgens</i>	5.22	91.30	13.59
<i>Artemisia frigida</i>	0.00	30.43	0.00
<i>Artemisia ludoviciana</i>	0.22	78.26	0.57
<i>Aster porteri</i>	0.48	56.52	1.25
<i>Astragalus agrestis</i>	0.00	8.70	0.00
<i>Calochortus gunnisonii</i>	0.00	8.70	0.00
<i>Campanula rotundifolia</i>	0.00	47.83	0.00
<i>Castilleja sessiliflora</i>	0.00	8.70	0.00
<i>Cerastium strictum</i>	0.07	78.26	0.17
<i>Cirsium ochrocentrum</i>	0.00	8.70	0.00
<i>Claytonia rosea</i>	0.00	8.70	0.00
<i>Comandra umbellata</i> ssp. <i>pallida</i>	0.00	4.35	0.00
<i>Corallorhiza maculata</i>	0.00	13.04	0.00
<i>Coriflora hirsutissima</i>	0.00	4.35	0.00

Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
NATIVE PERENNIAL FORBS (concluded)			
<i>Dalea purpurea</i>	0.00	13.04	0.00
<i>Delphinium nuttallianum</i>	0.00	4.35	0.00
<i>Drymocallis fissa</i>	0.11	65.22	0.28
<i>Eremogone fendleri</i>	1.11	65.22	2.89
<i>Erigeron colo-mexicanus</i>	0.00	4.35	0.00
<i>Erigeron</i> spp.	0.04	39.13	0.11
<i>Erigeron vetensis</i>	0.07	8.70	0.17
<i>Eriogonum flavum</i> var. <i>flavum</i>	0.00	4.35	0.00
<i>Eriogonum</i> spp.	0.00	17.39	0.00
<i>Eriogonum umbellatum</i>	0.00	13.04	0.00
<i>Erysimum capitatum</i>	0.00	8.70	0.00
<i>Gaillardia aristata</i>	0.04	65.22	0.11
<i>Galium aparine</i>	0.04	8.70	0.11
<i>Galium septentrionale</i>	0.00	4.35	0.00
<i>Galium</i> spp.	0.50	56.52	1.30
<i>Geranium caespitosum</i> ssp. <i>caespitosum</i>	0.00	21.74	0.00
<i>Gutierrezia sarothrae</i>	0.00	21.74	0.00
<i>Harbouria trachypleura</i>	0.00	30.43	0.00
<i>Helianthus</i> spp.	0.00	4.35	0.00
<i>Heterotheca villosa</i>	0.04	17.39	0.11
<i>Heuchera bracteata</i>	0.00	4.35	0.00
<i>Heuchera</i> spp.	0.00	13.04	0.00
<i>Lathyrus</i> spp.	0.00	8.70	0.00
<i>Lesquerella montana</i>	0.00	21.74	0.00
<i>Leucocrinum montanum</i>	0.00	13.04	0.00
<i>Liatris punctata</i>	0.30	26.09	0.79
<i>Lithospermum multiflorum</i>	0.00	13.04	0.00
<i>Lomatium orientale</i>	0.09	69.57	0.23
<i>Mertensia lanceolata</i>	0.07	56.52	0.17
<i>Monarda fistulosa</i> var. <i>menthifolia</i>	0.04	8.70	0.11
<i>Nothocalais cuspidata</i>	0.00	8.70	0.00
<i>Oligosporus dracunculus</i> ssp. <i>glaucus</i>	0.00	8.70	0.00
<i>Oxalis dillenii</i>	0.00	13.04	0.00
<i>Oxytropis lambertii</i>	0.00	4.35	0.00
<i>Packera fendleri</i>	0.00	8.70	0.00
<i>Paronychia jamesii</i>	0.00	4.35	0.00
<i>Penstemon secundiflorus</i>	0.00	4.35	0.00
<i>Penstemon virens</i>	1.13	100.00	2.94
<i>Phacelia heterophylla</i>	0.13	26.09	0.34
<i>Pneumonanthe bigelovii</i>	0.04	30.43	0.11
<i>Potentilla hippiana</i>	0.00	47.83	0.00
<i>Psoralea tenuiflorum</i>	0.04	21.74	0.11
<i>Pulsatilla patens</i> ssp. <i>hirsutissima</i>	0.04	52.17	0.11
<i>Ratibida columnifera</i>	0.00	8.70	0.00
<i>Rubus idaeus</i> ssp. <i>melanolasius</i>	0.00	4.35	0.00
<i>Rumex crispus</i>	0.00	13.04	0.00
<i>Scutellaria brittonii</i>	0.00	13.04	0.00
<i>Senecio integerrimus</i>	0.20	60.87	0.51
<i>Senecio</i> spp.	0.00	13.04	0.00
<i>Silene dichotoma</i>	0.04	4.35	0.11
<i>Sisyrinchium montanum</i>	0.00	4.35	0.00
<i>Solidago</i> spp.	0.00	4.35	0.00
<i>Thermopsis divaricarpa</i>	0.00	13.04	0.00
<i>Toxicoscordion venenosum</i>	0.00	4.35	0.00
<i>Viola</i> spp.	0.00	4.35	0.00
TOTAL NATIVE PERENNIAL FORBS	12.9	100.0	33.7

Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
INTRODUCED PERENNIAL FORBS			
<i>Brexa arvensis</i>	0.00	8.70	0.00
<i>Convolvulus arvensis</i>	0.00	8.70	0.00
<i>Hypericum perforatum</i>	0.59	73.91	1.53
<i>Potentilla recta</i>	0.22	39.13	0.57
<i>Taraxacum officinale</i>	0.39	73.91	1.02
<i>Trifolium pratense</i>	0.00	4.35	0.00
<i>Triodanis perfoliata</i>	0.00	4.35	0.00
TOTAL INTRO. PERENNIAL FORBS	1.2	91.3	3.1
NATIVE PERENNIAL GRASSES (cool)			
<i>Achnatherum nelsonii</i>	1.04	47.83	2.72
<i>Carex brevior</i>	0.00	4.35	0.00
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>	0.17	34.78	0.45
<i>Carex</i> spp.	2.39	95.65	6.23
<i>Eleocharis eliptica</i> var. <i>compressa</i>	0.00	4.35	0.00
<i>Elymus elymoides</i>	0.00	8.70	0.00
<i>Elymus trachycaulus</i>	0.00	13.04	0.00
<i>Hesperostipa comata</i>	0.00	4.35	0.00
<i>Juncus arcticus</i> ssp. <i>ater</i>	0.00	4.35	0.00
<i>Juncus interior</i>	0.04	13.04	0.11
<i>Juncus</i> spp.	0.00	17.39	0.00
<i>Koeleria macrantha</i>	0.26	69.57	0.68
<i>Nassella viridula</i>	0.00	13.04	0.00
<i>Pascopyrum smithii</i>	0.17	26.09	0.45
<i>Poa agassizensis</i>	1.35	82.61	3.51
<i>Poa compressa</i>	7.35	95.65	19.14
<i>Poa fendleriana</i>	0.04	4.35	0.11
<i>Poa nervosa</i>	0.04	4.35	0.11
<i>Poa secunda</i>	0.00	4.35	0.00
<i>Poa</i> spp.	0.17	4.35	0.45
TOTAL NATIVE PERENNIAL GRASSES (c)	13.0	100.0	34.0
INTRODUCED PERENNIAL GRASSES (cool)			
<i>Elytrigia repens</i>	0.00	8.70	0.00
<i>Phleum pratense</i>	0.04	26.09	0.11
<i>Poa pratensis</i>	0.00	4.35	0.00
TOTAL INTRO. PERENNIAL GRASSES (c)	0.0	30.4	0.1
NATIVE PERENNIAL GRASSES (warm)			
<i>Andropogon gerardii</i>	0.61	56.52	1.59
<i>Aristida</i> spp.	0.00	4.35	0.00
<i>Chondrosum gracile</i>	0.17	30.43	0.45
<i>Danthonia</i> spp.	0.07	4.35	0.17
<i>Dichanthelium linearifolium</i>	0.20	4.35	0.51
<i>Muhlenbergia montana</i>	0.28	65.22	0.74
<i>Muhlenbergia wrightii</i>	0.00	4.35	0.00
<i>Schizachyrium scoparium</i>	0.00	4.35	0.00
<i>Sporobolus cryptandrus</i>	0.00	13.04	0.00
TOTAL NATIVE PERENNIAL GRASSES (w)	1.3	78.3	3.5

Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
NATIVE SHRUBS			
Ceanothus fendleri	0.04	8.70	0.11
Cercocarpus montanus	0.00	8.70	0.00
Crataegus spp.	0.04	4.35	0.11
Juniperus communis ssp. alpina	0.00	4.35	0.00
Mahonia repens	0.48	47.83	1.25
Oreobatus deliciosus	0.09	52.17	0.23
Padus virginiana ssp. melanocarpa	0.11	39.13	0.28
Rhus aromatica ssp. trilobata	0.54	60.87	1.42
Ribes cereum	0.13	69.57	0.34
Ribes inerme	0.00	4.35	0.00
Rosa woodsii	0.20	34.78	0.51
Symphoricarpos occidentalis	0.59	56.52	1.53
Yucca glauca	0.00	4.35	0.00
TOTAL NATIVE SHRUBS	2.2	91.3	5.8
NATIVE TREES			
Pinus ponderosa ssp. scopulorum	1.41	95.65	3.68
Pseudotsuga menziesii	0.11	8.70	0.28
Sabina scopulorum	0.04	8.70	0.11
TOTAL NATIVE TREES	1.6	95.7	4.1
FERNS			
Cystopteris fragilis	0.00	4.35	0.00
Selaginella densa	0.00	13.04	0.00
TOTAL FERNS	0.0	17.4	0.0
SUCCULENT			
Opuntia fragilis	0.00	8.70	0.00
Opuntia macrorrhiza	0.00	73.91	0.00
Opuntia spp.	0.00	4.35	0.00
TOTAL SUCCULENT	0.0	78.3	0.0
UNKNOWN SPECIES			
Unknown forb	0.52	26.09	1.36
Unknown forb 1	0.35	13.04	0.91
Unknown forb 3	0.04	4.35	0.11
Unknown grass	1.43	34.78	3.74
Unknown grass 1	0.83	17.39	2.15
Unknown grass 2	0.24	13.04	0.62
TOTAL UNKNOWN SPECIES	3.4	87.0	8.9
Litter	52.83	100.00	
Bare soil	1.65	47.83	
Rock	2.57	91.30	
TOTALS	95.4		
TOTAL VEGETATION COVER	38.4 (s = 13.1)		100.0
GROUND COVER (Litter + Rock + Veg + St.D)	93.8		
SPECIES DENSITY (# of species/400 sq.m.) (AVERAGE = 44.0 Std.Dev. = 8.0)			

Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	ELDOE05	ELDOE15	LINN05	LINN10	LINS01	LINS05	LINS10	LINS15	LJCNE01
NATIVE ANNUAL & BIENNIAL FORBS									
<i>Chenopodium</i> spp.									
<i>Collinsia parviflora</i>			P	P	P	P		P	
<i>Collomia linearis</i>									
<i>Descurainia incisa</i>		P							
<i>Frasera speciosa</i>									
<i>Grindelia squarrosa</i>	1		P	1		P	P		1
<i>Oreocarya virgata</i>	P			P					
<i>Plantago patagonica</i>									
<i>Polygonum douglasii</i>		P							
<i>Silene antirrhina</i>	P							P	
TOTAL NATIVE ANN. & BIEN. FORBS	P	P	P	P	P	P	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS									
<i>Alyssum alyssoides</i>								1	
<i>Alyssum parviflorum</i>									
<i>Alyssum</i> spp.	P			P					
<i>Camelina microcarpa</i>							1		P
<i>Carduus nutans</i> ssp. <i>macrolepis</i>								1	1
<i>Cynoglossum officinale</i>									P
<i>Fallopia convolvulus</i>									
<i>Lactuca serriola</i>			P					7	
<i>Neolepia campestre</i>						P	P	P	1
<i>Noccaea montana</i>			P			P	1		
<i>Thlaspi arvense</i>									
<i>Tragopogon dubius</i> ssp. <i>major</i>					P	P	P	P	P
<i>Turritis glabra</i>									
<i>Verbascum thapsus</i>								1	
TOTAL INTRO. ANN. & BIEN. FORBS	P	---	P	P	P	P	P	7	P
INTRODUCED ANNUAL GRASSES									
<i>Anisantha tectorum</i>	P			P			1	P	1
<i>Bromus briziformis</i>	P		P				P		1
<i>Bromus commutatus</i>									
<i>Bromus japonicus</i>	P						P	P	3
TOTAL INTRO. ANN. GRASSES	P	---	P	P	---	---	1	P	5
NATIVE PERENNIAL FORBS									
<i>Acetosella vulgaris</i>	P								
<i>Achillea lanulosa</i>	3	1	1	1	P	1	1	P	2
<i>Aletes acaulis</i>	3	P							
<i>Allium cernuum</i>	P	1							
<i>Allium</i> spp.					2	2	2		P
<i>Allium textile</i>			1	1				5	
<i>Ambrosia psilostachya</i> var. <i>coronopifolia</i>	1								
<i>Amerosedum lanceolatum</i>	1	P			P				
<i>Anaphalis margaritacea</i>	1								
<i>Antennaria neglecta</i>									
<i>Antennaria parvifolia</i>									
<i>Antennaria</i> spp.	7	P		P	P	P	P	1	2
<i>Apocynum androsaemifolium</i>	P	1							
<i>Arnica fulgens</i>			5	1	P	2	5	1	19
<i>Artemisia frigida</i>		P		P					
<i>Artemisia ludoviciana</i>	P	P	P	1			P	P	P
<i>Aster porteri</i>	1	P					P		
<i>Astragalus agrestis</i>									
<i>Calochortus gunnisonii</i>	P	P							
<i>Campanula rotundifolia</i>	1	1	1	1	P	P	P	1	P
<i>Castilleja sessiliflora</i>									
<i>Cerastium strictum</i>	1	1	1	2		1	P		1
<i>Cirsium ochrocentrum</i>				P					
<i>Claytonia rosea</i>			P	P					
<i>Comandra umbellata</i> ssp. <i>pallida</i>									
<i>Corallorhiza maculata</i>				P		P	P		
<i>Coriiflora hirsutissima</i>		P							

Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	ELDOE05	ELDOE15	LINN05	LINN10	LINS01	LINS05	LINS10	LINS15	LJCNE01
NATIVE PERENNIAL FORBS (concluded)									
<i>Dalea purpurea</i>		1							
<i>Delphinium nuttallianum</i>		1	1	P		P	P	P	1
<i>Drymocallis fissa</i>	3	P	1	P		P	P	1	P
<i>Eremogone fendleri</i>			P						
<i>Erigeron colo-mexicanus</i>									
<i>Erigeron</i> spp.									
<i>Erigeron vetensis</i>									
<i>Eriogonum flavum</i> var. <i>flavum</i>	P								
<i>Eriogonum</i> spp.			P						
<i>Eriogonum umbellatum</i>	1	P			P				
<i>Erysimum capitatum</i>				P					
<i>Gaillardia aristata</i>	P		1	1		P	P		
<i>Galium aparine</i>			1						
<i>Galium septentrionale</i>		1							
<i>Galium</i> spp.				P	P	5	1	1	2
<i>Geranium caespitosum</i> ssp. <i>caespitosum</i>	P	1	P	P		P			
<i>Gutierrezia sarothrae</i>									
<i>Harbouria trachypleura</i>		1	P	P				P	P
<i>Helianthus</i> spp.	P								
<i>Heterotheca villosa</i>	1	1							
<i>Heuchera bracteata</i>				P					
<i>Heuchera</i> spp.		P			P				
<i>Lathyrus</i> spp.	P	P							
<i>Lesquerella montana</i>			P	P					
<i>Leucocrinum montanum</i>			P	P					
<i>Liatris punctata</i>	P								
<i>Lithospermum multiflorum</i>	P	P							
<i>Lomatium orientale</i>			P	P	P	P	1		
<i>Mertensia lanceolata</i>			P	P	P	P	P	2	
<i>Monarda fistulosa</i> var. <i>menthifolia</i>	1	P							
<i>Nothocalais cuspidata</i>									
<i>Oligosporus dracunculus</i> ssp. <i>glaucus</i>									
<i>Oxalis dillenii</i>									
<i>Oxytropis lambertii</i>									
<i>Packera fendleri</i>				1	1				
<i>Paronychia jamesii</i>									
<i>Penstemon secundiflorus</i>									
<i>Penstemon virens</i>	P	2	3	2	P	P	3	1	1
<i>Phacelia heterophylla</i>	P	P		P			P	3	
<i>Pneumonanthe bigelovii</i>							P		
<i>Potentilla hippiana</i>			P			P			P
<i>Psoralea tenuiflorum</i>									
<i>Pulsatilla patens</i> ssp. <i>hirsutissima</i>	P	1	P	1		P	P	P	P
<i>Ratibida columnifera</i>									
<i>Rubus idaeus</i> ssp. <i>melanolasius</i>								P	
<i>Rumex crispus</i>									
<i>Scutellaria brittonii</i>		P				P			
<i>Senecio integerrimus</i>			2	P	P	1	1	1	1
<i>Senecio</i> spp.									
<i>Silene dichotoma</i>									
<i>Sisyrinchium montanum</i>	P								
<i>Solidago</i> spp.		P							
<i>Thermopsis divaricarpa</i>									
<i>Toxicoscordion venenosum</i>									
<i>Viola</i> spp.									
TOTAL NATIVE PERENNIAL FORBS	18	5	10	6	2	9	9	11	25

Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	ELDOE05	ELDOE15	LINN05	LINN10	LINS01	LINS05	LINS10	LINS15	LJCNE01
INTRODUCED PERENNIAL FORBS									
<i>Brexa arvensis</i>								P	
<i>Convolvulus arvensis</i>									
<i>Hypericum perforatum</i>	P		P	1			P	13	P
<i>Potentilla recta</i>	1							P	
<i>Taraxacum officinale</i>	P	P	1	P		P	P		2
<i>Trifolium pratense</i>									
<i>Triodanis perfoliata</i>								P	
TOTAL INTRO. PERENNIAL FORBS	1	P	P	P	---	P	P	13	2
NATIVE PERENNIAL GRASSES (cool)									
<i>Achnatherum nelsonii</i>	3	1	6				2	P	2
<i>Carex brevior</i>									
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>			P	P			P		
<i>Carex</i> spp.	3	4	P	1	4	P	1	P	5
<i>Eleocharis elliptica</i> var. <i>compressa</i>									
<i>Elymus elymoides</i>	P	1							
<i>Elymus trachycaulus</i>		1	P						
<i>Hesperostipa comata</i>									
<i>Juncus arcticus</i> ssp. <i>ater</i>									
<i>Juncus interior</i>									
<i>Juncus</i> spp.	P								
<i>Koeleria macrantha</i>	P	P	P					P	P
<i>Nassella viridula</i>									
<i>Pascopyrum smithii</i>									
<i>Poa agassizensis</i>	10		1			P	P	1	2
<i>Poa compressa</i>	11	P	P	1	P	1	P	1	5
<i>Poa fendleriana</i>									
<i>Poa nervosa</i>									
<i>Poa secunda</i>						1			
<i>Poa</i> spp.									
TOTAL NATIVE PERENNIAL GRASSES (c)	25	4	6	2	4	P	3	P	12
INTRODUCED PERENNIAL GRASSES (cool)									
<i>Elytrigia repens</i>	P		P						
<i>Phleum pratense</i>	1							1	
<i>Poa pratensis</i>									
TOTAL INTRO. PERENNIAL GRASSES (c)	1	---	P	---	---	---	---	P	---
NATIVE PERENNIAL GRASSES (warm)									
<i>Andropogon gerardii</i>	P						1		1
<i>Aristida</i> spp.									
<i>Chondrosum gracile</i>									1
<i>Danthonia</i> spp.									2
<i>Dichanthelium linearifolium</i>									
<i>Muhlenbergia montana</i>	1		P		P	P	P		P
<i>Muhlenbergia wrightii</i>	P								
<i>Schizachyrium scoparium</i>									
<i>Sporobolus cryptandrus</i>									
TOTAL NATIVE PERENNIAL GRASSES (w)	P	---	P	---	P	P	P	---	3

Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	ELDOE05	ELDOE15	LINN05	LINN10	LINS01	LINS05	LINS10	LINS15	LJCNE01
NATIVE SHRUBS									
Ceanothus fendleri		1				P			
Cercocarpus montanus				P					
Crataegus spp.									
Juniperus communis ssp. alpina						1			
Mahonia repens	P	8	P		P	P	P		3
Oreobatus deliciosus		P	P	1	P				1
Padus virginiana ssp. melanocarpa	P	3		P					P
Rhus aromatica ssp. trilobata			P	1			P		2
Ribes cereum	P	P	P	1		1	P		P
Ribes inerme									
Rosa woodsii	5						P		
Symphoricarpos occidentalis		1	P	1					P
Yucca glauca									
TOTAL NATIVE SHRUBS	5	12	P	1	P	P	P	---	5
NATIVE TREES									
Pinus ponderosa ssp. scopulorum	3	1	3	3	4	2	1	3	2
Pseudotsuga menziesii		3							
Sabina scopulorum						P			
TOTAL NATIVE TREES	3	3	3	3	4	2	1	3	2
FERNS									
Cystopteris fragilis				P					
Selaginella densa									
TOTAL FERNS	---	---	---	P	---	---	---	---	---
SUCCULENT									
Opuntia fragilis				P					
Opuntia macrorhiza	P			1	P	P	P		1
Opuntia spp.			P						
TOTAL SUCCULENT	P	---	P	P	P	P	P	---	P
UNKNOWN SPECIES									
Unknown forb									1
Unknown forb 1									
Unknown forb 3									
Unknown grass					4			12	
Unknown grass 1	1					10	8		
Unknown grass 2				3			2		
TOTAL UNKNOWN SPECIES	1	---	---	3	4	10	9	12	1
Litter	40	66	73	70	80	75	72	45	39
Bare soil			2	1				2	
Rock	2	6	2	10	6	2	2	3	4
TOTALS	94	93	95	94	99	97	97	94	96
TOTAL VEGETATION COVER	53	22	18	14	13	20	23	44	53
GROUND COVER (Litter + Rock + Veg + St.D	94	93	93	93	99	97	97	92	96
SPECIES DENSITY (# of species/400 sq.m.) (AVERAGE = 44.0 Std.Dev. = 8.0)	58	47	46	49	24	38	45	38	44

*P = Present within 400 sq.m. plot, but not quantitatively encountered.

Page 9 of 16

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Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	LJCNE05	LJCNE10	LJCSE01	LJCSE05	LJCSE10	LJCSE15	LJCSE20	LJCSW05	LJCSW10
NATIVE PERENNIAL FORBS (concluded)									
<i>Dalea purpurea</i>									
<i>Delphinium nuttallianum</i>									
<i>Drymocallis fissa</i>	P	1	1	P				P	P
<i>Eremogone fendleri</i>		P	4				P		
<i>Erigeron colo-mexicanus</i>									
<i>Erigeron</i> spp.	P			P	P			1	P
<i>Erigeron vetensis</i>			P						
<i>Eriogonum flavum</i> var. <i>flavum</i>									
<i>Eriogonum</i> spp.								P	
<i>Eriogonum umbellatum</i>									
<i>Erysimum capitatum</i>	P								
<i>Gaillardia aristata</i>	P		1	P			P		P
<i>Galium aparine</i>						1			
<i>Galium septentrionale</i>									
<i>Galium</i> spp.	1	2	P	1			2	2	P
<i>Geranium caespitosum</i> ssp. <i>caespitosum</i>									
<i>Gutierrezia sarothrae</i>	P							P	P
<i>Harbouria trachypleura</i>						P			
<i>Helianthus</i> spp.									
<i>Heterotheca villosa</i>									
<i>Heuchera bracteata</i>									
<i>Heuchera</i> spp.						P			
<i>Lathyrus</i> spp.									
<i>Lesquerella montana</i>									
<i>Leucocrinum montanum</i>									
<i>Liatris punctata</i>	P	1					P		
<i>Lithospermum multiflorum</i>								P	
<i>Lomatium orientale</i>	P	P	1				P	P	1
<i>Mertensia lanceolata</i>		1	P	P		P	1		
<i>Monarda fistulosa</i> var. <i>menthifolia</i>									
<i>Nothocalais cuspidata</i>									
<i>Oligosporus dracunculus</i> ssp. <i>glaucus</i>			P						
<i>Oxalis dillenii</i>	P							P	P
<i>Oxytropis lambertii</i>									
<i>Packera fendleri</i>									
<i>Paronychia jamesii</i>									
<i>Penstemon secundiflorus</i>									
<i>Penstemon virens</i>	1	6	1	P	P	7	1	1	4
<i>Phacelia heterophylla</i>									P
<i>Pneumonanthe bigelovii</i>			P	P	1		P		
<i>Potentilla hippiana</i>		P	1	P			P		
<i>Psoralidium tenuiflorum</i>	1							1	P
<i>Pulsatilla patens</i> ssp. <i>hirsutissima</i>		1					P	1	P
<i>Ratibida columnifera</i>	P								
<i>Rubus idaeus</i> ssp. <i>melanolasius</i>									
<i>Rumex crispus</i>	P			P			P		
<i>Scutellaria brittonii</i>									P
<i>Senecio integerrimus</i>	1	2		P	P	1		P	1
<i>Senecio</i> spp.						1			
<i>Silene dichotoma</i>						1			
<i>Sisyrinchium montanum</i>									
<i>Solidago</i> spp.									
<i>Thermopsis divaricarpa</i>	P			P	P				
<i>Toxicoscordion venenosum</i>								P	
<i>Viola</i> spp.								P	
TOTAL NATIVE PERENNIAL FORBS	7	33	15	13	28	15	17	19	8

Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	LJCNE05	LJCNE10	LJCSE01	LJCSE05	LJCSE10	LJCSE15	LJCSE20	LJCSW05	LJCSW10
INTRODUCED PERENNIAL FORBS									
<i>Brea arvensis</i>			P						
<i>Convolvulus arvensis</i>				1					
<i>Hypericum perforatum</i>	P	P	P	1	P		P	P	1
<i>Potentilla recta</i>	P		P		1			3	
<i>Taraxacum officinale</i>	P	2	P	2	2			1	1
<i>Trifolium pratense</i>									P
<i>Triodanis perfoliata</i>									
TOTAL INTRO. PERENNIAL FORBS	P	2	P	2	3	---	P	4	1
NATIVE PERENNIAL GRASSES (cool)									
<i>Achnatherum nelsonii</i>	P	2					P	2	9
<i>Carex brevior</i>	P								
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>			4			P	P		
<i>Carex</i> spp.	5	3	P	1	1	8	6	4	5
<i>Eleocharis elliptica</i> var. <i>compressa</i>						P			
<i>Elymus elymoides</i>									
<i>Elymus trachycaulus</i>						P			
<i>Hesperostipa comata</i>									
<i>Juncus arcticus</i> ssp. <i>ater</i>					P				
<i>Juncus interior</i>					P				
<i>Juncus</i> spp.				P			P		
<i>Koeleria macrantha</i>	P		P	1	1		1	1	
<i>Nassella viridula</i>			P					P	
<i>Pascopyrum smithii</i>	4				1			P	P
<i>Poa agassizensis</i>	5	2	3	4	1	1	P	1	
<i>Poa compressa</i>	17	3	11	6	8		6	8	1
<i>Poa fendleriana</i>									
<i>Poa nervosa</i>						1			
<i>Poa secunda</i>									
<i>Poa</i> spp.									
TOTAL NATIVE PERENNIAL GRASSES (c)	30	10	18	11	10	9	12	14	13
INTRODUCED PERENNIAL GRASSES (cool)									
<i>Elytrigia repens</i>									
<i>Phleum pratense</i>	P			P	1				
<i>Poa pratensis</i>	P								
TOTAL INTRO. PERENNIAL GRASSES (c)	P	---	---	P	P	---	---	---	---
NATIVE PERENNIAL GRASSES (warm)									
<i>Andropogon gerardii</i>	8	1	P	1			1	2	1
<i>Aristida</i> spp.				P					
<i>Chondrosium gracile</i>							1	1	P
<i>Danthonia</i> spp.									
<i>Dichanthelium linearifolium</i>									
<i>Muhlenbergia montana</i>		1	P	P			1	P	
<i>Muhlenbergia wrightii</i>									
<i>Schizachyrium scoparium</i>									
<i>Sporobolus cryptandrus</i>				P					
TOTAL NATIVE PERENNIAL GRASSES (w)	8	2	P	1	---	---	P	2	P

Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	LJCNE05	LJCNE10	LJCSE01	LJCSE05	LJCSE10	LJCSE15	LJCSE20	LJCSW05	LJCSW10
NATIVE SHRUBS									
Ceanothus fendleri						P			
Cercocarpus montanus									
Crataegus spp.									1
Juniperus communis ssp. alpina									
Mahonia repens		P		P	P			P	
Oreobatus deliciosus	1		P	1	P	P			1
Padus virginiana ssp. melanocarpa		P		P		P		P	1
Rhus aromatica ssp. trilobata	8	1	1	1		P	P		
Ribes cereum		P	P	P	1	3	P		1
Ribes inerme							P		
Rosa woodsii	1			P	P		P	P	P
Symphoricarpos occidentalis	P	1		7	1	2	P	P	
Yucca glauca									1
TOTAL NATIVE SHRUBS	8	2	1	8	P	5	P	P	6
NATIVE TREES									
Pinus ponderosa ssp. scopulorum	1	1	1	1	3	2	1	1	1
Pseudotsuga menziesii									1
Sabina scopulorum								1	
TOTAL NATIVE TREES	P	1	P	1	3	2	1	1	1
FERNS									
Cystopteris fragilis									
Selaginella densa			1			P	P		
TOTAL FERNS	---	---	P	---	---	P	P	---	---
SUCCULENT									
Opuntia fragilis						P			
Opuntia macrorhiza	P	1		P		P	P	1	P
Opuntia spp.									
TOTAL SUCCULENT	P	P	---	P	---	P	P	P	P
UNKNOWN SPECIES									
Unknown forb			2					1	
Unknown forb 1	3								2
Unknown forb 3							1		
Unknown grass				1	4	4		1	
Unknown grass 1		1							
Unknown grass 2									2
TOTAL UNKNOWN SPECIES	3	1	2	1	4	4	1	2	4
Litter	29	43	56	56	46	58	59	49	55
Bare soil					1		2		2
Rock	4	1		1	3	3	1	2	4
TOTALS	94	96	96	96	97	98	96	95	93
TOTAL VEGETATION COVER	62	53	40	39	48	37	35	45	33
GROUND COVER (Litter + Rock + Veg + St.D)	94	96	96	96	97	98	94	95	92
SPECIES DENSITY (# of species/400 sq.m.) (AVERAGE = 44.0 Std.Dev. = 8.0)	50	39	49	54	33	41	48	53	48

*P = Present within 400 sq.m. plot, but not quantitatively encountered.

Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*				
	----- SAMPLE NUMBER -----				
	STGLI01	STGLI05	STGLI10	STGLI15	STGLI20
NATIVE ANNUAL & BIENNIAL FORBS					
<i>Chenopodium</i> spp.				P	
<i>Collinsia parviflora</i>					
<i>Collomia linearis</i>					
<i>Descurainia incisa</i>					
<i>Frasera speciosa</i>	P				
<i>Grindelia squarrosa</i>	1	1	1	P	2
<i>Oreocarya virgata</i>					
<i>Plantago patagonica</i>		P			
<i>Polygonum douglasii</i>					
<i>Silene antirrhina</i>					
TOTAL NATIVE ANN. & BIEN. FORBS	P	1	P	P	2
INTRODUCED ANNUAL & BIENNIAL FORBS					
<i>Alyssum alyssoides</i>		P	1	P	
<i>Alyssum parviflorum</i>					
<i>Alyssum</i> spp.					
<i>Camelina microcarpa</i>		P	1	P	
<i>Carduus nutans</i> ssp. <i>macrolepis</i>			P		
<i>Cynoglossum officinale</i>					
<i>Fallopia convolvulus</i>					
<i>Lactuca serriola</i>					
<i>Neolepia campestre</i>		P		P	P
<i>Noccaea montana</i>		P			
<i>Thlaspi arvense</i>			P		P
<i>Tragopogon dubius</i> ssp. <i>major</i>	P	1	1	P	1
<i>Turritis glabra</i>					
<i>Verbascum thapsus</i>					
TOTAL INTRO. ANN. & BIEN. FORBS	P	1	P	P	P
INTRODUCED ANNUAL GRASSES					
<i>Anisantha tectorum</i>	3	7	3	2	2
<i>Bromus briziformis</i>					
<i>Bromus commutatus</i>					
<i>Bromus japonicus</i>			2		
TOTAL INTRO. ANN. GRASSES	3	7	5	2	2
NATIVE PERENNIAL FORBS					
<i>Acetosella vulgaris</i>					
<i>Achillea lanulosa</i>	P	P	P	P	1
<i>Aletes acaulis</i>					
<i>Allium cernuum</i>					
<i>Allium</i> spp.			P	P	
<i>Allium textile</i>	P				
<i>Ambrosia psilostachya</i> var. <i>coronopifolia</i>		3			
<i>Amerosedum lanceolatum</i>			P	1	P
<i>Anaphalis margaritacea</i>					
<i>Antennaria neglecta</i>	P				
<i>Antennaria parvifolia</i>					
<i>Antennaria</i> spp.	P		P	1	
<i>Apocynum androsaemifolium</i>					
<i>Arnica fulgens</i>	P	3	3	P	7
<i>Artemisia frigida</i>	1		P		P
<i>Artemisia ludoviciana</i>	P	P			P
<i>Aster porteri</i>	P	1	2	3	P
<i>Astragalus agrestis</i>	P				
<i>Calochortus gunnisonii</i>					
<i>Campanula rotundifolia</i>	P				
<i>Castilleja sessiliflora</i>	P			P	
<i>Cerastium strictum</i>		P		P	
<i>Cirsium ochrocentrum</i>					
<i>Claytonia rosea</i>					
<i>Comandra umbellata</i> ssp. <i>pallida</i>				P	
<i>Corallorhiza maculata</i>					
<i>Coriflora hirsutissima</i>					

Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*				
	----- SAMPLE NUMBER -----				
	STGLII01	STGLII05	STGLII10	STGLII15	STGLII20
NATIVE PERENNIAL FORBS (concluded)					
<i>Dalea purpurea</i>		1		1	P
<i>Delphinium nuttallianum</i>					
<i>Drymocallis fissa</i>				P	
<i>Eremogone fendleri</i>	5	P	3	9	5
<i>Erigeron colo-mexicanus</i>					
<i>Erigeron</i> spp.	1	1	P	P	
<i>Erigeron vetensis</i>				2	
<i>Eriogonum flavum</i> var. <i>flavum</i>					
<i>Eriogonum</i> spp.				P	1
<i>Eriogonum umbellatum</i>					
<i>Erysimum capitatum</i>					
<i>Gaillardia aristata</i>	P	1	P	P	P
<i>Galium aparine</i>					
<i>Galium septentrionale</i>					
<i>Galium</i> spp.					
<i>Geranium caespitosum</i> ssp. <i>caespitosum</i>					
<i>Gutierrezia sarothrae</i>	1	P			
<i>Harbouria trachypleura</i>					P
<i>Helianthus</i> spp.					
<i>Heterotheca villosa</i>	P			P	
<i>Heuchera bracteata</i>					
<i>Heuchera</i> spp.					
<i>Lathyrus</i> spp.					
<i>Lesquerella montana</i>	1		P	P	
<i>Leucocrinum montanum</i>	P				
<i>Liatris punctata</i>	5			3	
<i>Lithospermum multiflorum</i>					
<i>Lomatium orientale</i>	P	P	P	P	P
<i>Mertensia lanceolata</i>	P				P
<i>Monarda fistulosa</i> var. <i>menthifolia</i>					
<i>Nothocalais cuspidata</i>	P			P	
<i>Oligosporus dracunculus</i> ssp. <i>glaucus</i>					P
<i>Oxalis dillenii</i>					
<i>Oxytropis lambertii</i>	P				
<i>Packera fendleri</i>					
<i>Paronychia jamesii</i>				P	
<i>Penstemon secundiflorus</i>				P	
<i>Penstemon virens</i>	P	P	P	1	P
<i>Phacelia heterophylla</i>					
<i>Pneumonanthe bigelovii</i>			P		P
<i>Potentilla hippiana</i>	1	P	P		P
<i>Psoralea tenuiflorum</i>	1	P			
<i>Pulsatilla patens</i> ssp. <i>hirsutissima</i>					
<i>Ratibida columnifera</i>	P				
<i>Rubus idaeus</i> ssp. <i>melanolasius</i>					
<i>Rumex crispus</i>					
<i>Scutellaria brittonii</i>					
<i>Senecio integerrimus</i>					
<i>Senecio</i> spp.				P	P
<i>Silene dichotoma</i>					
<i>Sisyrinchium montanum</i>					
<i>Solidago</i> spp.					
<i>Thermopsis divaricarpa</i>					
<i>Toxicoscordion venenosum</i>					
<i>Viola</i> spp.					
TOTAL NATIVE PERENNIAL FORBS	10	8	8	16	12

Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*				
	----- SAMPLE NUMBER -----				
	STGLII01	STGLII05	STGLII10	STGLII15	STGLII20
INTRODUCED PERENNIAL FORBS					
<i>Brexa arvensis</i>	P				
<i>Convolvulus arvensis</i>	1		P	P	
<i>Hypericum perforatum</i>	P	P		P	
<i>Potentilla recta</i>	P		P		1
<i>Taraxacum officinale</i>					
<i>Trifolium pratense</i>					
<i>Triodanis perfoliata</i>					
TOTAL INTRO. PERENNIAL FORBS	P	P	P	P	P
NATIVE PERENNIAL GRASSES (cool)					
<i>Achnatherum nelsonii</i>					
<i>Carex brevior</i>				P	P
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>				1	4
<i>Carex</i> spp.	4		2		
<i>Eleocharis eliptica</i> var. <i>compressa</i>					
<i>Elymus elymoides</i>					
<i>Elymus trachycaulus</i>					
<i>Hesperostipa comata</i>	P				
<i>Juncus arcticus</i> ssp. <i>ater</i>					
<i>Juncus interior</i>			1	1	
<i>Juncus</i> spp.					1
<i>Koeleria macrantha</i>	3	2	1	1	1
<i>Nassella viridula</i>	1				
<i>Pascopyrum smithii</i>	1			P	
<i>Poa agassizensis</i>	P	1	2	2	2
<i>Poa compressa</i>	8	22	26	16	24
<i>Poa fendleriana</i>					1
<i>Poa nervosa</i>					
<i>Poa secunda</i>					
<i>Poa</i> spp.	4				
TOTAL NATIVE PERENNIAL GRASSES (c)	18	24	29	20	30
INTRODUCED PERENNIAL GRASSES (cool)					
<i>Elytrigia repens</i>					
<i>Phleum pratense</i>		P			
<i>Poa pratensis</i>					
TOTAL INTRO. PERENNIAL GRASSES (c)	---	P	---	---	---
NATIVE PERENNIAL GRASSES (warm)					
<i>Andropogon gerardii</i>		2		1	P
<i>Aristida</i> spp.					
<i>Chondrosium gracile</i>	2	3	P		
<i>Danthonia</i> spp.					
<i>Dichanthelium linearifolium</i>				5	
<i>Muhlenbergia montana</i>	5		1	P	P
<i>Muhlenbergia wrightii</i>					
<i>Schizachyrium scoparium</i>		1			
<i>Sporobolus cryptandrus</i>	P		1		
TOTAL NATIVE PERENNIAL GRASSES (w)	6	4	1	5	P

Table A. Understory Cover Data - Community A, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*				
	----- SAMPLE NUMBER -----				
	STGLII01	STGLII05	STGLII10	STGLII15	STGLII20
NATIVE SHRUBS					
Ceanothus fendleri					
Cercocarpus montanus					
Crataegus spp.					
Juniperus communis ssp. alpina					
Mahonia repens					
Oreobatus deliciosus					P
Padus virginiana ssp. melanocarpa					
Rhus aromatica ssp. trilobata	1		1	P	1
Ribes cereum			P		P
Ribes inerme					
Rosa woodsii					
Symphoricarpos occidentalis	1				
Yucca glauca					
TOTAL NATIVE SHRUBS	P	---	P	P	1
NATIVE TREES					
Pinus ponderosa ssp. scopulorum	4		1	1	1
Pseudotsuga menziesii					
Sabina scopulorum					
TOTAL NATIVE TREES	4	---	1	P	1
FERNS					
Cystopteris fragilis					
Selaginella densa					
TOTAL FERNS	---	---	---	---	---
SUCCULENT					
Opuntia fragilis					
Opuntia macrorhiza	P	P	P		P
Opuntia spp.					
TOTAL SUCCULENT	P	P	P	---	P
UNKNOWN SPECIES					
Unknown forb		3		2	4
Unknown forb 1	4				
Unknown forb 3					
Unknown grass	4			4	
Unknown grass 1					
Unknown grass 2					
TOTAL UNKNOWN SPECIES	8	3	---	6	4
Litter	39	46	46	36	44
Bare soil	6	6	7	10	2
Rock	2		1	3	1
TOTALS	93	99	96	97	97
TOTAL VEGETATION COVER	47	48	44	48	51
GROUND COVER (Litter + Rock + Veg + St.D)	87	93	89	87	96
SPECIES DENSITY (# of species/400 sq.m.)	52	33	37	48	39
(AVERAGE = 44.0 Std.Dev. = 8.0)					

*P = Present within 400 sq.m. plot, but not quantitatively encou

Table B. Understory Cover Data - Community B, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	Percent Foliar Cover*		
				----- SAMPLE NUMBER -----		
				PNBK01	PNBK05	PNBK10
NATIVE ANNUAL & BIENNIAL FORBS						
Grindelia squarrosa	0.67	100.00	1.51	1	1	P
Silene antirrhina	0.00	33.33	0.00		P	
TOTAL NATIVE ANN. & BIEN. FORBS	0.7	100.0	1.5	1	1	P
INTRODUCED ANNUAL & BIENNIAL FORBS						
Alyssum alyssoides	0.33	100.00	0.75	P	P	1
Camelina microcarpa	0.00	33.33	0.00		P	
Carduus nutans ssp. macrolepis	0.00	100.00	0.00	1	1	1
Lactuca serriola	0.00	33.33	0.00		P	
Tragopogon dubius ssp. major	0.00	100.00	0.00	P	P	P
Verbascum thapsus	0.00	100.00	0.00	1	P	P
TOTAL INTRO. ANN. & BIEN. FORBS	0.3	100.0	0.8	P	P	1
INTRODUCED ANNUAL GRASSES						
Anisantha sterilis	0.00	66.67	0.00		P	P
Anisantha tectorum	0.67	100.00	1.51	1	P	2
Bromus briziformis	0.00	66.67	0.00	P		1
Bromus japonicus	0.50	100.00	1.13	2	1	P
TOTAL INTRO. ANN. GRASSES	1.2	100.0	2.6	2	P	2
NATIVE PERENNIAL FORBS						
Achillea lanulosa	0.83	100.00	1.89	P	1	2
Adenolinum lewisii	0.00	100.00	0.00	P	P	P
Allium cernuum	0.00	100.00	0.00	P	P	P
Amerosedum lanceolatum	0.00	33.33	0.00		P	
Artemisia frigida	1.00	100.00	2.26	1	1	1
Artemisia ludoviciana	0.33	100.00	0.75	P	1	P
Aster porteri	0.00	33.33	0.00	P		
Astragalus flexuosus	0.00	100.00	0.00	1	P	P
Campanula rotundifolia	0.00	100.00	0.00	P	1	P
Cerastium strictum	0.33	100.00	0.75	1	1	1
Cirsium ochrocentrum	0.00	33.33	0.00		P	
Drymocallis fissa	0.00	66.67	0.00	P		P
Eriogonum flavum var. flavum	0.00	100.00	0.00	1	P	P
Eriogonum umbellatum	0.00	66.67	0.00	P		P
Gaillardia aristata	0.00	33.33	0.00		P	
Galium septentrionale	0.00	66.67	0.00	1	P	
Galium spp.	0.00	33.33	0.00			P
Harbouria trachypleura	0.00	66.67	0.00	P	P	
Helianthus pumilus	0.00	100.00	0.00	1	P	P
Heterotheca villosa	1.33	100.00	3.02	4	P	1
Iris missouriensis	0.00	33.33	0.00		1	
Lathyrus spp.	0.00	100.00	0.00	1	P	P
Lithospermum multiflorum	0.00	100.00	0.00	P	P	P
Monarda fistulosa var. menthifolia	0.00	33.33	0.00	P		
Oxytropis sericea	0.00	100.00	0.00	P	P	1
Paronychia jamesii	0.00	33.33	0.00	P		
Penstemon virens	0.00	100.00	0.00	P	P	P
Phacelia heterophylla	0.00	33.33	0.00			P
Phlox multiflora	0.00	66.67	0.00	1	P	
Phlox spp.	0.00	33.33	0.00			1
Pulsatilla patens ssp. hirsutissima	0.00	33.33	0.00			P
Scutellaria brittonii	0.00	33.33	0.00			P
Sisyrinchium montanum	0.00	33.33	0.00		P	
Thermopsis divaricarpa	0.00	33.33	0.00			P
Townsendia grandiflora	0.00	33.33	0.00		P	
TOTAL NATIVE PERENNIAL FORBS	3.8	100.0	8.7	6	3	3

Table B. Understory Cover Data - Community B, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	Percent Foliar Cover*		
				----- SAMPLE NUMBER -----		
				PNBK01	PNBK05	PNBK10
INTRODUCED PERENNIAL FORBS						
<i>Convolvulus arvensis</i>	0.00	33.33	0.00		P	
<i>Linaria genistifolia</i> ssp. <i>dalmatica</i>	0.00	33.33	0.00			P
<i>Linaria vulgaris</i>	1.00	33.33	2.26	3		
<i>Nepeta cataria</i>	0.00	66.67	0.00	P	1	
<i>Saponaria officinalis</i>	0.33	33.33	0.75			1
<i>Taraxacum officinale</i>	0.00	66.67	0.00	P		P
TOTAL INTRO. PERENNIAL FORBS	1.3	100.0	3.0	3	P	1
NATIVE PERENNIAL GRASSES (cool)						
<i>Achnatherum nelsonii</i>	0.33	100.00	0.75	P	1	1
<i>Bromopsis lanatipes</i>	0.00	33.33	0.00	P		
<i>Carex</i> spp.	0.50	100.00	1.13	P	1	2
<i>Elymus canadensis</i>	0.00	66.67	0.00	P		P
<i>Elymus elymoides</i>	0.00	100.00	0.00	P	1	P
<i>Elymus lanceolatus</i> fm. <i>albicans</i>	18.17	100.00	41.13	13	25	18
<i>Hesperostipa comata</i>	0.00	66.67	0.00		P	P
<i>Koeleria macrantha</i>	0.00	66.67	0.00		P	P
<i>Leucopoa kingii</i>	0.33	100.00	0.75	1	P	1
<i>Leymus ambiguus</i>	8.17	100.00	18.49	14	8	3
<i>Nassella viridula</i>	0.00	33.33	0.00		1	
<i>Poa agassizensis</i>	0.33	66.67	0.75	1	P	
<i>Poa compressa</i>	0.50	100.00	1.13	2	1	1
<i>Poa cusickii</i> ssp. <i>epilis</i>	0.00	33.33	0.00		P	
TOTAL NATIVE PERENNIAL GRASSES (c)	28.3	100.0	64.2	29	33	23
NATIVE PERENNIAL GRASSES (warm)						
<i>Bouteloua curtipendula</i>	0.00	66.67	0.00		P	P
<i>Schizachyrium scoparium</i>	0.00	66.67	0.00	1	P	
TOTAL NATIVE PERENNIAL GRASSES (w)	0.0	100.0	0.0	P	P	P
NATIVE SHRUBS						
<i>Oreobatus deliciosus</i>	0.00	33.33	0.00	P		
<i>Padus virginiana</i> ssp. <i>melanocarpa</i>	1.00	100.00	2.26	3	1	P
<i>Physocarpus monogynus</i>	3.50	33.33	7.92			11
<i>Rhus aromatica</i> ssp. <i>trilobata</i>	2.83	100.00	6.42	9	1	P
<i>Ribes cereum</i>	0.00	100.00	0.00	P	P	P
<i>Rosa woodsii</i>	0.00	33.33	0.00	P		
<i>Symphoricarpos occidentalis</i>	0.00	100.00	0.00	P	P	P
<i>Yucca glauca</i>	0.83	100.00	1.89	P	1	2
TOTAL NATIVE SHRUBS	8.2	100.0	18.5	12	1	12
NATIVE TREES						
<i>Pinus ponderosa</i> ssp. <i>scopulorum</i>	0.00	100.00	0.00	P	1	P
<i>Sabina scopulorum</i>	0.00	33.33	0.00	P		
TOTAL NATIVE TREES	0.0	100.0	0.0	P	P	P
FERNS						
<i>Cystopteris fragilis</i>	0.00	66.67	0.00	P		P
TOTAL FERNS	0.0	66.7	0.0	P	---	P
SUCCULENT						
<i>Opuntia macrorhiza</i>	0.00	100.00	0.00	1	P	P
<i>Opuntia polyacantha</i>	0.33	100.00	0.75	P	P	1
TOTAL SUCCULENT	0.3	100.0	0.8	P	P	1

Table B. Understory Cover Data - Community B, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	Percent Foliar Cover*		
				----- SAMPLE NUMBER -----		
				PNBK01	PNBK05	PNBK10
Litter	36.33	100.00		30	43	37
Bare soil	0.00	33.33			1	
Rock	13.67	100.00		12	13	17
TOTALS	94.2			94	93	96
TOTAL VEGETATION COVER	44.2 (s = 7.1		100.0	52	38	43
GROUND COVER (Litter + Rock + Veg + St.D	94.2			94	93	96
SPECIES DENSITY (# of species/400 sq.m.) (AVERAGE = 57.3 Std.Dev. = 1.5)				57	59	56

*P = Present within 400 sq.m. plot, but not quantitatively encounter

Table C. Understory Cover Data - Community C, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
NATIVE ANNUAL & BIENNIAL FORBS			
<i>Chenopodium leptophyllum</i>	0.00	5.88	0.00
<i>Collinsia parviflora</i>	0.00	5.88	0.00
<i>Frasera speciosa</i>	0.00	11.76	0.00
<i>Grindelia squarrosa</i>	0.18	88.24	0.62
<i>Oligosporus pacificus</i>	0.06	11.76	0.21
<i>Oreocarya virgata</i>	0.06	17.65	0.21
<i>Silene antirrhina</i>	0.00	11.76	0.00
TOTAL NATIVE ANN. & BIEN. FORBS	0.3	94.1	1.0
INTRODUCED ANNUAL & BIENNIAL FORBS			
<i>Acosta diffusa</i>	0.00	11.76	0.00
<i>Alyssum alyssoides</i>	0.15	17.65	0.52
<i>Alyssum parviflorum</i>	0.00	5.88	0.00
<i>Camelina microcarpa</i>	0.00	5.88	0.00
<i>Carduus nutans</i> ssp. <i>macrolepis</i>	0.00	58.82	0.00
<i>Cynoglossum officinale</i>	0.00	29.41	0.00
<i>Fallopia convolvulus</i>	0.00	11.76	0.00
<i>Lactuca serriola</i>	0.00	23.53	0.00
<i>Neolepia campestre</i>	0.00	17.65	0.00
<i>Tragopogon dubius</i> ssp. <i>major</i>	0.06	64.71	0.21
<i>Turritis glabra</i>	0.00	5.88	0.00
<i>Verbascum thapsus</i>	0.06	70.59	0.21
TOTAL INTRO. ANN. & BIEN. FORBS	0.3	100.0	0.9
INTRODUCED ANNUAL GRASSES			
<i>Anisantha tectorum</i>	0.65	64.71	2.28
<i>Bromus briziformis</i>	0.26	41.18	0.93
<i>Bromus japonicus</i>	0.21	64.71	0.72
<i>Bromus</i> spp.	0.06	5.88	0.21
TOTAL INTRO. ANN. GRASSES	1.2	94.1	4.1
NATIVE PERENNIAL FORBS			
<i>Achillea lanulosa</i>	0.21	88.24	0.72
<i>Adenolinum lewisii</i>	0.00	5.88	0.00
<i>Aletes acaulis</i>	2.56	52.94	9.00
<i>Allium cernuum</i>	0.00	35.29	0.00
<i>Allium</i> spp.	0.26	29.41	0.93
<i>Ambrosia psilostachya</i> var. <i>coronopifolia</i>	0.56	82.35	1.96
<i>Amerosedum lanceolatum</i>	0.00	11.76	0.00
<i>Antennaria</i> spp.	0.12	23.53	0.41
<i>Arnica fulgens</i>	0.00	23.53	0.00
<i>Artemisia frigida</i>	0.18	70.59	0.62
<i>Artemisia ludoviciana</i>	1.12	100.00	3.93
<i>Asclepias</i> spp.	0.00	11.76	0.00
<i>Aster laevis</i> var. <i>geyeri</i>	0.00	5.88	0.00
<i>Aster porteri</i>	0.00	23.53	0.00
<i>Astragalus flexuosus</i>	0.00	17.65	0.00
<i>Calochortus gunnisonii</i>	0.00	11.76	0.00
<i>Campanula rotundifolia</i>	0.00	35.29	0.00
<i>Castilleja miniata</i>	0.00	5.88	0.00
<i>Cerastium strictum</i>	0.12	58.82	0.41
<i>Chlorocrepis albiflora</i>	0.00	5.88	0.00
<i>Cirsium ochrocentrum</i>	0.00	35.29	0.00
<i>Comandra umbellata</i> ssp. <i>pallida</i>	0.00	5.88	0.00
<i>Corallorhiza maculata</i>	0.00	17.65	0.00
<i>Coriflora hirsutissima</i>	0.00	5.88	0.00
<i>Dalea purpurea</i>	0.00	5.88	0.00
<i>Drymocallis fissa</i>	0.00	64.71	0.00
<i>Eremogone fendleri</i>	0.06	23.53	0.21
<i>Erigeron speciosus</i>	0.00	5.88	0.00
<i>Erigeron</i> spp.	0.18	47.06	0.62
<i>Eriogonum flavum</i> var. <i>flavum</i>	0.32	29.41	1.14
<i>Eriogonum</i> spp.	0.00	23.53	0.00
<i>Eriogonum umbellatum</i>	0.00	35.29	0.00

Table C. Understory Cover Data - Community C, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
NATIVE PERENNIAL FORBS (concluded)			
Erysimum capitatum	0.00	5.88	0.00
Gaillardia aristata	0.00	41.18	0.00
Galium spp.	0.09	23.53	0.31
Geranium caespitosum ssp. caespitosum	0.00	35.29	0.00
Gutierrezia sarothrae	0.00	23.53	0.00
Harbouria trachypleura	0.00	11.76	0.00
Helianthus pumilus	0.00	17.65	0.00
Heterotheca villosa	0.68	70.59	2.38
Heuchera bracteata	0.00	5.88	0.00
Heuchera spp.	0.00	5.88	0.00
Lathyrus leucanthus	0.00	5.88	0.00
Lathyrus spp.	0.44	47.06	1.55
Lesquerella montana	0.00	11.76	0.00
Liatris punctata	0.00	35.29	0.00
Lithospermum incisum	0.00	5.88	0.00
Lithospermum multiflorum	0.06	11.76	0.21
Lomatium orientale	0.00	11.76	0.00
Lupinus argenteus	0.32	11.76	1.14
Mertensia lanceolata	0.00	29.41	0.00
Monarda fistulosa var. menthifolia	0.18	29.41	0.62
Oenothera villosa	0.00	5.88	0.00
Oligosporus dracunculus ssp. glaucus	0.00	5.88	0.00
Onosmodium molle ssp. occidentale	0.00	11.76	0.00
Oxalis dillenii	0.00	11.76	0.00
Packera fendleri	0.00	11.76	0.00
Penstemon secundiflorus	0.00	5.88	0.00
Penstemon spp.	0.00	5.88	0.00
Penstemon virens	1.15	88.24	4.03
Phacelia heterophylla	0.00	70.59	0.00
Physalis hederifolia var. comata	0.00	5.88	0.00
Physalis virginiana	0.00	17.65	0.00
Pneumonanthe bigelovii	0.00	17.65	0.00
Prunella vulgaris	0.00	5.88	0.00
Pseudognaphalium canescens	0.00	11.76	0.00
Psoralidium tenuiflorum	0.00	41.18	0.00
Pulsatilla patens ssp. hirsutissima	0.00	23.53	0.00
Rubus idaeus ssp. melanolasius	0.00	5.88	0.00
Scrophularia lanceolata	0.00	5.88	0.00
Scutellaria brittonii	0.00	5.88	0.00
Senecio integerrimus	0.00	11.76	0.00
Senecio spp.	0.00	11.76	0.00
Solidago spp.	0.00	5.88	0.00
Stenactis strigosa	0.00	5.88	0.00
Thermopsis divaricarpa	0.00	11.76	0.00
Townsendia grandiflora	0.00	11.76	0.00
Tradescantia occidentalis	0.00	23.53	0.00
Tragia ramosa	0.00	5.88	0.00
Viola spp.	0.00	5.88	0.00
TOTAL NATIVE PERENNIAL FORBS	8.6	100.0	30.2
INTRODUCED PERENNIAL FORBS			
Brexa arvensis	0.00	29.41	0.00
Convolvulus arvensis	0.00	5.88	0.00
Hypericum perforatum	0.00	41.18	0.00
Linaria genistifolia ssp. dalmatica	0.00	5.88	0.00
Linaria vulgaris	0.35	5.88	1.24
Nepeta cataria	0.00	5.88	0.00
Potentilla recta	0.06	11.76	0.21
Taraxacum officinale	0.00	29.41	0.00
TOTAL INTRO. PERENNIAL FORBS	0.4	76.5	1.4

Table C. Understory Cover Data - Community C, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
NATIVE PERENNIAL GRASSES (cool)			
<i>Achnatherum nelsonii</i>	0.15	41.18	0.52
<i>Bromopsis lanatipes</i>	0.00	35.29	0.00
<i>Carex brevior</i>	0.00	5.88	0.00
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>	0.00	11.76	0.00
<i>Carex</i> spp.	3.76	100.00	13.24
<i>Elymus elymoides</i>	0.09	58.82	0.31
<i>Elymus lanceolatus</i> fm. <i>albicans</i>	0.00	23.53	0.00
<i>Elymus trachycaulus</i>	0.09	23.53	0.31
<i>Hesperostipa comata</i>	0.82	82.35	2.90
<i>Hesperostipa spartea</i>	0.00	17.65	0.00
<i>Juncus arcticus</i> ssp. <i>ater</i>	0.00	5.88	0.00
<i>Koeleria macrantha</i>	0.00	52.94	0.00
<i>Leucopoa kingii</i>	0.00	17.65	0.00
<i>Leymus ambiguus</i>	0.53	23.53	1.86
<i>Nassella viridula</i>	0.00	11.76	0.00
<i>Poa agassizensis</i>	1.38	82.35	4.86
<i>Poa compressa</i>	1.53	76.47	5.38
TOTAL NATIVE PERENNIAL GRASSES (c)	8.4	100.0	29.4
INTRODUCED PERENNIAL GRASSES (cool)			
<i>Agropyron cristatum</i> ssp. <i>desertorum</i>	0.00	5.88	0.00
<i>Agrostis gigantea</i>	0.12	5.88	0.41
<i>Bromopsis inermis</i>	0.06	11.76	0.21
<i>Dactylis glomerata</i>	0.00	11.76	0.00
<i>Elytrigia repens</i>	0.00	5.88	0.00
<i>Phleum pratense</i>	0.00	17.65	0.00
<i>Thinopyrum intermedium</i>	0.00	5.88	0.00
TOTAL INTRO. PERENNIAL GRASSES (c)	0.2	41.2	0.6
NATIVE PERENNIAL GRASSES (warm)			
<i>Andropogon gerardii</i>	1.41	82.35	4.96
<i>Aristida</i> spp.	0.00	5.88	0.00
<i>Bouteloua curtipendula</i>	0.00	35.29	0.00
<i>Chondrosum gracile</i>	0.06	35.29	0.21
<i>Dichanthelium</i> spp.	0.00	5.88	0.00
<i>Muhlenbergia montana</i>	0.21	58.82	0.72
<i>Muhlenbergia wrightii</i>	0.00	5.88	0.00
<i>Schizachyrium scoparium</i>	0.35	70.59	1.24
<i>Sorghastrum avenaceum</i>	0.00	11.76	0.00
<i>Sporobolus cryptandrus</i>	0.41	17.65	1.45
<i>Sporobolus heterolepis</i>	0.00	5.88	0.00
TOTAL NATIVE PERENNIAL GRASSES (w)	2.4	100.0	8.6
NATIVE SHRUBS			
<i>Arctostaphylos uva-ursi</i>	0.06	5.88	0.21
<i>Ceanothus fendleri</i>	0.00	17.65	0.00
<i>Cercocarpus montanus</i>	0.35	29.41	1.24
<i>Crataegus</i> spp.	0.06	5.88	0.21
<i>Mahonia repens</i>	0.38	52.94	1.34
<i>Oreobatus deliciosus</i>	0.15	58.82	0.52
<i>Padus virginiana</i> ssp. <i>melanocarpa</i>	1.29	47.06	4.55
<i>Rhus aromatica</i> ssp. <i>trilobata</i>	0.94	64.71	3.31
<i>Rhus glabra</i>	0.06	5.88	0.21
<i>Ribes cereum</i>	0.29	82.35	1.03
<i>Ribes inerme</i>	0.06	11.76	0.21
<i>Rosa woodsii</i>	0.09	47.06	0.31
<i>Symphoricarpos occidentalis</i>	1.12	52.94	3.93
<i>Toxicodendron rydbergii</i>	0.06	23.53	0.21
<i>Yucca glauca</i>	0.09	41.18	0.31
TOTAL NATIVE SHRUBS	5.0	100.0	17.6

Table C. Understory Cover Data - Community C, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
INTRODUCED SHRUBS			
<i>Colutea arborescens</i>	0.00	11.76	0.00
TOTAL INTRODUCED SHRUBS	0.0	11.8	0.0
NATIVE TREES			
<i>Celtis reticulata</i>	0.00	5.88	0.00
<i>Pinus ponderosa</i> ssp. <i>scopulorum</i>	1.21	100.00	4.24
<i>Pseudotsuga menziesii</i>	0.00	5.88	0.00
<i>Quercus</i> spp.	0.00	5.88	0.00
<i>Sabina scopulorum</i>	0.15	23.53	0.52
TOTAL NATIVE TREES	1.4	100.0	4.8
NATIVE VINES			
<i>Clematis ligusticifolia</i>	0.00	5.88	0.00
TOTAL NATIVE VINES	0.0	5.9	0.0
FERNS			
<i>Cystopteris fragilis</i>	0.00	29.41	0.00
TOTAL FERNS	0.0	29.4	0.0
SUCCULENT			
<i>Coryphantha missouriensis</i>	0.00	11.76	0.00
<i>Echinocereus viridiflorus</i>	0.00	11.76	0.00
<i>Opuntia fragilis</i>	0.00	29.41	0.00
<i>Opuntia macrorhiza</i>	0.24	88.24	0.83
<i>Opuntia polyacantha</i>	0.00	23.53	0.00
TOTAL SUCCULENT	0.2	94.1	0.8
UNKNOWN SPECIES			
Unknown forb	0.06	5.88	0.21
Unknown grass	0.09	5.88	0.31
TOTAL UNKNOWN SPECIES	0.1	11.8	0.5
Litter	57.35	100.00	
Bare soil	0.79	35.29	
Rock	8.94	100.00	
Water	0.71	17.65	
TOTALS	96.2		
TOTAL VEGETATION COVER	28.4 (s = 12.		100.0
GROUND COVER (Litter + Rock + Veg + St.D	95.4		
SPECIES DENSITY (# of species/400 sq.m.) (AVERAGE = 46.6 Std.Dev. = 8.7)			

Table C. Understory Cover Data - Community C, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	LJCNW05	LJCNW10	LJCSW01	LOSH05	LOSH10	MRL01	MRL10	S1010	S501
NATIVE ANNUAL & BIENNIAL FORBS									
<i>Chenopodium leptophyllum</i>									
<i>Collinsia parviflora</i>			P						
<i>Frasera speciosa</i>							P		
<i>Grindelia squarrosa</i>	P	P	P	1	1	1	1	1	P
<i>Oligosporus pacificus</i>									
<i>Oreocarya virgata</i>									P
<i>Silene antirrhina</i>								P	
TOTAL NATIVE ANN. & BIEN. FORBS	P	P	P	P	1	P	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS									
<i>Acosta diffusa</i>					1				
<i>Alyssum alyssoides</i>			P						
<i>Alyssum parviflorum</i>									
<i>Camelina microcarpa</i>									P
<i>Carduus nutans</i> ssp. <i>macrolepis</i>	P	P		P	P		P		
<i>Cynoglossum officinale</i>				P	P		P		1
<i>Fallopia convolvulus</i>						P			
<i>Lactuca serriola</i>	P				P	P			
<i>Neolepia campestre</i>	P					1			
<i>Tragopogon dubius</i> ssp. <i>major</i>	1	P		P	P	P	P		P
<i>Turritis glabra</i>						P			
<i>Verbascum thapsus</i>	P			1	P	P		P	P
TOTAL INTRO. ANN. & BIEN. FORBS	1	P	P	1	P	P	P	P	P
INTRODUCED ANNUAL GRASSES									
<i>Anisantha tectorum</i>	1	P	P	P		3	P		
<i>Bromus briziformis</i>	1	2				1	1		P
<i>Bromus japonicus</i>				1	1	1			P
<i>Bromus</i> spp.									
TOTAL INTRO. ANN. GRASSES	2	2	P	P	P	4	1	---	P
NATIVE PERENNIAL FORBS									
<i>Achillea lanulosa</i>	P	P	1	1	P	P	P	P	P
<i>Adenolinum lewisii</i>									
<i>Aletes acaulis</i>	6	9		9	13		P	3	1
<i>Allium cernuum</i>								P	
<i>Allium</i> spp.	3	2	1	P					
<i>Ambrosia psilostachya</i> var. <i>coronopifolia</i>		1		1	3	1	P	3	P
<i>Amerosedum lanceolatum</i>			P						
<i>Antennaria</i> spp.	P	P							
<i>Arnica fulgens</i>	1	P	P						P
<i>Artemisia frigida</i>		P	P	1					P
<i>Artemisia ludoviciana</i>	1	P	3	1	2	2	P	P	P
<i>Asclepias</i> spp.								P	
<i>Aster laevis</i> var. <i>geyeri</i>			P						
<i>Aster porteri</i>					P				
<i>Astragalus flexuosus</i>									
<i>Calochortus gunnisonii</i>		P							
<i>Campanula rotundifolia</i>	P		P			P	P	P	
<i>Castilleja miniata</i>			P						
<i>Cerastium strictum</i>	1	P	1			P			
<i>Chlorocrepis albiflora</i>								P	
<i>Cirsium ochrocentrum</i>			P						1
<i>Comandra umbellata</i> ssp. <i>pallida</i>									
<i>Corallorhiza maculata</i>	P	P							
<i>Coriflora hirsutissima</i>			P						
<i>Dalea purpurea</i>									P
<i>Drymocallis fissa</i>	P	P	P	P	P			P	P
<i>Eremogone fendleri</i>				P	P			1	1
<i>Erigeron speciosus</i>									
<i>Erigeron</i> spp.		2	1		1		P		
<i>Eriogonum flavum</i> var. <i>flavum</i>									
<i>Eriogonum</i> spp.	P	1				P			
<i>Eriogonum umbellatum</i>			P						

Table C. Understory Cover Data - Community C, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	LJCNW05	LJCNW10	LJCSW01	LOSH05	LOSH10	MRL01	MRL10	S1010	S501
NATIVE PERENNIAL FORBS (concluded)									
Erysimum capitatum			P						
Gaillardia aristata	P	P						1	P
Galium spp.	1					P	2	P	
Geranium caespitosum ssp. caespitosum						P		P	
Gutierrezia sarothrae				P			P	1	
Harbouria trachypleura									P
Helianthus pumilus						P			
Heterotheca villosa	P					P		P	P
Heuchera bracteata			P						
Heuchera spp.	1								
Lathyrus leucanthus			P						
Lathyrus spp.	P	1	P			1	7		
Lesquerella montana			P						
Liatris punctata								P	P
Lithospermum incisum			P						
Lithospermum multiflorum									
Lomatium orientale	P		P						
Lupinus argenteus									
Mertensia lanceolata	1			P		P	P		
Monarda fistulosa var. menthifolia						P	P		
Oenothera villosa									
Oligosporus dracunculus ssp. glaucus									
Onosmodium molle ssp. occidentale									
Oxalis dillenii					P				
Packera fendleri									
Penstemon secundiflorus									
Penstemon spp.									
Penstemon virens	P	1	13	3	P	1	P	1	1
Phacelia heterophylla	P			P	1			P	P
Physalis hederifolia var. comata									
Physalis virginiana				P				P	
Pneumonanthe bigelovii					P			1	
Prunella vulgaris									
Pseudognaphalium canescens									
Psoralea tenuiflorum		P			P		P	P	P
Pulsatilla patens ssp. hirsutissima	P	P	P						
Rubus idaeus ssp. melanolasius									
Scrophularia lanceolata									
Scutellaria brittonii									
Senecio integerrimus	1		P						
Senecio spp.		P							
Solidago spp.									
Stenactis strigosa									
Thermopsis divaricarpa						P			1
Townsendia grandiflora									
Tradescantia occidentalis	P					P			
Tragia ramosa									
Viola spp.			P						
TOTAL NATIVE PERENNIAL FORBS	11	13	17	14	18	3	8	6	3
INTRODUCED PERENNIAL FORBS									
Broomrape					P				P
Convolvulus arvensis				1					
Hypericum perforatum	1	P		P		P	P	P	
Linaria genistifolia ssp. dalmatica							P		
Linaria vulgaris									
Nepeta cataria									
Potentilla recta						1	P		
Taraxacum officinale	P	P	P				P		
TOTAL INTRO. PERENNIAL FORBS	P	P	P	P	P	1	P	P	P

Table C. Understory Cover Data - Community C, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	LJCNW05	LJCNW10	LJCSW01	LOSH05	LOSH10	MRLO1	MRL10	S1010	S501
NATIVE PERENNIAL GRASSES (cool)									
<i>Achnatherum nelsonii</i>		P	P			3		1	1
<i>Bromopsis lanatipes</i>		1					P		
<i>Carex brevior</i>									
<i>Carex pennsylvanica</i> ssp. <i>heliophila</i>		P							
<i>Carex</i> spp.	4	3	P	7	8	P	3	1	4
<i>Elymus elymoides</i>				P	1			P	P
<i>Elymus lanceolatus</i> fm. <i>albicans</i>	1								P
<i>Elymus trachycaulus</i>									P
<i>Hesperostipa comata</i>	1	3	1			P	1	P	4
<i>Hesperostipa spartea</i>								P	
<i>Juncus arcticus</i> ssp. <i>ater</i>									
<i>Koeleria macrantha</i>	P	P	P						P
<i>Leucopoa kingii</i>									
<i>Leymus ambiguus</i>		3	1			2	5		
<i>Nassella viridula</i>		P						P	
<i>Poa agassizensis</i>	P	6	1	3	5	1	1	P	5
<i>Poa compressa</i>	1	11	2	1	3	2	2	3	3
TOTAL NATIVE PERENNIAL GRASSES (c)	4	25	4	11	15	7	9	3	15
INTRODUCED PERENNIAL GRASSES (cool)									
<i>Agropyron cristatum</i> ssp. <i>desertorum</i>									
<i>Agrostis gigantea</i>									
<i>Bromopsis inermis</i>									
<i>Dactylis glomerata</i>							P		
<i>Elytrigia repens</i>									
<i>Phleum pratense</i>		P							
<i>Thinopyrum intermedium</i>									
TOTAL INTRO. PERENNIAL GRASSES (c)	---	P	---	---	---	---	P	---	---
NATIVE PERENNIAL GRASSES (warm)									
<i>Andropogon gerardii</i>	1	2		P	1	2		2	3
<i>Aristida</i> spp.								P	
<i>Bouteloua curtipendula</i>				P	P				
<i>Chondrosum gracile</i>									
<i>Dichanthelium</i> spp.					P				
<i>Muhlenbergia montana</i>	1		P	P	1			P	1
<i>Muhlenbergia wrightii</i>					P				
<i>Schizachyrium scoparium</i>	2	P		P			P	P	1
<i>Sorghastrum avenaceum</i>				P					
<i>Sporobolus cryptandrus</i>									4
<i>Sporobolus heterolepis</i>									P
TOTAL NATIVE PERENNIAL GRASSES (w)	4	2	P	P	2	2	P	2	7
NATIVE SHRUBS									
<i>Arctostaphylos uva-ursi</i>	1								
<i>Ceanothus fendleri</i>									
<i>Cercocarpus montanus</i>	1	2	4				1		
<i>Crataegus</i> spp.									
<i>Mahonia repens</i>		P	2			5	P	P	P
<i>Oreobatus deliciosus</i>		1	P	P	P	1	2		
<i>Padus virginiana</i> ssp. <i>melanocarpa</i>	P		P	P	P	19	3		
<i>Rhus aromatica</i> ssp. <i>trilobata</i>		P	2	5	1	3	P	P	P
<i>Rhus glabra</i>						1			
<i>Ribes cereum</i>	P	P		1	2	1	1	P	P
<i>Ribes inerme</i>									
<i>Rosa woodsii</i>		P		P	P	2			P
<i>Symphoricarpos occidentalis</i>		3	3	P	1	2	P	P	
<i>Toxicodendron rydbergii</i>						1	P		
<i>Yucca glauca</i>		P				P	P		1
TOTAL NATIVE SHRUBS	1	4	10	6	3	33	6	P	P

Table C. Understory Cover Data - Community C, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	LJCNW05	LJCNW10	LJCSW01	LOSH05	LOSH10	MRL01	MRL10	S1010	S501
INTRODUCED SHRUBS									
<i>Colutea arborescens</i>									
TOTAL INTRODUCED SHRUBS	---	---	---	---	---	---	---	---	---
NATIVE TREES									
<i>Celtis reticulata</i>									
<i>Pinus ponderosa</i> ssp. <i>scopulorum</i>	4	2	2	P	P	1	4	1	1
<i>Pseudotsuga menziesii</i>									
<i>Quercus</i> spp.									
<i>Sabina scopulorum</i>	P		3		P		P		
TOTAL NATIVE TREES	4	2	5	P	P	P	4	1	P
NATIVE VINES									
<i>Clematis ligusticifolia</i>									
TOTAL NATIVE VINES	---	---	---	---	---	---	---	---	---
FERNS									
<i>Cystopteris fragilis</i>	P						P		
TOTAL FERNS	P	---	---	---	---	---	P	---	---
SUCCULENT									
<i>Coryphantha missouriensis</i>									
<i>Echinocereus viridiflorus</i>									
<i>Opuntia fragilis</i>									
<i>Opuntia macrorhiza</i>	P		1	1	1	P	P	P	P
<i>Opuntia polyacantha</i>									
TOTAL SUCCULENT	P	---	P	P	1	P	P	P	P
UNKNOWN SPECIES									
Unknown forb									
Unknown grass	2		1						
TOTAL UNKNOWN SPECIES	2	---	1	---	---	---	---	---	---
Litter	61	45	47	62	57	28	62	77	62
Bare soil									
Rock	6	5	15	1	1	19	9	9	7
Water									
TOTALS	95	97	97	96	97	95	98	96	96
TOTAL VEGETATION COVER	28	47	36	31	40	48	28	11	25
GROUND COVER (Litter + Rock + Veg + St.D	95	97	97	94	97	95	98	96	94
SPECIES DENSITY (# of species/400 sq.m.)	51	49	52	39	40	47	46	42	48
(AVERAGE = 46.6 Std.Dev. = 8.7)									

*P=Present within 400 sq.m. plot, but not quantitatively encountered.

Table C. Understory Cover Data - Community C, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*							
	----- SAMPLE NUMBER -----							
	S901	WITNE10	WITNW01	WITS01	WITS10	WITW01	WTRT05	WTRT10
NATIVE ANNUAL & BIENNIAL FORBS								
<i>Chenopodium leptophyllum</i>				P				
<i>Collinsia parviflora</i>							P	
<i>Frasera speciosa</i>							1	1
<i>Grindelia squarrosa</i>	1		1	P	P			
<i>Oligosporus pacificus</i>				1		P		
<i>Oreocarya virgata</i>				1		1		
<i>Silene antirrhina</i>					P			
TOTAL NATIVE ANN. & BIEN. FORBS	1	---	P	1	P	1	1	P
INTRODUCED ANNUAL & BIENNIAL FORBS								
<i>Acosta diffusa</i>							P	
<i>Alyssum alyssoides</i>			3	1				
<i>Alyssum parviflorum</i>					1			
<i>Camelina microcarpa</i>								
<i>Carduus nutans</i> ssp. <i>macrolepis</i>	P		1		P		P	P
<i>Cynoglossum officinale</i>							P	
<i>Fallopia convolvulus</i>					P			
<i>Lactuca serriola</i>	P							
<i>Neolepia campestre</i>					1			
<i>Tragopogon dubius</i> ssp. <i>major</i>	P		P		P	P		
<i>Turritis glabra</i>								
<i>Verbascum thapsus</i>	1	1	P			1	P	P
TOTAL INTRO. ANN. & BIEN. FORBS	P	P	3	P	P	P	P	P
INTRODUCED ANNUAL GRASSES								
<i>Anisantha tectorum</i>	1			P	1		4	2
<i>Bromus briziformis</i>							P	P
<i>Bromus japonicus</i>	1	1	1		2	P	2	P
<i>Bromus</i> spp.								1
TOTAL INTRO. ANN. GRASSES	1	P	P	P	3	P	6	3
NATIVE PERENNIAL FORBS								
<i>Achillea lanulosa</i>	1	P	P			1	3	P
<i>Adenolinum lewisii</i>			P					
<i>Aletes acaulis</i>	4							P
<i>Allium cernuum</i>	P	P	P	P		P		
<i>Allium</i> spp.								P
<i>Ambrosia psilostachya</i> var. <i>coronopifolia</i>		P	2	P	1	P	P	1
<i>Amerosedum lanceolatum</i>						P		
<i>Antennaria</i> spp.			1				2	
<i>Arnica fulgens</i>								
<i>Artemisia frigida</i>	P	1	1	1	1	1	P	P
<i>Artemisia ludoviciana</i>	P	2	2	1	1	2	2	3
<i>Asclepias</i> spp.					P			
<i>Aster laevis</i> var. <i>geyeri</i>								
<i>Aster porteri</i>		P	P			1		
<i>Astragalus flexuosus</i>			P	P		1		
<i>Calochortus gunnisonii</i>							P	
<i>Campanula rotundifolia</i>							1	
<i>Castilleja miniata</i>								
<i>Cerastium strictum</i>		P	1	P		1	P	P
<i>Chlorocrepis albiflora</i>								
<i>Cirsium ochrocentrum</i>		P	P	P	P			
<i>Comandra umbellata</i> ssp. <i>pallida</i>		P						
<i>Corallorhiza maculata</i>							P	
<i>Coriiflora hirsutissima</i>								
<i>Dalea purpurea</i>								
<i>Drymocallis fissa</i>			P	P		P	P	
<i>Eremogone fendleri</i>								
<i>Erigeron speciosus</i>			P					
<i>Erigeron</i> spp.		P	1				P	P
<i>Eriogonum flavum</i> var. <i>flavum</i>		3	P	3	P	P		
<i>Eriogonum</i> spp.						P		
<i>Eriogonum umbellatum</i>		P	1			P	P	P

Table C. Understory Cover Data - Community C, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover *							
	----- SAMPLE NUMBER -----							
	S901	WITNE10	WITNW01	WITS01	WITS10	WITW01	WTRT05	WTRT10
NATIVE PERENNIAL FORBS (concluded)								
<i>Erysimum capitatum</i>			P			P	P	
<i>Gaillardia aristata</i>								P
<i>Galium</i> spp.								
<i>Geranium caespitosum</i> ssp. <i>caespitosum</i>		P	1		P	1		
<i>Gutierrezia sarothrae</i>							P	
<i>Harbouria trachypleura</i>								P
<i>Helianthus pumilus</i>		P	P					
<i>Heterotheca villosa</i>	P	6	2	1	P	3	P	P
<i>Heuchera bracteata</i>								
<i>Heuchera</i> spp.								
<i>Lathyrus leucanthus</i>								
<i>Lathyrus</i> spp.		P	1				P	
<i>Lesquerella montana</i>							P	
<i>Liatris punctata</i>				P	P	P	P	
<i>Lithospermum incisum</i>								
<i>Lithospermum multiflorum</i>			P			1		
<i>Lomatium orientale</i>								
<i>Lupinus argenteus</i>			3			3		
<i>Mertensia lanceolata</i>		P						
<i>Monarda fistulosa</i> var. <i>menthifolia</i>			2			2	P	
<i>Oenothera villosa</i>			P					
<i>Oligosporus dracunculus</i> ssp. <i>glaucus</i>		P						
<i>Onosmodium molle</i> ssp. <i>occidentale</i>			P			P		
<i>Oxalis dillenii</i>					P			
<i>Packera fendleri</i>				P		P		
<i>Penstemon secundiflorus</i>				P				
<i>Penstemon</i> spp.		P						
<i>Penstemon virens</i>	P	P		P		P	3	P
<i>Phacelia heterophylla</i>		P	P	P	P	P	P	P
<i>Physalis hederifolia</i> var. <i>comata</i>					P			
<i>Physalis virginiana</i>						P		
<i>Pneumonanthe bigelovii</i>						P		
<i>Prunella vulgaris</i>			P					
<i>Pseudognaphalium canescens</i>				P	P			
<i>Psoralegium tenuiflorum</i>					P		P	
<i>Pulsatilla patens</i> ssp. <i>hirsutissima</i>						1		
<i>Rubus idaeus</i> ssp. <i>melanolasius</i>	1							
<i>Scrophularia lanceolata</i>			P					
<i>Scutellaria brittonii</i>			P					
<i>Senecio integerrimus</i>								
<i>Senecio</i> spp.				P				
<i>Solidago</i> spp.						P		
<i>Stenactis strigosa</i>			P					
<i>Thermopsis divaricarpa</i>								
<i>Townsendia grandiflora</i>			P			P		
<i>Tradescantia occidentalis</i>				P				P
<i>Tragia ramosa</i>					1			
<i>Viola</i> spp.								
TOTAL NATIVE PERENNIAL FORBS	4	12	11	6	1	11	9	3
INTRODUCED PERENNIAL FORBS								
<i>Breia arvensis</i>	P		P					P
<i>Convolvulus arvensis</i>								
<i>Hypericum perforatum</i>							P	
<i>Linaria genistifolia</i> ssp. <i>dalmatica</i>								
<i>Linaria vulgaris</i>			6					
<i>Nepeta cataria</i>			P					
<i>Potentilla recta</i>								
<i>Taraxacum officinale</i>							P	
TOTAL INTRO. PERENNIAL FORBS	P	---	6	---	---	---	P	P

Table C. Understory Cover Data - Community C, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*							
	----- SAMPLE NUMBER -----							
	S901	WITNE10	WITNW01	WITS01	WITS10	WITW01	WTRT05	WTRT10
NATIVE PERENNIAL GRASSES (cool)								
<i>Achnatherum nelsonii</i>						1	P	
<i>Bromopsis lanatipes</i>		P	1		P	P		P
<i>Carex brevior</i>								P
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>								P
<i>Carex</i> spp.	3	8	3	3	P	7	7	8
<i>Elymus elymoides</i>	P	P	2	P	P	P		
<i>Elymus lanceolatus</i> fm. <i>albicans</i>		P			1			
<i>Elymus trachycaulus</i>	P	P	2					
<i>Hesperostipa comata</i>		2	1	2	P	3	1	P
<i>Hesperostipa spartea</i>					P	P		
<i>Juncus arcticus</i> ssp. <i>ater</i>							P	
<i>Koeleria macrantha</i>	P	1	P	P		1		
<i>Leucopoa kingii</i>		P		P		1		
<i>Leymus ambiguus</i>								
<i>Nassella viridula</i>								
<i>Poa agassizensis</i>	1	1	1		P		2	
<i>Poa compressa</i>	1		P			1	1	
TOTAL NATIVE PERENNIAL GRASSES (c)	4	11	8	4	P	9	9	8
INTRODUCED PERENNIAL GRASSES (cool)								
<i>Agropyron cristatum</i> ssp. <i>desertorum</i>				P				
<i>Agrostis gigantea</i>			2					
<i>Bromopsis inermis</i>	1				P			
<i>Dactylis glomerata</i>			P					
<i>Elytrigia repens</i>							P	
<i>Phleum pratense</i>	P						P	
<i>Thinopyrum intermedium</i>	P							
TOTAL INTRO. PERENNIAL GRASSES (c)	1	---	2	P	P	---	P	---
NATIVE PERENNIAL GRASSES (warm)								
<i>Andropogon gerardii</i>		3	1	2	3	3	3	P
<i>Aristida</i> spp.								
<i>Bouteloua curtipendula</i>		P	P	P	P			
<i>Chondrosum gracile</i>		1	P	P	1	P	P	
<i>Dichanthelium</i> spp.								
<i>Muhlenbergia montana</i>		2	1			P	P	
<i>Muhlenbergia wrightii</i>								
<i>Schizachyrium scoparium</i>		P	P	P	2	2	1	
<i>Sorghastrum avenaceum</i>	P							
<i>Sporobolus cryptandrus</i>				P	3			
<i>Sporobolus heterolepis</i>								
TOTAL NATIVE PERENNIAL GRASSES (w)	P	5	1	2	9	5	4	P
NATIVE SHRUBS								
<i>Arctostaphylos uva-ursi</i>								
<i>Ceanothus fendleri</i>	1	P		P				
<i>Cercocarpus montanus</i>			P					
<i>Crataegus</i> spp.			1					
<i>Mahonia repens</i>			P				P	P
<i>Oreobatus deliciosus</i>			P			P	1	P
<i>Padus virginiana</i> ssp. <i>melanocarpa</i>			1			P		
<i>Rhus aromatica</i> ssp. <i>trilobata</i>				1			5	2
<i>Rhus glabra</i>								
<i>Ribes cereum</i>	P	P	P		P		1	1
<i>Ribes inerme</i>			1	P				
<i>Rosa woodsii</i>			P		P	P		
<i>Symphoricarpos occidentalis</i>			9				3	
<i>Toxicodendron rydbergii</i>	P		P					
<i>Yucca glauca</i>	P				2			P
TOTAL NATIVE SHRUBS	P	P	12	P	2	P	9	2

Table C. Understory Cover Data - Community C, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*							
	----- SAMPLE NUMBER -----							
	S901	WITNE10	WITNW01	WITS01	WITS10	WITW01	WTRT05	WTRT10
INTRODUCED SHRUBS								
<i>Colutea arborescens</i>			1		P			
TOTAL INTRODUCED SHRUBS	---	---	P	---	P	---	---	---
NATIVE TREES								
<i>Celtis reticulata</i>	P							
<i>Pinus ponderosa</i> ssp. <i>scopulorum</i>	1	2	1	1	P	3	1	P
<i>Pseudotsuga menziesii</i>							P	
<i>Quercus</i> spp.								
<i>Sabina scopulorum</i>	P							
TOTAL NATIVE TREES	1	2	1	1	P	3	1	P
NATIVE VINES								
<i>Clematis ligusticifolia</i>			P					
TOTAL NATIVE VINES	---	---	P	---	---	---	---	---
FERNS								
<i>Cystopteris fragilis</i>			P	P	P			
TOTAL FERNS	---	---	P	P	P	---	---	---
SUCCULENT								
<i>Coryphantha missouriensis</i>					P			
<i>Echinocereus viridiflorus</i>								P
<i>Opuntia fragilis</i>					P		P	P
<i>Opuntia macrorhiza</i>	P	1	P	1		P	2	2
<i>Opuntia polyacantha</i>		1	P	1	P			
TOTAL SUCCULENT	P	P	P	P	P	P	2	2
UNKNOWN SPECIES								
Unknown forb								
Unknown grass								
TOTAL UNKNOWN SPECIES	---	---	---	---	---	---	---	---
Litter	72	61	45	66	53	65	55	61
Bare soil	1		1					9
Rock	14	5	4	11	29	1	4	14
Water		4		7	2			
TOTALS	97	97	93	98	97	94	98	99
TOTAL VEGETATION COVER	11	28	43	14	14	29	40	16
GROUND COVER (Litter + Rock + Veg + St.D	97	97	92	98	97	94	98	90
SPECIES DENSITY (# of species/400 sq.m.) (AVERAGE = 46.6 Std.Dev. = 8.7)	34	42	72	42	46	52	54	37

*P = Present within 400 sq.m. plot, but not quantitatively encountered.

Table D. Understory Cover Data - Community D, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
NATIVE ANNUAL & BIENNIAL FORBS			
<i>Chenopodium leptophyllum</i>	0.00	17.65	0.00
<i>Erigeron divergens</i>	0.38	23.53	0.90
<i>Frasera speciosa</i>	0.00	17.65	0.00
<i>Grindelia squarrosa</i>	0.15	94.12	0.35
<i>Oligosporus pacificus</i>	0.00	5.88	0.00
<i>Oreocarya virgata</i>	0.00	5.88	0.00
<i>Plantago patagonica</i>	0.00	5.88	0.00
<i>Silene antirrhina</i>	0.00	5.88	0.00
TOTAL NATIVE ANN. & BIEN. FORBS	0.5	100.0	1.2
INTRODUCED ANNUAL & BIENNIAL FORBS			
<i>Acosta diffusa</i>	0.00	17.65	0.00
<i>Alyssum alyssoides</i>	0.00	17.65	0.00
<i>Alyssum parviflorum</i>	0.00	5.88	0.00
<i>Alyssum</i> spp.	0.00	5.88	0.00
<i>Bassia sieversiana</i>	0.00	5.88	0.00
<i>Camelina microcarpa</i>	0.00	23.53	0.00
<i>Carduus nutans</i> ssp. <i>macrolepis</i>	0.06	52.94	0.14
<i>Cynoglossum officinale</i>	0.00	41.18	0.00
<i>Dianthus armeria</i>	0.00	5.88	0.00
<i>Fallopia convolvulus</i>	0.00	5.88	0.00
<i>Lactuca serriola</i>	0.06	41.18	0.14
<i>Neolepia campestre</i>	0.00	11.76	0.00
<i>Tragopogon dubius</i> ssp. <i>major</i>	0.00	94.12	0.00
<i>Verbascum thapsus</i>	0.00	64.71	0.00
TOTAL INTRO. ANN. & BIEN. FORBS	0.1	100.0	0.3
INTRODUCED ANNUAL GRASSES			
<i>Anisantha tectorum</i>	0.38	35.29	0.90
<i>Bromus briziformis</i>	0.06	23.53	0.14
<i>Bromus japonicus</i>	0.74	82.35	1.73
TOTAL INTRO. ANN. GRASSES	1.2	94.1	2.8
NATIVE PERENNIAL FORBS			
<i>Acetosella vulgaris</i>	0.00	5.88	0.00
<i>Achillea lanulosa</i>	0.15	76.47	0.35
<i>Adenolinum lewisii</i>	0.06	35.29	0.14
<i>Aletes acaulis</i>	0.53	35.29	1.24
<i>Allium cernuum</i>	0.00	41.18	0.00
<i>Ambrosia psilostachya</i> var. <i>coronopifolia</i>	1.59	100.00	3.73
<i>Amerosedum lanceolatum</i>	0.00	5.88	0.00
<i>Antennaria</i> spp.	0.00	29.41	0.00
<i>Apocynum androsaemifolium</i>	0.00	17.65	0.00
<i>Artemisia frigida</i>	0.00	52.94	0.00
<i>Artemisia ludoviciana</i>	1.79	100.00	4.22
<i>Asclepias pumila</i>	0.09	5.88	0.21
<i>Asclepias</i> spp.	0.00	5.88	0.00
<i>Asclepias stenophylla</i>	0.00	17.65	0.00
<i>Asclepias viridiflora</i>	0.00	17.65	0.00
<i>Aster laevis</i> var. <i>geyeri</i>	0.00	11.76	0.00
<i>Aster porteri</i>	0.71	47.06	1.66
<i>Astragalus flexuosus</i>	0.00	17.65	0.00
<i>Astragalus</i> spp.	0.00	5.88	0.00
<i>Brickellia rosmarinifolia</i> ssp. <i>chlorolepis</i>	0.00	5.88	0.00
<i>Calochortus gunnisonii</i>	0.00	17.65	0.00
<i>Calylophus serrulatus</i>	0.00	5.88	0.00
<i>Campanula rotundifolia</i>	0.00	41.18	0.00
<i>Cerastium strictum</i>	0.00	35.29	0.00
<i>Cirsium ochrocentrum</i>	0.00	64.71	0.00
<i>Comandra umbellata</i> ssp. <i>pallida</i>	0.00	35.29	0.00
<i>Corallorhiza maculata</i>	0.00	5.88	0.00
<i>Dalea purpurea</i>	0.00	64.71	0.00
<i>Drymocallis fissa</i>	0.24	64.71	0.55
<i>Eremogone fendleri</i>	0.00	29.41	0.00

Table D. Understory Cover Data - Community D, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
NATIVE PERENNIAL FORBS (concluded)			
<i>Erigeron</i> spp.	0.09	17.65	0.21
<i>Eriogonum</i> spp.	0.00	17.65	0.00
<i>Eriogonum umbellatum</i>	0.00	23.53	0.00
<i>Gaillardia aristata</i>	0.00	17.65	0.00
<i>Galium</i> spp.	0.00	5.88	0.00
<i>Geranium caespitosum</i> ssp. <i>caespitosum</i>	0.00	23.53	0.00
<i>Gutierrezia sarothrae</i>	0.00	41.18	0.00
<i>Harbouria trachypleura</i>	0.00	23.53	0.00
<i>Helianthus pumilus</i>	0.12	29.41	0.28
<i>Heterotheca foliosa</i>	0.00	5.88	0.00
<i>Heterotheca villosa</i>	0.00	52.94	0.00
<i>Heuchera</i> spp.	0.00	11.76	0.00
<i>Iris missouriensis</i>	0.00	5.88	0.00
<i>Lathyrus</i> spp.	0.00	35.29	0.00
<i>Lesquerella montana</i>	0.00	11.76	0.00
<i>Liatris punctata</i>	0.06	82.35	0.14
<i>Lithospermum multiflorum</i>	0.09	23.53	0.21
<i>Lupinus argenteus</i>	0.15	5.88	0.35
<i>Mertensia lanceolata</i>	0.00	11.76	0.00
<i>Monarda fistulosa</i> var. <i>menthifolia</i>	0.00	29.41	0.00
<i>Oligoneuron rigidum</i>	0.00	11.76	0.00
<i>Oligosporus dracunculus</i> ssp. <i>glaucus</i>	0.06	41.18	0.14
<i>Onosmodium molle</i> ssp. <i>occidentale</i>	0.06	52.94	0.14
<i>Oxalis dillenii</i>	0.00	52.94	0.00
<i>Oxybaphus hirsutus</i>	0.00	5.88	0.00
<i>Oxybaphus</i> spp.	0.00	5.88	0.00
<i>Oxytropis lambertii</i>	0.00	5.88	0.00
<i>Packera fendleri</i>	0.00	5.88	0.00
<i>Penstemon secundiflorus</i>	0.00	11.76	0.00
<i>Penstemon</i> spp.	0.00	5.88	0.00
<i>Penstemon virens</i>	0.18	58.82	0.41
<i>Phacelia heterophylla</i>	0.09	64.71	0.21
<i>Physalis virginiana</i>	0.00	17.65	0.00
<i>Pneumonanthe bigelovii</i>	0.00	35.29	0.00
<i>Psoralidium tenuiflorum</i>	1.26	94.12	2.97
<i>Pulsatilla patens</i> ssp. <i>hirsutissima</i>	0.00	35.29	0.00
<i>Ratibida columnifera</i>	0.00	52.94	0.00
<i>Scutellaria brittonii</i>	0.00	11.76	0.00
<i>Solidago missouriensis</i>	0.00	5.88	0.00
<i>Solidago</i> spp.	0.00	23.53	0.00
<i>Thermopsis divaricarpa</i>	0.00	17.65	0.00
<i>Tithymalus spathulatus</i>	0.06	5.88	0.14
<i>Tradescantia occidentalis</i>	0.00	23.53	0.00
<i>Tragia ramosa</i>	0.12	23.53	0.28
<i>Viola nuttallii</i>	0.00	5.88	0.00
<i>Viola</i> spp.	0.00	5.88	0.00
<i>Virgulus falcatus</i>	0.35	41.18	0.83
TOTAL NATIVE PERENNIAL FORBS	7.8	100.0	18.4
INTRODUCED PERENNIAL FORBS			
<i>Asparagus officinalis</i>	0.00	5.88	0.00
<i>Brexa arvensis</i>	0.00	5.88	0.00
<i>Hypericum perforatum</i>	0.26	82.35	0.62
<i>Potentilla recta</i>	0.00	5.88	0.00
<i>Taraxacum officinale</i>	0.00	35.29	0.00
<i>Verbena bracteata</i>	0.00	5.88	0.00
TOTAL INTRO. PERENNIAL FORBS	0.3	88.2	0.6

Table D. Understory Cover Data - Community D, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
NATIVE PERENNIAL GRASSES (cool)			
<i>Achnatherum nelsonii</i>	0.74	52.94	1.73
<i>Agrostis</i> spp.	0.12	17.65	0.28
<i>Bromopsis canadensis</i>	0.00	5.88	0.00
<i>Bromopsis lanatipes</i>	0.00	17.65	0.00
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>	0.00	5.88	0.00
<i>Carex</i> spp.	3.18	100.00	7.46
<i>Dicanthelium oligosanthes</i> var. <i>scribnerianum</i>	0.12	11.76	0.28
<i>Elymus canadensis</i>	0.09	5.88	0.21
<i>Elymus elymoides</i>	0.32	70.59	0.76
<i>Elymus lanceolatus</i> fm. <i>albicans</i>	0.09	17.65	0.21
<i>Elymus trachycaulus</i>	0.00	5.88	0.00
<i>Hesperostipa comata</i>	1.47	70.59	3.46
<i>Hesperostipa spartea</i>	0.00	23.53	0.00
<i>Juncus interior</i>	0.00	23.53	0.00
<i>Koeleria macrantha</i>	0.09	70.59	0.21
<i>Nassella viridula</i>	0.00	5.88	0.00
<i>Pascopyrum smithii</i>	0.38	29.41	0.90
<i>Poa agassizensis</i>	4.09	100.00	9.61
<i>Poa compressa</i>	1.38	88.24	3.25
TOTAL NATIVE PERENNIAL GRASSES (c)	12.1	100.0	28.3
INTRODUCED PERENNIAL GRASSES (cool)			
<i>Bromopsis inermis</i>	0.09	5.88	0.21
<i>Dactylis glomerata</i>	0.00	5.88	0.00
<i>Phleum pratense</i>	0.00	11.76	0.00
<i>Thinopyrum intermedium</i>	0.00	11.76	0.00
TOTAL INTRO. PERENNIAL GRASSES (c)	0.1	17.6	0.2
NATIVE PERENNIAL GRASSES (warm)			
<i>Andropogon gerardii</i>	9.29	100.00	21.84
<i>Aristida purpurea</i>	0.00	11.76	0.00
<i>Bouteloua curtipendula</i>	0.24	52.94	0.55
<i>Chondrosium gracile</i>	0.18	41.18	0.41
<i>Dichanthelium linearifolium</i>	0.12	5.88	0.28
<i>Muhlenbergia montana</i>	0.44	52.94	1.04
<i>Muhlenbergia wrightii</i>	0.18	17.65	0.41
<i>Panicum virgatum</i>	0.09	11.76	0.21
<i>Schizachyrium scoparium</i>	0.12	52.94	0.28
<i>Sorghastrum avenaceum</i>	0.71	47.06	1.66
<i>Sporobolus cryptandrus</i>	0.00	5.88	0.00
<i>Sporobolus heterolepis</i>	0.06	11.76	0.14
<i>Sporobolus</i> spp.	0.32	11.76	0.76
TOTAL NATIVE PERENNIAL GRASSES (w)	11.7	100.0	27.6
NATIVE SHRUBS			
<i>Acer glabrum</i>	0.00	5.88	0.00
<i>Amelanchier alnifolia</i>	0.00	5.88	0.00
<i>Amorpha nana</i>	0.00	11.76	0.00
<i>Ceanothus fendleri</i>	0.00	5.88	0.00
<i>Ceanothus herbaceus</i>	0.00	5.88	0.00
<i>Cercocarpus montanus</i>	0.00	5.88	0.00
<i>Crataegus</i> spp.	0.00	5.88	0.00
<i>Mahonia repens</i>	0.24	23.53	0.55
<i>Oreobatus deliciosus</i>	0.24	41.18	0.55
<i>Padus virginiana</i> ssp. <i>melanocarpa</i>	0.76	35.29	1.80
<i>Prunus americana</i>	0.00	5.88	0.00
<i>Rhus aromatica</i> ssp. <i>trilobata</i>	4.44	100.00	10.44
<i>Ribes cereum</i>	0.09	82.35	0.21
<i>Rosa woodsii</i>	0.32	70.59	0.76
<i>Symphoricarpos occidentalis</i>	0.21	35.29	0.48
<i>Toxicodendron rydbergii</i>	0.00	23.53	0.00
<i>Yucca glauca</i>	0.29	58.82	0.69
TOTAL NATIVE SHRUBS	6.6	100.0	15.5

Table D. Understory Cover Data - Community D, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
NATIVE TREES			
<i>Celtis reticulata</i>	0.00	17.65	0.00
<i>Negundo aceroides</i> ssp. <i>interius</i>	0.00	5.88	0.00
<i>Pinus ponderosa</i> ssp. <i>scopulorum</i>	0.71	100.00	1.66
<i>Pseudotsuga menziesii</i>	0.00	11.76	0.00
<i>Sabina scopulorum</i>	0.47	29.41	1.11
TOTAL NATIVE TREES	1.2	100.0	2.8
FERNS			
<i>Cystopteris fragilis</i>	0.00	11.76	0.00
TOTAL FERNS	0.0	11.8	0.0
SUCCULENT			
<i>Echinocereus viridiflorus</i>	0.00	11.76	0.00
<i>Opuntia fragilis</i>	0.00	35.29	0.00
<i>Opuntia macrorhiza</i>	0.21	88.24	0.48
<i>Opuntia polyacantha</i>	0.00	5.88	0.00
TOTAL SUCCULENT	0.2	88.2	0.5
UNKNOWN SPECIES			
Unknown forb	0.06	5.88	0.14
Unknown grass	0.32	11.76	0.76
Unknown grass 1	0.12	5.88	0.28
Unknown grass 2	0.29	17.65	0.69
TOTAL UNKNOWN SPECIES	0.8	35.3	1.9
Litter	44.18	100.00	
Bare soil	0.82	23.53	
Rock	8.15	100.00	
TOTALS	95.7		
TOTAL VEGETATION COVER	42.6 (s = 14.		100.0
GROUND COVER (Litter + Rock + Veg + St.D	94.9		
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE = 51.2 Std.Dev. = 9.0)			

Table D. Understory Cover Data - Community D, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	D101	D105	D110	D18101	D205	D210	D3D401	D3D410	D3D415
NATIVE ANNUAL & BIENNIAL FORBS									
<i>Chenopodium leptophyllum</i>		P	P						
<i>Erigeron divergens</i>			1		4	P			
<i>Frasera speciosa</i>	1	P					P		
<i>Grindelia squarrosa</i>	1	P	1	1	P	P	P	P	1
<i>Oligosporus pacificus</i>		1							
<i>Oreocarya virgata</i>		P							
<i>Plantago patagonica</i>									
<i>Silene antirrhina</i>									
TOTAL NATIVE ANN. & BIEN. FORBS	P	P	1	P	4	P	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS									
<i>Acosta diffusa</i>									
<i>Alyssum alyssoides</i>					P				
<i>Alyssum parviflorum</i>									
<i>Alyssum spp.</i>									
<i>Bassia sieversiana</i>				P					
<i>Camelina microcarpa</i>			P						
<i>Carduus nutans</i> ssp. <i>macrolepis</i>				1	P		P	P	P
<i>Cynoglossum officinale</i>				P			P	P	
<i>Dianthus armeria</i>				P					
<i>Fallopia convolvulus</i>									
<i>Lactuca serriola</i>		P		1					P
<i>Neolepia campestre</i>									
<i>Tragopogon dubius</i> ssp. <i>major</i>	P	P	P	P		P	P	P	P
<i>Verbascum thapsus</i>		P	1	P		P	P		P
TOTAL INTRO. ANN. & BIEN. FORBS	P	P	P	1	P	P	P	P	P
INTRODUCED ANNUAL GRASSES									
<i>Anisantha tectorum</i>			P		P	5			
<i>Bromus briziformis</i>				P					P
<i>Bromus japonicus</i>	P	1	1	8	P			P	P
TOTAL INTRO. ANN. GRASSES	P	P	P	8	P	5	---	P	P
NATIVE PERENNIAL FORBS									
<i>Acetosella vulgaris</i>		P							
<i>Achillea lanulosa</i>	P	1	P	P		P	P	1	P
<i>Adenolinum lewisii</i>		P	P				P		
<i>Aletes acaulis</i>	P			1				2	4
<i>Allium cernuum</i>	P		P	P	P			P	P
<i>Ambrosia psilostachya</i> var. <i>coronopifolia</i>	3	P	2	6	2	P	P	8	P
<i>Amerosedum lanceolatum</i>		P							
<i>Antennaria</i> spp.	P	P							1
<i>Apocynum androsaemifolium</i>	P		P						
<i>Artemisia frigida</i>			P		P	1	P		
<i>Artemisia ludoviciana</i>	3	2	1	P	2	2	2	10	2
<i>Asclepias pumila</i>									
<i>Asclepias</i> spp.					P				
<i>Asclepias stenophylla</i>			P						
<i>Asclepias viridiflora</i>	P		P				P		
<i>Aster laevis</i> var. <i>geyeri</i>		P		P					
<i>Aster porteri</i>			P		3		P	P	1
<i>Astragalus flexuosus</i>							P		1
<i>Astragalus</i> spp.									
<i>Brickellia rosmarinifolia</i> ssp. <i>chlorolepis</i>			P						
<i>Calochortus gunnisonii</i>							P		P
<i>Calylophus serrulatus</i>									
<i>Campanula rotundifolia</i>	P	P			P		P	P	
<i>Cerastium strictum</i>	P	P	P						
<i>Cirsium ochrocentrum</i>	P		P		P		1	P	
<i>Comandra umbellata</i> ssp. <i>pallida</i>	1	P			1		P		
<i>Corallorhiza maculata</i>									
<i>Dalea purpurea</i>	P	P	P				P	P	P
<i>Drymocallis fissa</i>	1	P	1	1	1		1	1	1
<i>Eremogone fendleri</i>	1	P	1		P				

Table D. Understory Cover Data - Community D, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	D101	D105	D110	D18101	D205	D210	D3D401	D3D410	D3D415
NATIVE PERENNIAL FORBS (concluded)									
Erigeron spp.						P			
Eriogonum spp.			P						
Eriogonum umbellatum		P							
Gaillardia aristata							P		
Galium spp.									
Geranium caespitosum ssp. caespitosum		P		P	P				
Gutierrezia sarothrae	P						P	P	P
Harbouria trachypleura	P	P				P			
Helianthus pumilus						P	P		
Heterotheca foliosa		1							
Heterotheca villosa	1		P	P		P	P		
Heuchera spp.		P						P	
Iris missouriensis								P	
Lathyrus spp.		P		P			P	P	
Lesquerella montana									
Liatris punctata	1	1	P	P	P	1	1	P	P
Lithospermum multiflorum	P		P	2				P	
Lupinus argenteus				3					
Mertensia lanceolata									P
Monarda fistulosa var. menthifolia		P		P			P	P	P
Oligoneuron rigidum	P							P	
Oligosporus dracunculus ssp. glaucus	P	P		1				P	
Onosmodium molle ssp. occidentale	P		P	P			P	1	P
Oxalis dillenii			1					P	P
Oxybaphus hirsutus					P				
Oxybaphus spp.		P							
Oxytropis lambertii							P		
Packera fendleri		P							
Penstemon secundiflorus	P								
Penstemon spp.									
Penstemon virens	1	1			P	P	1		P
Phacelia heterophylla	1	P	P	P	P	P			
Physalis virginiana					P		P	P	
Pneumonanthe bigelovii	P	1	P					P	
Psoralegium tenuiflorum	2	1	5	2	2		3	2	2
Pulsatilla patens ssp. hirsutissima	P		P		P		P	P	
Ratibida columnifera			P	P	P		P		
Scutellaria brittonii							P		
Solidago missouriensis		P							
Solidago spp.	P	P					P		1
Thermopsis divaricarpa							P		
Tithymalus spathulatus									
Tradescantia occidentalis									
Tragia ramosa							1		
Viola nuttallii									
Viola spp.		P							
Virgulus falcatus				P			P	3	1
TOTAL NATIVE PERENNIAL FORBS	11	4	8	13	8	2	4	24	9
INTRODUCED PERENNIAL FORBS									
Asparagus officinalis									
Brexa arvensis									P
Hypericum perforatum	P	P	4	1	P			P	1
Potentilla recta									
Taraxacum officinale			P	P			P	P	
Verbena bracteata									
TOTAL INTRO. PERENNIAL FORBS	P	P	4	1	P	---	P	P	P

Table D. Understory Cover Data - Community D, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	D101	D105	D110	D18101	D205	D210	D3D401	D3D410	D3D415
NATIVE PERENNIAL GRASSES (cool)									
<i>Achnatherum nelsonii</i>		P	1	P			5	2	1
<i>Agrostis</i> spp.								1	1
<i>Bromopsis canadensis</i>									
<i>Bromopsis lanatipes</i>				P					
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>						P			
<i>Carex</i> spp.	5	2	4	5	1	4	2	5	3
<i>Dicanthelium oligosanthes</i> var. <i>scribnerianum</i>									
<i>Elymus canadensis</i>		2							
<i>Elymus elymoides</i>	1	P	1	1	P	P	1	P	P
<i>Elymus lanceolatus</i> fm. <i>albicans</i>	P			1					
<i>Elymus trachycaulus</i>						P			
<i>Hesperostipa comata</i>	6	2		P	2	1	4	P	
<i>Hesperostipa spartea</i>	1			P			P	P	
<i>Juncus interior</i>		P						1	1
<i>Koeleria macrantha</i>	1	2	1		P		P		P
<i>Nassella viridula</i>			P						
<i>Pascopyrum smithii</i>									3
<i>Poa agassizensis</i>	2	3	7	7	P	P	5	9	11
<i>Poa compressa</i>	3	1	1		3	P		1	4
TOTAL NATIVE PERENNIAL GRASSES (c)	16	11	14	13	4	4	16	17	19
INTRODUCED PERENNIAL GRASSES (cool)									
<i>Bromopsis inermis</i>									2
<i>Dactylis glomerata</i>									P
<i>Phleum pratense</i>								P	P
<i>Thinopyrum intermedium</i>						P			1
TOTAL INTRO. PERENNIAL GRASSES (c)	---	---	---	---	---	P	---	P	2
NATIVE PERENNIAL GRASSES (warm)									
<i>Andropogon gerardii</i>	5	2	7	8	6	1	21	9	21
<i>Aristida purpurea</i>			P						
<i>Bouteloua curtipendula</i>	P		P	P			P	2	
<i>Chondrosium gracile</i>	1	1					1	P	
<i>Dichanthelium linearifolium</i>									
<i>Muhlenbergia montana</i>	2	P	2	P					P
<i>Muhlenbergia wrightii</i>		P							1
<i>Panicum virgatum</i>					1				
<i>Schizachyrium scoparium</i>	P		P				1	1	P
<i>Sorghastrum avenaceum</i>	2	P	1	1			1	1	1
<i>Sporobolus cryptandrus</i>									P
<i>Sporobolus heterolepis</i>			1					P	
<i>Sporobolus</i> spp.									
TOTAL NATIVE PERENNIAL GRASSES (w)	10	2	10	9	6	P	23	13	23
NATIVE SHRUBS									
<i>Acer glabrum</i>				P					
<i>Amelanchier alnifolia</i>		P							
<i>Amorpha nana</i>									
<i>Ceanothus fendleri</i>							P		
<i>Ceanothus herbaceus</i>					P				
<i>Cercocarpus montanus</i>									
<i>Crataegus</i> spp.									
<i>Mahonia repens</i>							1	P	
<i>Oreobatus deliciosus</i>	P	1	1			P		P	
<i>Padus virginiana</i> ssp. <i>melanocarpa</i>		2		12		P	P	P	
<i>Prunus americana</i>		1							
<i>Rhus aromatica</i> ssp. <i>trilobata</i>	1	5	4	P	4	1	14	2	1
<i>Ribes cereum</i>	1	1	1		P	1	P	1	P
<i>Rosa woodsii</i>		P	1	3	1		1	1	2
<i>Symphoricarpos occidentalis</i>		P	P						
<i>Toxicodendron rydbergii</i>		P		1				P	
<i>Yucca glauca</i>	1				1	P	1		1
TOTAL NATIVE SHRUBS	2	8	4	15	5	1	16	3	3

Table D. Understory Cover Data - Community D, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	D101	D105	D110	D18101	D205	D210	D3D401	D3D410	D3D415
NATIVE TREES									
<i>Celtis reticulata</i>								P	
<i>Negundo aceroides</i> ssp. <i>interius</i>									P
<i>Pinus ponderosa</i> ssp. <i>scopulorum</i>	1	2	P	2	P	1	2	2	1
<i>Pseudotsuga menziesii</i>		P					P		
<i>Sabina scopulorum</i>				3		P		5	P
TOTAL NATIVE TREES	P	2	P	5	P	1	2	7	P
FERNS									
<i>Cystopteris fragilis</i>		P							
TOTAL FERNS	---	P	---	---	---	---	---	---	---
SUCCULENT									
<i>Echinocereus viridiflorus</i>									
<i>Opuntia fragilis</i>	P	P	P						
<i>Opuntia macrorhiza</i>	P	P	1	1		P		P	P
<i>Opuntia polyacantha</i>									
TOTAL SUCCULENT	P	P	P	1	---	P	---	P	P
UNKNOWN SPECIES									
Unknown forb									
Unknown grass					3				
Unknown grass 1	2								
Unknown grass 2	1			3					
TOTAL UNKNOWN SPECIES	3	---	---	3	3	---	---	---	---
Litter	45	43	50	28	56	74	33	33	38
Bare soil					3				
Rock	9	28	5	2	10	13	5	2	2
TOTALS	95	96	94	97	98	98	97	97	94
TOTAL VEGETATION COVER	41	26	40	67	29	12	59	63	55
GROUND COVER (Litter + Rock + Veg + St.D)	95	96	94	97	95	98	97	97	94
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE = 51.2 Std.Dev. = 9.0)	58	70	59	53	42	33	61	60	57

*P = Present within plot, but not quantitatively encountered.

Table D. Understory Cover Data - Community D, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*							
	----- SAMPLE NUMBER -----							
	D3D420	D3D425	DAKR10	LJCNW15	LOSH01	WTRT01	WTRT15	WTRT20
NATIVE ANNUAL & BIENNIAL FORBS								
<i>Chenopodium leptophyllum</i>		P						
<i>Erigeron divergens</i>				2				
<i>Frasera speciosa</i>								
<i>Grindelia squarrosa</i>	1	P	2	1	1	P		P
<i>Oligosporus pacificus</i>								
<i>Oreocarya virgata</i>								
<i>Plantago patagonica</i>							P	
<i>Silene antirrhina</i>		P						
TOTAL NATIVE ANN. & BIEN. FORBS	P	P	2	3	P	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS								
<i>Acosta diffusa</i>		P			P	P		
<i>Alyssum alyssoides</i>	P		P					
<i>Alyssum parviflorum</i>						P		
<i>Alyssum spp.</i>	1							
<i>Bassia sieversiana</i>								
<i>Camelina microcarpa</i>	P			1				P
<i>Carduus nutans ssp. macrolepis</i>	P			P	P			1
<i>Cynoglossum officinale</i>	1	1		P				P
<i>Dianthus armeria</i>								
<i>Fallopia convolvulus</i>	P							
<i>Lactuca serriola</i>		P		P			P	P
<i>Neolepia campestre</i>				P				P
<i>Tragopogon dubius ssp. major</i>	P	1	P	1	1	P	1	1
<i>Verbascum thapsus</i>		P			P	P	P	P
TOTAL INTRO. ANN. & BIEN. FORBS	P	P	P	P	P	P	P	1
INTRODUCED ANNUAL GRASSES								
<i>Anisantha tectorum</i>			1	1		1		
<i>Bromus briziformis</i>	P			1				
<i>Bromus japonicus</i>	P	1		1	3	P	1	2
TOTAL INTRO. ANN. GRASSES	P	P	P	2	3	1	1	2
NATIVE PERENNIAL FORBS								
<i>Acetosella vulgaris</i>								
<i>Achillea lanulosa</i>	3	P		P		P		P
<i>Adenolinum lewisii</i>			1				P	P
<i>Aletes acaulis</i>				P				
<i>Allium cernuum</i>	P							
<i>Ambrosia psilostachya var. coronopifolia</i>	1	2	2	P	1	1	2	2
<i>Amerosedum lanceolatum</i>								
<i>Antennaria spp.</i>	P					1		
<i>Apocynum androsaemifolium</i>					P			
<i>Artemisia frigida</i>		P	P			P	P	1
<i>Artemisia ludoviciana</i>	1	1	2	1	3	2	P	P
<i>Asclepias pumila</i>							2	
<i>Asclepias spp.</i>								
<i>Asclepias stenophylla</i>					P			P
<i>Asclepias viridiflora</i>								
<i>Aster laevis var. geyeri</i>								
<i>Aster porteri</i>	1	8	1					
<i>Astragalus flexuosus</i>		P						
<i>Astragalus spp.</i>			P					
<i>Brickellia rosmarinifolia ssp. chlorolepis</i>								
<i>Calochortus gunnisonii</i>						P		
<i>Calylophus serrulatus</i>					1			
<i>Campanula rotundifolia</i>	1					P		
<i>Cerastium strictum</i>	P		P	P				
<i>Cirsium ochrocentrum</i>			P	P	P	P	P	1
<i>Comandra umbellata ssp. pallida</i>		1	P					
<i>Corallorhiza maculata</i>				P				
<i>Dalea purpurea</i>		1			P	1	P	P
<i>Drymocallis fissa</i>	P		2		P			
<i>Eremogone fendleri</i>					P			

Table D. Understory Cover Data - Community D, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*							
	----- SAMPLE NUMBER -----							
	D3D420	D3D425	DAKR10	LJCNW15	LOSH01	WTRT01	WTRT15	WTRT20
NATIVE PERENNIAL FORBS (concluded)								
Erigeron spp.						P	2	P
Eriogonum spp.				P				
Eriogonum umbellatum		P			1	1		
Gaillardia aristata	P					1		
Galium spp.				P				
Geranium caespitosum ssp. caespitosum						P		
Gutierrezia sarothrae		1	P				P	
Harbouria trachypleura			P					
Helianthus pumilus		P	2					P
Heterotheca foliosa								
Heterotheca villosa			P		P	P	P	
Heuchera spp.								
Iris missouriensis								
Lathyrus spp.		P	1					
Lesquerella montana					P	P		
Liatris punctata		P	1	P	1	P		
Lithospermum multiflorum								
Lupinus argenteus								
Mertensia lanceolata						P		
Monarda fistulosa var. menthifolia								
Oligoneuron rigidum								
Oligosporus dracunculus ssp. glaucus		P	P			P		
Onosmodium molle ssp. occidentale		P	P					1
Oxalis dillenii	1	1		P	1		P	P
Oxybaphus hirsutus								
Oxybaphus spp.								
Oxytropis lambertii								
Packera fendleri								
Penstemon secundiflorus						P		
Penstemon spp.					P			
Penstemon virens	1	P	1		P			
Phacelia heterophylla	P			P	P		P	2
Physalis virginiana								
Pneumonanthe bigelovii	P		P					
Psoraleidium tenuiflorum	P	2	1	P	1	2	1	1
Pulsatilla patens ssp. hirsutissima	P							
Ratibida columnifera		1	P			P	P	P
Scutellaria brittonii			P					
Solidago missouriensis								
Solidago spp.								
Thermopsis divaricarpa				P		P		
Tithymalus spathulatus				1				
Tradescantia occidentalis				P	P	1		P
Tragia ramosa			1		1			1
Viola nuttallii				P				
Viola spp.								
Virgulus falcatus	P	1	2					
TOTAL NATIVE PERENNIAL FORBS	10	13	10	2	4	5	6	4
INTRODUCED PERENNIAL FORBS								
Asparagus officinalis	P							
Brexa arvensis								
Hypericum perforatum	1	P		P	P	P	P	P
Potentilla recta		1						
Taraxacum officinale	P	P						
Verbena bracteata							P	
TOTAL INTRO. PERENNIAL FORBS	P	P	---	P	P	P	P	P

Table D. Understory Cover Data - Community D, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*							
	----- SAMPLE NUMBER -----							
	D3D420	D3D425	DAKR10	LJCNW15	LOSH01	WTRT01	WTRT15	WTRT20
NATIVE PERENNIAL GRASSES (cool)								
Achnatherum nelsonii	P	P	6					
Agrostis spp.	1							
Bromopsis canadensis				P				
Bromopsis lanatipes	P		P					
Carex pensylvanica ssp. heliophila								
Carex spp.	3	2	1	5	3	5	3	5
Dicanthelium oligosanthes var. scribnerianum				1			1	
Elymus canadensis								
Elymus elymoides	2		P		P			
Elymus lanceolatus fm. albicans				2				
Elymus trachycaulus								
Hesperostipa comata			5	3		2	2	2
Hesperostipa spartea								
Juncus interior					P			
Koeleria macrantha	P	P	1	P	1		P	
Nassella viridula								
Pascopyrum smithii	P	3					1	1
Poa agassizensis	2	9	3	2	3	3	2	5
Poa compressa	P	1	1	3	2	1	5	3
TOTAL NATIVE PERENNIAL GRASSES (c)	7	15	14	15	7	9	13	15
INTRODUCED PERENNIAL GRASSES (cool)								
Bromopsis inermis								
Dactylis glomerata								
Phleum pratense								
Thinopyrum intermedium								
TOTAL INTRO. PERENNIAL GRASSES (c)	---	---	---	---	---	---	---	---
NATIVE PERENNIAL GRASSES (warm)								
Andropogon gerardii	10	21	2	7	5	16	12	10
Aristida purpurea							P	
Bouteloua curtipendula		P	P		2		1	
Chondrosium gracile		1			1		1	
Dichanthelium linearifolium					2			
Muhlenbergia montana	P			2	1		2	
Muhlenbergia wrightii							2	
Panicum virgatum					2			
Schizachyrium scoparium			P		P		P	1
Sorghastrum avenaceum						8		
Sporobolus cryptandrus								
Sporobolus heterolepis								
Sporobolus spp.					2		4	
TOTAL NATIVE PERENNIAL GRASSES (w)	10	21	2	8	13	23	22	10
NATIVE SHRUBS								
Acer glabrum								
Amelanchier alnifolia								
Amorpha nana							P	P
Ceanothus fendleri								
Ceanothus herbaceus								
Cercocarpus montanus				1				
Crataegus spp.			P					
Mahonia repens	P		3					
Oreobatus deliciosus	3			P				
Padus virginiana ssp. melanocarpa			1					
Prunus americana								
Rhus aromatica ssp. trilobata	18	11	1	7	3	6	P	P
Ribes cereum	1		P		P	P	P	2
Rosa woodsii	P	P	P		P		P	
Symphoricarpos occidentalis	P		4		P			1
Toxicodendron rydbergii				P				
Yucca glauca			1	1		1	1	1
TOTAL NATIVE SHRUBS	21	11	7	7	3	7	1	2

Table D. Understory Cover Data - Community D, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*							
	----- SAMPLE NUMBER -----							
	D3D420	D3D425	DAKR10	LJCNW15	LOSH01	WTRT01	WTRT15	WTRT20
NATIVE TREES								
Celtis reticulata	1		P					
Negundo aceroides ssp. interius								
Pinus ponderosa ssp. scopulorum	1	1	1	1	1	2	1	1
Pseudotsuga menziesii								
Sabina scopulorum	P							
TOTAL NATIVE TREES	P	P	P	1	1	2	P	1
FERNS								
Cystopteris fragilis				P				
TOTAL FERNS	---	---	---	P	---	---	---	---
SUCCULENT								
Echinocereus viridiflorus						P	P	
Opuntia fragilis		P				P	P	
Opuntia macrorhiza	P	P	P	1	2	1	1	1
Opuntia polyacantha			P					
TOTAL SUCCULENT	P	P	P	P	2	P	1	P
UNKNOWN SPECIES								
Unknown forb								1
Unknown grass					3			
Unknown grass 1								
Unknown grass 2						2		
TOTAL UNKNOWN SPECIES	---	---	---	---	3	2	---	1
Litter	44	33	36	48	54	37	49	55
Bare soil			8	1			4	
Rock	4	3	15	12	8	12	7	5
TOTALS	95	94	92	97	95	96	101	95
TOTAL VEGETATION COVER	47	59	34	37	34	48	43	35
GROUND COVER (Litter + Rock + Veg + St.D)	95	94	85	97	95	96	98	95
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE = 51.2 Std.Dev. = 9.0)	52	46	52	47	48	45	45	42

*P=Present within plot, but not quantitatively encountered.

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
NATIVE ANNUAL & BIENNIAL FORBS			
<i>Bahia dissecta</i>	0.00	3.17	0.00
<i>Chenopodium leptophyllum</i>	0.00	3.17	0.00
<i>Chenopodium</i> spp.	0.00	4.76	0.00
<i>Collinsia parviflora</i>	0.00	3.17	0.00
<i>Collomia linearis</i>	0.00	3.17	0.00
<i>Erigeron divergens</i>	0.00	1.59	0.00
<i>Frasera speciosa</i>	0.00	14.29	0.00
<i>Grindelia squarrosa</i>	0.05	63.49	0.19
<i>Oligosporus pacificus</i>	0.00	1.59	0.00
<i>Oreocarya virgata</i>	0.00	14.29	0.00
<i>Polygonum douglasii</i>	0.00	1.59	0.00
<i>Pterogonum alatum</i>	0.00	1.59	0.00
<i>Silene antirrhina</i>	0.00	19.05	0.00
TOTAL NATIVE ANN. & BIEN. FORBS	0.0	4.8	0.2
INTRODUCED ANNUAL & BIENNIAL FORBS			
<i>Acosta diffusa</i>	0.00	4.76	0.00
<i>Acosta maculosa</i>	0.00	1.59	0.00
<i>Alyssum alyssoides</i>	0.00	6.35	0.00
<i>Alyssum parviflorum</i>	0.00	3.17	0.00
<i>Alyssum</i> spp.	0.00	3.17	0.00
<i>Bassia sieversiana</i>	0.00	1.59	0.00
<i>Camelina microcarpa</i>	0.00	3.17	0.00
<i>Carduus nutans</i> ssp. <i>macrolepis</i>	0.00	49.21	0.00
<i>Cirsium vulgare</i>	0.00	3.17	0.00
<i>Cynoglossum officinale</i>	0.00	22.22	0.00
<i>Fallopia convolvulus</i>	0.00	6.35	0.00
<i>Lactuca serriola</i>	0.02	19.05	0.09
<i>Neolepia campestre</i>	0.00	4.76	0.00
<i>Tragopogon dubius</i> ssp. <i>major</i>	0.00	57.14	0.00
<i>Turritis glabra</i>	0.00	1.59	0.00
<i>Verbascum thapsus</i>	0.03	60.32	0.13
TOTAL INTRO. ANN. & BIEN. FORBS	0.1	3.2	0.2
INTRODUCED ANNUAL GRASSES			
<i>Anisantha tectorum</i>	0.50	46.03	1.99
<i>Bromus briziformis</i>	0.00	12.70	0.00
<i>Bromus japonicus</i>	0.10	41.27	0.38
TOTAL INTRO. ANN. GRASSES	0.6	15.9	2.4
NATIVE PERENNIAL FORBS			
<i>Acetosella vulgaris</i>	0.04	1.59	0.16
<i>Achillea lanulosa</i>	0.16	74.60	0.63
<i>Adenolinum lewisii</i>	0.00	1.59	0.00
<i>Aletes acaulis</i>	5.07	76.19	20.22
<i>Allium cernuum</i>	0.00	58.73	0.00
<i>Allium</i> spp.	0.07	14.29	0.28
<i>Allium textile</i>	0.02	1.59	0.06
<i>Ambrosia psilostachya</i> var. <i>coronopifolia</i>	0.21	52.38	0.85
<i>Amerosedum lanceolatum</i>	0.00	11.11	0.00
<i>Anaphalis margaritacea</i>	0.00	20.63	0.00
<i>Antennaria</i> spp.	0.06	46.03	0.22
<i>Apocynum androsaemifolium</i>	0.02	14.29	0.09
<i>Arnica fulgens</i>	0.02	14.29	0.09
<i>Artemisia frigida</i>	0.05	34.92	0.19
<i>Artemisia ludoviciana</i>	0.35	85.71	1.39
<i>Asclepias stenophylla</i>	0.00	3.17	0.00
<i>Aster laevis</i> var. <i>geyeri</i>	0.00	1.59	0.00
<i>Aster porteri</i>	0.06	25.40	0.22
<i>Astragalus adsurgens</i> var. <i>robustior</i>	0.00	4.76	0.00
<i>Astragalus agrestis</i>	0.00	1.59	0.00
<i>Astragalus flexuosus</i>	0.00	3.17	0.00
<i>Astragalus tenellus</i>	0.00	1.59	0.00
<i>Brickellia grandiflora</i>	0.00	1.59	0.00

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
NATIVE PERENNIAL FORBS (continued)			
<i>Calochortus gunnisonii</i>	0.00	9.52	0.00
<i>Campanula rotundifolia</i>	0.21	84.13	0.82
<i>Cerastium strictum</i>	0.10	57.14	0.41
<i>Chlorocrepis albiflora</i>	0.00	15.87	0.00
<i>Cirsium ochrocentrum</i>	0.00	15.87	0.00
<i>Comandra umbellata</i> ssp. <i>pallida</i>	0.00	3.17	0.00
<i>Corallorhiza maculata</i>	0.00	14.29	0.00
<i>Coriflora hirsutissima</i>	0.00	1.59	0.00
<i>Dalea purpurea</i>	0.00	7.94	0.00
<i>Drymocallis arguta</i>	0.00	1.59	0.00
<i>Drymocallis fissa</i>	0.13	69.84	0.51
<i>Eremogone fendleri</i>	0.00	12.70	0.00
<i>Erigeron colo-mexicanus</i>	0.00	1.59	0.00
<i>Erigeron flagellaris</i>	0.00	1.59	0.00
<i>Erigeron speciosus</i>	0.00	1.59	0.00
<i>Erigeron</i> spp.	0.02	17.46	0.09
<i>Eriogonum flavum</i> var. <i>flavum</i>	0.02	17.46	0.09
<i>Eriogonum</i> spp.	0.00	3.17	0.00
<i>Eriogonum umbellatum</i>	0.00	22.22	0.00
<i>Erysimum capitatum</i>	0.00	4.76	0.00
<i>Gaillardia aristata</i>	0.00	31.75	0.00
<i>Galium aparine</i>	0.00	4.76	0.00
<i>Galium septentrionale</i>	0.04	9.52	0.16
<i>Galium</i> spp.	0.00	7.94	0.00
<i>Geranium caespitosum</i> ssp. <i>caespitosum</i>	0.00	36.51	0.00
<i>Glycyrrhiza lepidota</i>	0.33	3.17	1.30
<i>Gutierrezia sarothrae</i>	0.00	11.11	0.00
<i>Harbouria trachypleura</i>	0.06	74.60	0.22
<i>Helianthus pumilus</i>	0.03	12.70	0.13
<i>Helianthus</i> spp.	0.00	1.59	0.00
<i>Heliomeris multiflora</i>	0.00	1.59	0.00
<i>Heterotheca foliosa</i>	0.00	6.35	0.00
<i>Heterotheca villosa</i>	0.21	69.84	0.82
<i>Heuchera</i> spp.	0.00	6.35	0.00
<i>Iris missouriensis</i>	0.00	9.52	0.00
<i>Lathyrus leucanthus</i>	0.02	1.59	0.06
<i>Lathyrus</i> spp.	0.38	30.16	1.52
<i>Lesquerella montana</i>	0.00	12.70	0.00
<i>Liatris punctata</i>	0.06	41.27	0.22
<i>Ligusticum porteri</i>	0.00	1.59	0.00
<i>Lithospermum incisum</i>	0.00	3.17	0.00
<i>Lithospermum multiflorum</i>	0.00	3.17	0.00
<i>Lomatium orientale</i>	0.00	1.59	0.00
<i>Lupinus argenteus</i>	0.00	14.29	0.00
<i>Maianthemum</i> spp.	0.00	1.59	0.00
<i>Maianthemum stellatum</i>	0.00	1.59	0.00
<i>Mertensia lanceolata</i>	0.00	20.63	0.00
<i>Monarda fistulosa</i> var. <i>menthifolia</i>	0.30	26.98	1.20
<i>Nothocalais cuspidata</i>	0.00	1.59	0.00
<i>Oligosporus dracunculus</i> ssp. <i>glaucus</i>	0.00	4.76	0.00
<i>Onosmodium molle</i> ssp. <i>occidentale</i>	0.00	9.52	0.00
<i>Osmorhiza depauperata</i>	0.02	1.59	0.06
<i>Oxalis dillenii</i>	0.00	7.94	0.00
<i>Oxytropis lambertii</i>	0.00	1.59	0.00
<i>Packera fendleri</i>	0.00	17.46	0.00
<i>Paronychia jamesii</i>	0.00	3.17	0.00
<i>Penstemon</i> spp.	0.00	1.59	0.00
<i>Penstemon virens</i>	0.22	76.19	0.89
<i>Phacelia heterophylla</i>	0.00	38.10	0.00
<i>Phlox multiflora</i>	0.00	1.59	0.00
<i>Physalis hederifolia</i> var. <i>comata</i>	0.00	6.35	0.00
<i>Physalis</i> spp.	0.00	9.52	0.00
<i>Physalis virginiana</i>	0.00	3.17	0.00
<i>Pneumonanthe bigelovii</i>	0.00	3.17	0.00

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
NATIVE PERENNIAL FORBS (concluded)			
<i>Pseudognaphalium canescens</i>	0.00	3.17	0.00
<i>Pseudostellaria jamesiana</i>	0.00	1.59	0.00
<i>Psoraleidium tenuiflorum</i>	0.18	23.81	0.73
<i>Pterospora andromedea</i>	0.00	6.35	0.00
<i>Pulsatilla patens</i> ssp. <i>hirsutissima</i>	0.02	28.57	0.09
<i>Ratibida columnifera</i>	0.00	1.59	0.00
<i>Rubus idaeus</i> ssp. <i>melanolasius</i>	0.32	15.87	1.27
<i>Rumex crispus</i>	0.00	3.17	0.00
<i>Scrophularia lanceolata</i>	0.00	1.59	0.00
<i>Scutellaria brittonii</i>	0.02	19.05	0.06
<i>Senecio integerrimus</i>	0.00	3.17	0.00
<i>Senecio spartioides</i>	0.00	1.59	0.00
<i>Senecio</i> spp.	0.00	4.76	0.00
<i>Silene scouleri</i> ssp. <i>hallii</i>	0.00	1.59	0.00
<i>Solidago nana</i>	0.04	6.35	0.16
<i>Solidago</i> spp.	0.02	33.33	0.06
<i>Thalictrum fendleri</i>	0.00	1.59	0.00
<i>Thermopsis divaricarpa</i>	0.10	12.70	0.38
<i>Townsendia grandiflora</i>	0.00	1.59	0.00
<i>Toxicoscordion venenosum</i>	0.00	1.59	0.00
<i>Tradescantia occidentalis</i>	0.00	1.59	0.00
<i>Tragia ramosa</i>	0.02	3.17	0.06
<i>Viola</i> spp.	0.00	4.76	0.00
<i>Virgulus falcatus</i>	0.00	1.59	0.00
TOTAL NATIVE PERENNIAL FORBS	9.0	85.7	35.7
INTRODUCED PERENNIAL FORBS			
<i>Brexa arvensis</i>	0.28	33.33	1.11
<i>Convolvulus arvensis</i>	0.00	1.59	0.00
<i>Hypericum formosum</i>	0.00	1.59	0.00
<i>Hypericum perforatum</i>	0.00	19.05	0.00
<i>Linaria genistifolia</i> ssp. <i>dalmatica</i>	0.00	1.59	0.00
<i>Nepeta cataria</i>	0.00	3.17	0.00
<i>Pseudognaphalium viscosum</i>	0.00	1.59	0.00
<i>Saponaria officinalis</i>	0.00	1.59	0.00
<i>Taraxacum officinale</i>	0.00	20.63	0.00
<i>Tithymalus myrsinites</i>	0.00	1.59	0.00
TOTAL INTRO. PERENNIAL FORBS	0.3	11.1	1.1
NATIVE PERENNIAL GRASSES (cool)			
<i>Achnatherum nelsonii</i>	0.23	53.97	0.92
<i>Achnatherum scribneri</i>	0.08	9.52	0.32
<i>Bromopsis lanatipes</i>	0.04	39.68	0.16
<i>Bromopsis</i> spp.	0.00	1.59	0.00
<i>Carex brevior</i>	0.02	3.17	0.09
<i>Carex foenea</i>	0.00	1.59	0.00
<i>Carex occidentalis</i>	0.02	7.94	0.06
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>	0.03	7.94	0.13
<i>Carex petasata</i>	0.12	1.59	0.47
<i>Carex</i> spp.	3.05	95.24	12.15
<i>Danthonia parryi</i>	0.00	1.59	0.00
<i>Dicanthelium oligosanthes</i> var. <i>scribnerianum</i>	0.00	3.17	0.00
<i>Elymus canadensis</i>	0.00	9.52	0.00
<i>Elymus elymoides</i>	0.07	68.25	0.28
<i>Elymus glaucus</i>	0.00	1.59	0.00
<i>Elymus lanceolatus</i> fm. <i>albicans</i>	0.03	11.11	0.13
<i>Elymus longifolius</i>	0.00	4.76	0.00
<i>Elymus trachycaulus</i>	0.05	19.05	0.19
<i>Hesperostipa comata</i>	0.16	31.75	0.63
<i>Hesperostipa spartea</i>	0.00	6.35	0.00
<i>Juncus acuminatus</i>	0.00	1.59	0.00
<i>Juncus arcticus</i> ssp. <i>ater</i>	0.00	1.59	0.00
<i>Juncus interior</i>	0.06	3.17	0.25
<i>Koeleria macrantha</i>	0.05	38.10	0.19

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
NATIVE PERENN. GRASSES (cool)[concluded]			
<i>Leucopoa kingii</i>	0.37	36.51	1.49
<i>Leymus ambiguus</i>	0.13	17.46	0.54
<i>Nassella viridula</i>	0.00	6.35	0.00
<i>Pascopyrum smithii</i>	0.03	3.17	0.13
<i>Poa agassizensis</i>	0.67	60.32	2.69
<i>Poa compressa</i>	0.32	53.97	1.27
<i>Poa cusickii</i> ssp. <i>epilis</i>	0.00	3.17	0.00
<i>Poa</i> spp.	0.00	1.59	0.00
TOTAL NATIVE PERENNIAL GRASSES (c)	5.5	87.3	22.1
INTRODUCED PERENNIAL GRASSES (cool)			
<i>Agropyron cristatum</i> ssp. <i>desertorum</i>	0.02	3.17	0.06
<i>Agrostis gigantea</i>	0.00	1.59	0.00
<i>Arrhenatherum elatius</i>	0.00	3.17	0.00
<i>Bromopsis inermis</i>	0.47	12.70	1.87
<i>Dactylis glomerata</i>	0.00	6.35	0.00
<i>Elytrigia repens</i>	0.14	17.46	0.57
<i>Phleum pratense</i>	0.28	39.68	1.11
<i>Poa pratensis</i>	0.00	1.59	0.00
<i>Thinopyrum intermedium</i>	0.03	3.17	0.13
TOTAL INTRO. PERENNIAL GRASSES (c)	0.9	17.5	3.7
NATIVE PERENNIAL GRASSES (warm)			
<i>Andropogon gerardii</i>	0.52	49.21	2.09
<i>Aristida</i> spp.	0.00	1.59	0.00
<i>Bouteloua curtipendula</i>	0.02	6.35	0.06
<i>Chondrosium gracile</i>	0.00	3.17	0.00
<i>Dichanthelium linearifolium</i>	0.00	1.59	0.00
<i>Dichanthelium</i> spp.	0.00	3.17	0.00
<i>Muhlenbergia montana</i>	0.13	49.21	0.54
<i>Muhlenbergia wrightii</i>	0.02	7.94	0.06
<i>Panicum virgatum</i>	0.02	1.59	0.09
<i>Schizachyrium scoparium</i>	0.12	38.10	0.47
<i>Sorghastrum avenaceum</i>	0.13	12.70	0.54
<i>Sporobolus cryptandrus</i>	0.00	6.35	0.00
<i>Sporobolus heterolepis</i>	0.18	3.17	0.73
TOTAL NATIVE PERENNIAL GRASSES (w)	1.2	36.5	4.6
NATIVE SUBSHRUBS			
<i>Brickellia californica</i>	0.00	1.59	0.00
TOTAL NATIVE SUBSHRUBS	0.0	0.0	0.0
NATIVE SHRUBS			
<i>Acer glabrum</i>	0.00	9.52	0.00
<i>Amorpha nana</i>	0.00	3.17	0.00
<i>Arctostaphylos uva-ursi</i>	0.11	11.11	0.44
<i>Ceanothus fendleri</i>	0.58	63.49	2.31
<i>Cercocarpus montanus</i>	0.15	9.52	0.60
<i>Chrysothamnus nauseosus</i>	0.00	1.59	0.00
<i>Crocanthemum bicknellii</i>	0.10	1.59	0.38
<i>Holodiscus discolor</i>	0.00	1.59	0.00
<i>Jamesia americana</i>	0.00	1.59	0.00
<i>Juniperus communis</i> ssp. <i>alpina</i>	0.22	19.05	0.89
<i>Mahonia repens</i>	1.46	57.14	5.82
<i>Oreobatus deliciosus</i>	0.06	33.33	0.25
<i>Padus virginiana</i> ssp. <i>melanocarpa</i>	0.78	50.79	3.10
<i>Physocarpus monogynus</i>	0.00	1.59	0.00
<i>Prunus americana</i>	0.10	3.17	0.41
<i>Rhus aromatica</i> ssp. <i>trilobata</i>	0.25	34.92	1.01
<i>Rhus glabra</i>	0.00	7.94	0.00
<i>Ribes cereum</i>	0.09	71.43	0.35
<i>Rosa woodsii</i>	0.07	46.03	0.28
<i>Symphoricarpos occidentalis</i>	0.54	31.75	2.15
<i>Toxicodendron rydbergii</i>	0.02	9.52	0.09
<i>Yucca glauca</i>	0.02	15.87	0.06
TOTAL NATIVE SHRUBS	4.6	63.5	18.2

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)
INTRODUCED SHRUBS			
<i>Colutea arborescens</i>	0.00	3.17	0.00
TOTAL INTRODUCED SHRUBS	0.0	0.0	0.0
NATIVE TREES			
<i>Cerasus pensylvanica</i>	0.00	1.59	0.00
<i>Pinus ponderosa</i> ssp. <i>scopulorum</i>	1.40	100.00	5.60
<i>Pseudotsuga menziesii</i>	0.93	50.79	3.70
<i>Sabina scopulorum</i>	0.17	28.57	0.66
TOTAL NATIVE TREES	2.5	77.8	10.0
NATIVE VINES			
<i>Clematis ligusticifolia</i>	0.00	1.59	0.00
TOTAL NATIVE VINES	0.0	0.0	0.0
FERNS			
<i>Cystopteris fragilis</i>	0.00	19.05	0.00
<i>Selaginella densa</i>	0.02	4.76	0.09
TOTAL FERNS	0.0	1.6	0.1
SUCCULENT			
<i>Coryphantha missouriensis</i>	0.00	1.59	0.00
<i>Opuntia fragilis</i>	0.00	1.59	0.00
<i>Opuntia macrorhiza</i>	0.06	66.67	0.25
<i>Opuntia polyacantha</i>	0.00	17.46	0.00
TOTAL SUCCULENT	0.1	6.3	0.3
EPIPHYTE(PARASITE)			
<i>Corallorhiza</i> spp.	0.00	3.17	0.00
TOTAL EPIPHYTE(PARASITE)	0.0	0.0	0.0
UNKNOWN SPECIES			
Unknown forb	0.17	6.35	0.70
Unknown forb 1	0.02	1.59	0.06
Unknown grass	0.10	6.35	0.38
Unknown grass 1	0.04	1.59	0.16
Unknown grass 2	0.02	1.59	0.06
Unknown grass 3	0.03	1.59	0.13
TOTAL UNKNOWN SPECIES	0.4	14.3	1.5
Litter	62.05	100.00	
Bare soil	0.50	34.92	
Rock	8.21	96.83	
Water	0.58	12.70	
TOTALS	96.4		
TOTAL VEGETATION COVER	25.1 (s = 15.1)		100.0
GROUND COVER (Litter + Rock + Veg + St.D)	95.9		
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE = 39.9 Std.Dev. = 10.9)			

Page 6 of 40

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Page 7 of 40

PLANT SPECIES	Percent Foliar Cover*									
	----- SAMPLE NUMBER -----									
	D18105	D201	D3D405	D3D430	ELDOE01	ELDOE10	LINN01	LJCNW01	MRL15	
NATIVE PERENNIAL FORBS (continued)										
Calochortus gunnisonii					P			P		
Campanula rotundifolia	1	P	P	P	P	P	P	1	P	
Cerastium strictum	P		P	P	P	P			P	
Chlorocrepis albiflora				P						
Cirsium ochrocentrum								P		
Comandra umbellata ssp. pallida		P								
Corallorhiza maculata									P	
Coriflora hirsutissima										
Dalea purpurea	P	P								
Drymocallis arguta										
Drymocallis fissa	P	P	P	P	1	1		P	P	
Eremogone fendleri			P		P				P	
Erigeron colo-mexicanus										
Erigeron flagellaris						P				
Erigeron speciosus										
Erigeron spp.	1	2								
Eriogonum flavum var. flavum							P			
Eriogonum spp.					P				P	
Eriogonum umbellatum		P			P	P	P			
Erysimum capitatum										
Gaillardia aristata					P			P		
Galium aparine							P			
Galium septentrionale						P				
Galium spp.								P	P	
Geranium caespitosum ssp. caespitosum				P	1	P	P		P	
Glycyrrhiza lepidota										
Gutierrezia sarothrae	P			P						
Harbouria trachypleura			P		P	P	P		P	
Helianthus pumilus		2								
Helianthus spp.										
Heliomeris multiflora						P				
Heterotheca foliosa						P				
Heterotheca villosa		P	P	3	P			P		
Heuchera spp.										
Iris missouriensis							P			
Lathyrus leucanthus										
Lathyrus spp.					1					
Lesquerella montana					P					
Liatris punctata	P	1		P	P	P				
Ligusticum porteri										
Lithospermum incisum										
Lithospermum multiflorum										
Lomatium orientale								P		
Lupinus argenteus										
Maianthemum spp.										
Maianthemum stellatum										
Mertensia lanceolata						P	P	1	1	
Monarda fistulosa var. menthifolia	2					1				
Nothocalais cuspidata								P		
Oligosporus dracunculus ssp. glaucus	P	P								
Onosmodium molle ssp. occidentale										
Osmorhiza depauperata										
Oxalis dillenii	P			P				P		
Oxytropis lambertii										
Packera fendleri				P						
Paronychia jamesii		P								
Penstemon spp.		P								
Penstemon virens	1		P	P	P	1	P	1	P	
Phacelia heterophylla		P	P	P	P					
Phlox multiflora										
Physalis hederifolia var. comata										
Physalis spp.										
Physalis virginiana	P									
Pneumonanthe bigelovii								P		

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	D18105	D201	D3D405	D3D430	ELDOE01	ELDOE10	LINN01	LJCNW01	MRL15
NATIVE PERENNIAL FORBS (concluded)									
<i>Pseudognaphalium canescens</i>									
<i>Pseudostellaria jamesiana</i>									
<i>Psoralidium tenuiflorum</i>	7	3						P	
<i>Pterospora andromedea</i>			P			P			
<i>Pulsatilla patens</i> ssp. <i>hirsutissima</i>	P	P			P	P			P
<i>Ratibida columnifera</i>		P							
<i>Rubus idaeus</i> ssp. <i>melanolasius</i>									
<i>Rumex crispus</i>									
<i>Scrophularia lanceolata</i>									
<i>Scutellaria brittonii</i>				1		P			
<i>Senecio integerrimus</i>								P	1
<i>Senecio spartioides</i>									
<i>Senecio</i> spp.									
<i>Silene scouleri</i> ssp. <i>hallii</i>									
<i>Solidago nana</i>		P							
<i>Solidago</i> spp.			P	P					
<i>Thalictrum fendleri</i>									
<i>Thermopsis divaricarpa</i>									
<i>Townsendia grandiflora</i>									
<i>Toxicoscordion venenosum</i>								P	
<i>Tradescantia occidentalis</i>									
<i>Tragia ramosa</i>									
<i>Viola</i> spp.					P	P	P		
<i>Virgulus falcatus</i>						P			
TOTAL NATIVE PERENNIAL FORBS	27	13	3	17	7	7	---	15	1
INTRODUCED PERENNIAL FORBS									
<i>Brexa arvensis</i>									
<i>Convolvulus arvensis</i>									
<i>Hypericum formosum</i>									
<i>Hypericum perforatum</i>	1	P		1	P	P		1	
<i>Linaria genistifolia</i> ssp. <i>dalmatica</i>									
<i>Nepeta cataria</i>						P			
<i>Pseudognaphalium viscosum</i>									
<i>Saponaria officinalis</i>									
<i>Taraxacum officinale</i>	P			P		1		P	
<i>Tithymalus myrsinites</i>									
TOTAL INTRO. PERENNIAL FORBS	---	---	---	---	---	---	---	---	---
NATIVE PERENNIAL GRASSES (cool)									
<i>Achnatherum nelsonii</i>	1		P	2	P	1	P		1
<i>Achnatherum scribneri</i>									
<i>Bromopsis lanatipes</i>									
<i>Bromopsis</i> spp.									
<i>Carex brevior</i>			2						
<i>Carex foenea</i>									
<i>Carex occidentalis</i>									
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>									
<i>Carex petasata</i>									
<i>Carex</i> spp.	1	6		2	4	8	1		3
<i>Danthonia parryi</i>						P			
<i>Dicanthelium oligosanthos</i> var. <i>scribnerianum</i>									
<i>Elymus canadensis</i>									
<i>Elymus elymoides</i>	P	P	1	P		P			
<i>Elymus glaucus</i>									
<i>Elymus lanceolatus</i> fm. <i>albicans</i>									
<i>Elymus longifolius</i>									
<i>Elymus trachycaulus</i>								1	
<i>Hesperostipa comata</i>	4	1	P	1	1			2	
<i>Hesperostipa spartea</i>									
<i>Juncus acuminatus</i>									
<i>Juncus arcticus</i> ssp. <i>ater</i>									
<i>Juncus interior</i>		P							
<i>Koeleria macrantha</i>		2	P		P			P	1

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	---- SAMPLE NUMBER ----								
	D18105	D201	D3D405	D3D430	ELDOE01	ELDOE10	LINN01	LJCNW01	MRL15
NATIVE PERENN. GRASSES (cool)[conclude]									
<i>Leucopoa kingii</i>			1						
<i>Leymus ambiguus</i>			2				P		P
<i>Nassella viridula</i>									
<i>Pascopyrum smithii</i>	2								
<i>Poa agassizensis</i>	3	4	P	1	P	2			
<i>Poa compressa</i>	1	P	P	P	P	1		1	
<i>Poa cusickii</i> ssp. <i>epilis</i>									
<i>Poa</i> spp.									
TOTAL NATIVE PERENNIAL GRASSES (c)	12	11	5	4	4	10	---	3	3
INTRODUCED PERENNIAL GRASSES (cool)									
<i>Agropyron cristatum</i> ssp. <i>desertorum</i>									
<i>Agrostis gigantea</i>									
<i>Arrhenatherum elatius</i>									
<i>Bromopsis inermis</i>	P								
<i>Dactylis glomerata</i>	P								
<i>Elytrigia repens</i>									
<i>Phleum pratense</i>	2					P			
<i>Poa pratensis</i>									
<i>Thinopyrum intermedium</i>									
TOTAL INTRO. PERENNIAL GRASSES (c)	2	---	---	---	---	---	---	---	---
NATIVE PERENNIAL GRASSES (warm)									
<i>Andropogon gerardii</i>	2	10	P	1	P			1	P
<i>Aristida</i> spp.		P							
<i>Bouteloua curtipendula</i>	1	P							
<i>Chondrosium gracile</i>	P	P							
<i>Dichanthelium linearifolium</i>					1				
<i>Dichanthelium</i> spp.								1	
<i>Muhlenbergia montana</i>			1	2				1	P
<i>Muhlenbergia wrightii</i>	P								
<i>Panicum virgatum</i>									
<i>Schizachyrium scoparium</i>	P	P		P					
<i>Sorghastrum avenaceum</i>	P	4							
<i>Sporobolus cryptandrus</i>	P								
<i>Sporobolus heterolepis</i>		1							
TOTAL NATIVE PERENNIAL GRASSES (w)	2	15	---	3	---	---	---	---	---
NATIVE SUBSHRUBS									
<i>Brickellia californica</i>									
TOTAL NATIVE SUBSHRUBS	---	---	---	---	---	---	---	---	---
NATIVE SHRUBS									
<i>Acer glabrum</i>					P			P	
<i>Amorpha nana</i>									
<i>Arctostaphylos uva-ursi</i>					1				
<i>Ceanothus fendleri</i>					P	1			
<i>Cercocarpus montanus</i>	P							10	
<i>Chrysothamnus nauseosus</i>									
<i>Crocanthemum bicknellii</i>									
<i>Holodiscus discolor</i>									
<i>Jamesia americana</i>									
<i>Juniperus communis</i> ssp. <i>alpina</i>	5		1		1		P		5
<i>Mahonia repens</i>	1				1	1		5	P
<i>Oreobatus deliciosus</i>	1					P		2	
<i>Padus virginiana</i> ssp. <i>melanocarpa</i>	P				P	1	1	1	P
<i>Physocarpus monogynus</i>									
<i>Prunus americana</i>									
<i>Rhus aromatica</i> ssp. <i>trilobata</i>	1	2		P			P	1	
<i>Rhus glabra</i>					P			1	
<i>Ribes cereum</i>			P		P				1
<i>Rosa woodsii</i>	1	P	P	P		P	1	P	
<i>Symphoricarpos occidentalis</i>	P					P		P	
<i>Toxicodendron rydbergii</i>									
<i>Yucca glauca</i>		1	P					P	
TOTAL NATIVE SHRUBS	6	2	1	---	1	3	1	17	5

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	D18105	D201	D3D405	D3D430	ELDOE01	ELDOE10	LINN01	LJCNW01	MRL15
INTRODUCED SHRUBS									
Colutea arborescens									
TOTAL INTRODUCED SHRUBS	---	---	---	---	---	---	---	---	---
NATIVE TREES									
Cerasus pensylvanica									
Pinus ponderosa ssp. scopulorum	2	P	2	1	4	1	3	3	4
Pseudotsuga menziesii	1					P	P		
Sabina scopulorum	1		2	1			1	P	
TOTAL NATIVE TREES	2	---	3	---	4	1	3	3	4
NATIVE VINES									
Clematis ligusticifolia									
TOTAL NATIVE VINES	---	---	---	---	---	---	---	---	---
FERNS									
Cystopteris fragilis				P			P		P
Selaginella densa				1					2
TOTAL FERNS	---	---	---	---	---	---	---	---	2
SUCCULENT									
Coryphantha missouriensis									
Opuntia fragilis								P	
Opuntia macrorhiza	P	1	P	P	P	P		1	
Opuntia polyacantha	P			P					
TOTAL SUCCULENT	---	1	---	---	---	---	---	1	---
EPIPHYTE(PARASITE)									
Corallorhiza spp.									
TOTAL EPIPHYTE(PARASITE)	---	---	---	---	---	---	---	---	---
UNKNOWN SPECIES									
Unknown forb					3				
Unknown forb 1									1
Unknown grass									2
Unknown grass 1	3								
Unknown grass 2	1								
Unknown grass 3									
TOTAL UNKNOWN SPECIES	4	---	---	---	3	---	---	---	3
Litter	38	50	80	63	73	73	78	35	75
Bare soil				1				1	
Rock	3	7	8	10	4	2	16	23	7
Water									
TOTALS	93	97	98	97	95	96	98	95	98
TOTAL VEGETATION COVER	53	41	11	23	19	22	4	38	16
GROUND COVER (Litter + Rock + Veg + St.D	93	97	98	96	95	96	98	95	98
SPECIES DENSITY (# of species/100 sq.m.)	60	49	39	48	55	57	26	52	34
(AVERAGE = 39.9 Std.Dev. = 10.9)									

*P = Present within plot, but not quantitatively encountered.

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	PWRL01	PWRL05	PWRL10	PWRL15	PWRL20	PWRL25	S1001	S1005	S301
NATIVE ANNUAL & BIENNIAL FORBS									
Bahia dissecta									
Chenopodium leptophyllum									
Chenopodium spp.									
Collinsia parviflora									
Collomia linearis									
Erigeron divergens				P					
Frasera speciosa									
Grindelia squarrosa	P	P	P	1	P	P	1	1	
Oligosporus pacificus									
Oreocarya virgata			P				P		P
Polygonum douglasii									
Pterogonum alatum									
Silene antirrhina									
TOTAL NATIVE ANN. & BIEN. FORBS	---	---	---	1	---	---	---	---	---
INTRODUCED ANNUAL & BIENNIAL FORBS									
Acosta diffusa			P				P		
Acosta maculosa							P		
Alyssum alyssoides							P		
Alyssum parviflorum									
Alyssum spp.									
Bassia sieversiana									
Camelina microcarpa									
Carduus nutans ssp. macrolepis	P	P	P	P	1		P	P	P
Cirsium vulgare									
Cynoglossum officinale	P		P			1	P	P	
Fallopia convolvulus						1			
Lactuca serriola	P		P		P			P	
Neolepia campestre		P							
Tragopogon dubius ssp. major		P	P	P	P	P		P	
Turritia glabra									
Verbascum thapsus	1	P	P	P	1	P	P	P	P
TOTAL INTRO. ANN. & BIEN. FORBS	---	---	---	---	---	---	---	---	---
INTRODUCED ANNUAL GRASSES									
Anisantha tectorum	2				P			P	1
Bromus briziformis		P							
Bromus japonicus	P	1	1	2	P		1	P	P
TOTAL INTRO. ANN. GRASSES	2	---	---	2	---	---	---	---	---
NATIVE PERENNIAL FORBS									
Acetosella vulgaris									
Achillea lanulosa	P	1	2	1		1	P	P	
Adenolinum lewisii									
Aletes acaulis	2	8	3	4	9	P	2	P	
Allium cernuum	P	P	P	P	P		P	P	
Allium spp.		P						P	
Allium textile									
Ambrosia psilostachya var. coronopifolia	3	P	1	P		1	P	1	P
Amerosedum lanceolatum									
Anaphalis margaritacea								P	P
Antennaria spp.		P					P	1	
Apocynum androsaemifolium									
Arnica fulgens	P						P		
Artemisia frigida			P				P		
Artemisia ludoviciana	P	P	P	1	1	P	1	2	P
Asclepias stenophylla									
Aster laevis var. geyeri						P			
Aster porteri	1								P
Astragalus adsurgens var. robustior									
Astragalus agrestis							P		
Astragalus flexuosus									
Astragalus tenellus									
Brickellia grandiflora	P								

Page 12 of 40

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Page 13 of 40

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Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	PWRL01	PWRL05	PWRL10	PWRL15	PWRL20	PWRL25	S1001	S1005	S301
NATIVE PERENN. GRASSES (cool)[conclude									
<i>Leucopoa kingii</i>								4	
<i>Leymus ambiguus</i>				1		1		1	
<i>Nassella viridula</i>		P					P		
<i>Pascopyrum smithii</i>									
<i>Poa agassizensis</i>	1	P	1	1	P	P	3	2	P
<i>Poa compressa</i>	1	P					P	1	P
<i>Poa cusickii</i> ssp. <i>epilis</i>									
<i>Poa</i> spp.									
TOTAL NATIVE PERENNIAL GRASSES (c)	2	4	5	10	4	---	7	8	2
INTRODUCED PERENNIAL GRASSES (cool)									
<i>Agropyron cristatum</i> ssp. <i>desertorum</i>						P			
<i>Agrostis gigantea</i>									
<i>Arrhenatherum elatius</i>									
<i>Bromopsis inermis</i>					P				
<i>Dactylis glomerata</i>					P				
<i>Elytrigia repens</i>	1	P	1						1
<i>Phleum pratense</i>	P	2	10		P	1	P	P	1
<i>Poa pratensis</i>				P					
<i>Thinopyrum intermedium</i>						2			P
TOTAL INTRO. PERENNIAL GRASSES (c)	---	2	11	---	---	2	---	---	---
NATIVE PERENNIAL GRASSES (warm)									
<i>Andropogon gerardii</i>			1	P			1	1	1
<i>Aristida</i> spp.									
<i>Bouteloua curtipendula</i>									
<i>Chondrosum gracile</i>									
<i>Dichanthelium linearifolium</i>									
<i>Dichanthelium</i> spp.									
<i>Muhlenbergia montana</i>		P		P					P
<i>Muhlenbergia wrightii</i>									
<i>Panicum virgatum</i>									
<i>Schizachyrium scoparium</i>		1					P		P
<i>Sorghastrum avenaceum</i>								P	
<i>Sporobolus cryptandrus</i>									
<i>Sporobolus heterolepis</i>									
TOTAL NATIVE PERENNIAL GRASSES (w)	---	---	---	---	---	---	1	1	---
NATIVE SUBSHRUBS									
<i>Brickellia californica</i>									
TOTAL NATIVE SUBSHRUBS	---	---	---	---	---	---	---	---	---
NATIVE SHRUBS									
<i>Acer glabrum</i>									
<i>Amorpha nana</i>		P							
<i>Arctostaphylos uva-ursi</i>									
<i>Ceanothus fendleri</i>	P		P	2	P				3
<i>Cercocarpus montanus</i>									
<i>Chrysothamnus nauseosus</i>									
<i>Crocanthemum bicknellii</i>									
<i>Holodiscus discolor</i>		1							
<i>Jamesia americana</i>									
<i>Juniperus communis</i> ssp. <i>alpina</i>									
<i>Mahonia repens</i>		1	P			8		P	
<i>Oreobatus deliciosus</i>		P	P			P	P	1	
<i>Padus virginiana</i> ssp. <i>melanocarpa</i>			P		P	20	P	6	
<i>Physocarpus monogynus</i>							P		
<i>Prunus americana</i>						7			
<i>Rhus aromatica</i> ssp. <i>trilobata</i>		P	1			1	5	5	
<i>Rhus glabra</i>									
<i>Ribes cereum</i>	1	P	1	P	1	2	1	1	P
<i>Rosa woodsii</i>		1	P	P		1	1		
<i>Symphoricarpos occidentalis</i>		P	1			11	2	P	P
<i>Toxicodendron rydbergii</i>				P		2	P	P	
<i>Yucca glauca</i>									
TOTAL NATIVE SHRUBS	---	---	1	2	---	49	6	12	3

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	---- SAMPLE NUMBER ----								
	PWRL01	PWRL05	PWRL10	PWRL15	PWRL20	PWRL25	S1001	S1005	S301
INTRODUCED SHRUBS									
<i>Colutea arborescens</i>									
TOTAL INTRODUCED SHRUBS	---	---	---	---	---	---	---	---	---
NATIVE TREES									
<i>Cerasus pensylvanica</i>			P						
<i>Pinus ponderosa</i> ssp. <i>scopulorum</i>	2	P	2	1	1	1	P	2	1
<i>Pseudotsuga menziesii</i>		1	2	1	P	P	2	8	
<i>Sabina scopulorum</i>									
TOTAL NATIVE TREES	2	---	4	1	---	1	2	9	1
NATIVE VINES									
<i>Clematis ligusticifolia</i>									
TOTAL NATIVE VINES	---	---	---	---	---	---	---	---	---
FERNS									
<i>Cystopteris fragilis</i>					P			P	
<i>Selaginella densa</i>									
TOTAL FERNS	---	---	---	---	---	---	---	---	---
SUCCULENT									
<i>Coryphantha missouriensis</i>									
<i>Opuntia fragilis</i>									
<i>Opuntia macrorhiza</i>	P	P	P	P	P		P	P	P
<i>Opuntia polyacantha</i>									
TOTAL SUCCULENT	---	---	---	---	---	---	---	---	---
EPIPHYTE(PARASITE)									
<i>Corallorhiza</i> spp.									
TOTAL EPIPHYTE(PARASITE)	---	---	---	---	---	---	---	---	---
UNKNOWN SPECIES									
Unknown forb									
Unknown forb 1									
Unknown grass									
Unknown grass 1									
Unknown grass 2									
Unknown grass 3		2							
TOTAL UNKNOWN SPECIES	---	2	---	---	---	---	---	---	---
Litter	66	74	68	68	78	20	70	60	73
Bare soil					1				1
Rock	8	5	4	8	5	11	5	4	15
Water									
TOTALS	96	94	96	96	96	94	95	95	97
TOTAL VEGETATION COVER	23	16	25	20	13	63	20	31	9
GROUND COVER (Litter + Rock + Veg + St.D)	96	94	96	96	96	94	95	95	97
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE = 39.9 Std.Dev. = 10.9)	38	50	47	38	38	48	59	55	33

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	S305	S310	S315	S320	S325	S401	S405	S505	S510
NATIVE PERENNIAL FORBS (concluded)									
<i>Pseudognaphalium canescens</i>									
<i>Pseudostellaria jamesiana</i>									
<i>Psoralidium tenuiflorum</i>					1			P	
<i>Pterospora andromedea</i>									
<i>Pulsatilla patens</i> ssp. <i>hirsutissima</i>						P			
<i>Ratibida columnifera</i>									
<i>Rubus idaeus</i> ssp. <i>melanolasius</i>									
<i>Rumex crispus</i>									
<i>Scrophularia lanceolata</i>									
<i>Scutellaria brittonii</i>									
<i>Senecio integerrimus</i>									
<i>Senecio spartioides</i>									
<i>Senecio</i> spp.									
<i>Silene scouleri</i> ssp. <i>hallii</i>									
<i>Solidago nana</i>						P			
<i>Solidago</i> spp.	P	P	P	P				1	
<i>Thalictrum fendleri</i>									
<i>Thermopsis divaricarpa</i>									
<i>Townsendia grandiflora</i>									
<i>Toxicoscordion venenosum</i>									
<i>Tradescantia occidentalis</i>									
<i>Tragia ramosa</i>					1				
<i>Viola</i> spp.									
<i>Virgulus falcatus</i>									
TOTAL NATIVE PERENNIAL FORBS	23	21	11	9	11	11	---	16	4
INTRODUCED PERENNIAL FORBS									
<i>Brexa arvensis</i>				P	1		1		
<i>Convolvulus arvensis</i>									
<i>Hypericum formosum</i>						P			
<i>Hypericum perforatum</i>	P				P				
<i>Linaria genistifolia</i> ssp. <i>dalmatica</i>									
<i>Nepeta cataria</i>									
<i>Pseudognaphalium viscosum</i>								1	
<i>Saponaria officinalis</i>									
<i>Taraxacum officinale</i>									
<i>Tithymalus myrsinites</i>									
TOTAL INTRO. PERENNIAL FORBS	---	---	---	---	---	---	---	---	---
NATIVE PERENNIAL GRASSES (cool)									
<i>Achnatherum nelsonii</i>		P	P			P		P	
<i>Achnatherum scribneri</i>									
<i>Bromopsis lanatipes</i>					P				
<i>Bromopsis</i> spp.									
<i>Carex brevior</i>									
<i>Carex foenea</i>									
<i>Carex occidentalis</i>									1
<i>Carex pennsylvanica</i> ssp. <i>heliophila</i>		2				P			
<i>Carex petasata</i>									
<i>Carex</i> spp.	2		2	5	2	7	P	P	1
<i>Danthonia parryi</i>									
<i>Dicanthelium oligosanthes</i> var. <i>scribnerianum</i>									
<i>Elymus canadensis</i>									
<i>Elymus elymoides</i>	P		P	P	P	P	P	1	
<i>Elymus glaucus</i>									
<i>Elymus lanceolatus</i> fm. <i>albicans</i>					1				
<i>Elymus longifolius</i>									
<i>Elymus trachycaulus</i>									
<i>Hesperostipa comata</i>				P	3				
<i>Hesperostipa spartea</i>					1				
<i>Juncus acuminatus</i>									
<i>Juncus arcticus</i> ssp. <i>ater</i>									
<i>Juncus interior</i>									
<i>Koeleria macrantha</i>	P				P	P			

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	S305	S310	S315	S320	S325	S401	S405	S505	S510
NATIVE PERENN. GRASSES (cool){conclude									
Leucopoa kingii						P		1	
Leymus ambiguus					1				
Nassella viridula									
Pascopyrum smithii									
Poa agassizensis				P	1	1	P		3
Poa compressa			1			P	P	1	5
Poa cusickii ssp. epilis						P			
Poa spp.									
TOTAL NATIVE PERENNIAL GRASSES (c)	2	2	2	5	7	7	---	---	10
INTRODUCED PERENNIAL GRASSES (cool)									
Agropyron cristatum ssp. desertorum									1
Agrostis gigantea									
Arrhenatherum elatius									
Bromopsis inermis									
Dactylis glomerata									
Elytrigia repens				6					2
Phleum pratense				P		P	P		2
Poa pratensis									
Thinopyrum intermedium									
TOTAL INTRO. PERENNIAL GRASSES (c)	---	---	---	6	---	---	---	---	5
NATIVE PERENNIAL GRASSES (warm)									
Andropogon gerardii	P			2	1	2			
Aristida spp.									
Bouteloua curtipendula									
Chondrosium gracile									
Dichanthelium linearifolium									
Dichanthelium spp.	P								
Muhlenbergia montana	3	P	P		1	2		P	
Muhlenbergia wrightii									
Panicum virgatum					2				
Schizachyrium scoparium	1	P		P	1	2		1	
Sorghastrum avenaceum						P		1	3
Sporobolus cryptandrus					1				
Sporobolus heterolepis	11								
TOTAL NATIVE PERENNIAL GRASSES (w)	14	---	---	2	3	5	---	1	3
NATIVE SUBSHRUBS									
Brickellia californica									
TOTAL NATIVE SUBSHRUBS	---	---	---	---	---	---	---	---	---
NATIVE SHRUBS									
Acer glabrum						P			
Amorpha nana									
Arctostaphylos uva-ursi									
Ceanothus fendleri	P			P			P		P
Cercocarpus montanus									
Chrysothamnus nauseosus									
Crocanthemum bicknellii									
Holodiscus discolor									
Jamesia americana									
Juniperus communis ssp. alpina								P	
Mahonia repens				P	14	P	P		P
Oreobatus deliciosus					P				
Padus virginiana ssp. melanocarpa									
Physocarpus monogynus					P				
Prunus americana					P				
Rhus aromatica ssp. trilobata		P							
Rhus glabra				P					P
Ribes cereum					P	P	P		2
Rosa woodsii					P	P			
Symphoricarpos occidentalis								P	
Toxicodendron rydbergii									
Yucca glauca				P	P			P	
TOTAL NATIVE SHRUBS	---	---	---	---	14	---	---	---	2

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	S305	S310	S315	S320	S325	S401	S405	S505	S510
INTRODUCED SHRUBS									
<i>Colutea arborescens</i>									
TOTAL INTRODUCED SHRUBS	---	---	---	---	---	---	---	---	---
NATIVE TREES									
<i>Cerasus pensylvanica</i>									
<i>Pinus ponderosa</i> ssp. <i>scopulorum</i>	P	1	1	2	1	2	1	1	2
<i>Pseudotsuga menziesii</i>	P			1					
<i>Sabina scopulorum</i>									P
TOTAL NATIVE TREES	---	1	1	2	---	2	---	---	2
NATIVE VINES									
<i>Clematis ligusticifolia</i>									
TOTAL NATIVE VINES	---	---	---	---	---	---	---	---	---
FERNS									
<i>Cystopteris fragilis</i>									
<i>Selaginella densa</i>									
TOTAL FERNS	---	---	---	---	---	---	---	---	---
SUCCULENT									
<i>Coryphantha missouriensis</i>									P
<i>Opuntia fragilis</i>									
<i>Opuntia macrorhiza</i>	P	P	P	1	1	P	P	P	P
<i>Opuntia polyacantha</i>									
TOTAL SUCCULENT	---	---	---	1	---	---	---	---	---
EPIPHYTE(PARASITE)									
<i>Corallorhiza</i> spp.									
TOTAL EPIPHYTE(PARASITE)	---	---	---	---	---	---	---	---	---
UNKNOWN SPECIES									
Unknown forb									
Unknown forb 1									
Unknown grass					1				
Unknown grass 1									
Unknown grass 2									
Unknown grass 3									
TOTAL UNKNOWN SPECIES	---	---	---	---	1	---	---	---	---
Litter	59	75	77	62	49	70	81	72	66
Bare soil						2	1		3
Rock	1	1	8	13	12	3	17	9	4
Water									
TOTALS	99	100	98	99	95	99	98	97	98
TOTAL VEGETATION COVER	39	24	14	25	35	24	0	17	25
GROUND COVER (Litter + Rock + Veg + St.D	99	100	98	99	95	97	97	97	95
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE = 39.9 Std.Dev. = 10.9)	35	17	20	32	57	45	18	34	28

Page 21 of 40

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Page 22 of 40

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Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	S905	S910	SNSH01	SNSH05	ST1001	ST1005	ST101	ST105	ST110
NATIVE PERENNIAL FORBS (concluded)									
<i>Pseudognaphalium canescens</i>					P				
<i>Pseudostellaria jamesiana</i>									
<i>Psoralea tenuiflora</i>	P								
<i>Pterospora andromedea</i>									
<i>Pulsatilla patens</i> ssp. <i>hirsutissima</i>			P	P	P				
<i>Ratibida columnifera</i>									
<i>Rubus idaeus</i> ssp. <i>melanolasius</i>		P					2		5
<i>Rumex crispus</i>									
<i>Scrophularia lanceolata</i>									
<i>Scutellaria brittonii</i>	P					P			
<i>Senecio integerrimus</i>									
<i>Senecio spartioides</i>									
<i>Senecio</i> spp.							P		
<i>Silene scouleri</i> ssp. <i>hallii</i>									
<i>Solidago nana</i>									
<i>Solidago</i> spp.						P			
<i>Thalictrum fendleri</i>					P				
<i>Thermopsis divaricarpa</i>						P			
<i>Townsendia grandiflora</i>									
<i>Toxicoscordion venenosum</i>									
<i>Tradescantia occidentalis</i>									
<i>Tragia ramosa</i>									
<i>Viola</i> spp.									
<i>Virgulus falcatus</i>									
TOTAL NATIVE PERENNIAL FORBS	21	31	5	7	11	---	10	2	17
INTRODUCED PERENNIAL FORBS									
<i>Brexa arvensis</i>		P			1		2		1
<i>Convolvulus arvensis</i>									
<i>Hypericum formosum</i>		P							
<i>Hypericum perforatum</i>									
<i>Linaria genistifolia</i> ssp. <i>dalmatica</i>									
<i>Nepeta cataria</i>	P								
<i>Pseudognaphalium viscosum</i>									
<i>Saponaria officinalis</i>									
<i>Taraxacum officinale</i>			P	P					
<i>Tithymalus myrsinites</i>									
TOTAL INTRO. PERENNIAL FORBS	---	---	---	---	1	---	2	---	1
NATIVE PERENNIAL GRASSES (cool)									
<i>Achnatherum nelsonii</i>		1	P	1	P		P		2
<i>Achnatherum scribneri</i>						P			
<i>Bromopsis lanatipes</i>				P					P
<i>Bromopsis</i> spp.							P		
<i>Carex brevior</i>									
<i>Carex foenea</i>				P					
<i>Carex occidentalis</i>									
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>									
<i>Carex petasata</i>									
<i>Carex</i> spp.	1	2	11	20	2	1	1	1	P
<i>Danthonia parryi</i>									
<i>Dicanthelium oligosanthes</i> var. <i>scribnerianum</i>									
<i>Elymus canadensis</i>	1				P				1
<i>Elymus elymoides</i>	P	P	1	P			P	P	1
<i>Elymus glaucus</i>									
<i>Elymus lanceolatus</i> fm. <i>albicans</i>						1			
<i>Elymus longifolius</i>									
<i>Elymus trachycaulus</i>	2								
<i>Hesperostipa comata</i>	P		1	1					
<i>Hesperostipa spartea</i>									
<i>Juncus acuminatus</i>									
<i>Juncus arcticus</i> ssp. <i>ater</i>									
<i>Juncus interior</i>									
<i>Koeleria macrantha</i>			1	1	P		1		

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	S905	S910	SNSH01	SNSH05	ST1001	ST1005	ST101	ST105	ST110
NATIVE PERENN. GRASSES (cool)[conclude									
Leucopoa kingii				1		1	4	P	P
Leymus ambiguus						P			
Nassella viridula						1			
Pascopyrum smithii									
Poa agassizensis	3	1			2		4		2
Poa compressa		5	P			1	2		1
Poa cusickii ssp. epilis						P			
Poa spp.									
TOTAL NATIVE PERENNIAL GRASSES (c)	5	9	12	22	4	2	11	---	4
INTRODUCED PERENNIAL GRASSES (cool)									
Agropyron cristatum ssp. desertorum									
Agrostis gigantea		1							
Arrhenatherum elatius						P			
Bromopsis inermis		P	2	P	27				
Dactylis glomerata							P		
Elytrigia repens									P
Phleum pratense					1		2	P	1
Poa pratensis									
Thinopyrum intermedium									
TOTAL INTRO. PERENNIAL GRASSES (c)	---	---	2	---	27	---	2	---	---
NATIVE PERENNIAL GRASSES (warm)									
Andropogon gerardii							1		
Aristida spp.									
Bouteloua curtipendula	P								
Chondrosum gracile									
Dichanthelium linearifolium									
Dichanthelium spp.									
Muhlenbergia montana			1			1			
Muhlenbergia wrightii			1	P					
Panicum virgatum									
Schizachyrium scoparium						1			
Sorghastrum avenaceum					2				
Sporobolus cryptandrus							1		
Sporobolus heterolepis									
TOTAL NATIVE PERENNIAL GRASSES (w)	---	---	1	---	2	1	1	---	---
NATIVE SUBSHRUBS									
Brickellia californica									
TOTAL NATIVE SUBSHRUBS	---	---	---	---	---	---	---	---	---
NATIVE SHRUBS									
Acer glabrum			P	P	1				
Amorpha nana									
Arctostaphylos uva-ursi									
Ceanothus fendleri		1	P	P			5	P	5
Cercocarpus montanus			P						
Chrysothamnus nauseosus		P							
Crocanthemum bicknellii		6							
Holodiscus discolor									
Jamesia americana									
Juniperus communis ssp. alpina								1	
Mahonia repens			P	2	1		1	2	1
Oreobatus deliciosus	2	P	P	P		P			
Padus virginiana ssp. melanocarpa		P	P		6				
Physocarpus monogynus									
Prunus americana									
Rhus aromatica ssp. trilobata	4		P	P	P				
Rhus glabra		P							
Ribes cereum	2	P	1	P	P	P			1
Rosa woodsii	1		P		P	P			
Symphoricarpos occidentalis	10		P	1	6				
Toxicodendron rydbergii	P								
Yucca glauca									
TOTAL NATIVE SHRUBS	16	7	---	3	13	---	5	2	5

Page 25 of 40

PLANT SPECIES	Percent Foliar Cover *								
	----- SAMPLE NUMBER -----								
	S905	S910	SNSH01	SNSH05	ST1001	ST1005	ST101	ST105	ST110
INTRODUCED SHRUBS									
Colutea arborescens									
TOTAL INTRODUCED SHRUBS	---	---	---	---	---	---	---	---	---
NATIVE TREES									
Cerasus pensylvanica									
Pinus ponderosa ssp. scopulorum	P	P	3	5	1	2	1	1	2
Pseudotsuga menziesii				P	8	2	2	3	P
Sabina scopulorum						P		1	
TOTAL NATIVE TREES	---	---	3	5	8	4	2	4	2
NATIVE VINES									
Clematis ligusticifolia			P						
TOTAL NATIVE VINES	---	---	---	---	---	---	---	---	---
FERNS									
Cystopteris fragilis			P	P					
Selaginella densa						1			
TOTAL FERNS	---	---	---	---	---	---	---	---	---
SUCCULENT									
Coryphantha missouriensis									
Opuntia fragilis									
Opuntia macrorhiza	P	P	1				P		
Opuntia polyacantha						P			
TOTAL SUCCULENT	---	---	---	---	---	---	---	---	---
EPIPHYTE(PARASITE)									
Corallorhiza spp.									
TOTAL EPIPHYTE(PARASITE)	---	---	---	---	---	---	---	---	---
UNKNOWN SPECIES									
Unknown forb		1							
Unknown forb 1									
Unknown grass		2							
Unknown grass 1									
Unknown grass 2									
Unknown grass 3									
TOTAL UNKNOWN SPECIES	---	3	---	---	---	---	---	---	---
Litter	27	46	70	59	32	42	48	69	62
Bare soil			1			4	9	1	
Rock	9	2	2	4		44	7	21	4
Water									
TOTALS	98	97	94	99	97	96	95	98	95
TOTAL VEGETATION COVER	63	49	22	36	65	7	32	7	29
GROUND COVER (Litter + Rock + Veg + St.D	98	97	93	99	97	92	86	97	95
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE = 39.9 Std.Dev. = 10.9)	39	43	55	40	42	39	42	18	37

Page 26 of 40

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Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*									
	----- SAMPLE NUMBER -----									
	ST115	ST305	ST310	ST501	ST505	ST601	ST605	ST610	ST615	
NATIVE PERENNIAL FORBS (continued)										
Calochortus gunnisonii										
Campanula rotundifolia	P	P	P	P		1	P		P	
Cerastium strictum	1	P	P				1			
Chlorocrepis albiflora		P			1	1	P		P	
Cirsium ochrocentrum								P		
Comandra umbellata ssp. pallida										
Corallorhiza maculata				P		P				
Coriiflora hirsutissima										
Dalea purpurea										
Drymocallis arguta							P			
Drymocallis fissa	1	P	1			P		1		
Eremogone fendleri						1				
Erigeron colo-mexicanus				P						
Erigeron flagellaris										
Erigeron speciosus										
Erigeron spp.										
Eriogonum flavum var. flavum										
Eriogonum spp.										
Eriogonum umbellatum		P								
Erysimum capitatum										
Gaillardia aristata						P				
Galium aparine	P									
Galium septentrionale		P								
Galium spp.										
Geranium caespitosum ssp. caespitosum		P				P		P		
Glycyrrhiza lepidota										
Gutierrezia sarothrae										
Harbouria trachypleura	P	P	1	P		P	2	P	P	
Helianthus pumilus										
Helianthus spp.										
Heliomeris multiflora										
Heterotheca foliosa						P		P		
Heterotheca villosa	P	1	1	1			1		P	
Heuchera spp.										
Iris missouriensis						P				
Lathyrus leucanthus										
Lathyrus spp.	1	9	1				P	1		
Lesquerella montana										
Liatris punctata						P				
Ligusticum porteri										
Lithospermum incisum										
Lithospermum multiflorum				P						
Lomatium orientale										
Lupinus argenteus										
Maianthemum spp.					P					
Maianthemum stellatum										
Mertensia lanceolata						P	P	P		
Monarda fistulosa var. menthifolia	P		P							
Nothocalais cuspidata										
Oligosporus dracunculus ssp. glaucus										
Onosmodium molle ssp. occidentale								1		
Osmorhiza depauperata										
Oxalis dillenii										
Oxytropis lambertii										
Packera fendleri										
Paronychia jamesii										
Penstemon spp.										
Penstemon virens	1		1	1	P	P	P	P	P	
Phacelia heterophylla	P	P				P			P	
Phlox multiflora										
Physalis hederifolia var. comata										
Physalis spp.						P		P		
Physalis virginiana										
Pneumonanthe bigelovii						1				

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	ST115	ST305	ST310	ST501	ST505	ST601	ST605	ST610	ST615
NATIVE PERENNIAL FORBS (concluded)									
<i>Pseudognaphalium canescens</i>									
<i>Pseudostellaria jamesiana</i>									
<i>Psoralea tenuiflorum</i>	1							P	
<i>Pterospora andromedea</i>						P			
<i>Pulsatilla patens</i> ssp. <i>hirsutissima</i>		P				P			
<i>Ratibida columnifera</i>									
<i>Rubus idaeus</i> ssp. <i>melanolasius</i>	P		P						
<i>Rumex crispus</i>									
<i>Scrophularia lanceolata</i>									
<i>Scutellaria brittonii</i>	P								
<i>Senecio integerrimus</i>									
<i>Senecio spartioides</i>									
<i>Senecio</i> spp.									
<i>Silene scouleri</i> ssp. <i>hallii</i>									
<i>Solidago nana</i>									
<i>Solidago</i> spp.		P	P			1	1		P
<i>Thalictrum fendleri</i>									
<i>Thermopsis divaricarpa</i>	1								
<i>Townsendia grandiflora</i>									
<i>Toxicoscordion venenosum</i>									
<i>Tradescantia occidentalis</i>									
<i>Tragia ramosa</i>									
<i>Viola</i> spp.									
<i>Virgulus falcatus</i>									
TOTAL NATIVE PERENNIAL FORBS	16	13	11	1	---	9	11	11	---
INTRODUCED PERENNIAL FORBS									
<i>Breia arvensis</i>	2	P	5			P	P		
<i>Convolvulus arvensis</i>									
<i>Hypericum formosum</i>									
<i>Hypericum perforatum</i>						P			
<i>Linaria genistifolia</i> ssp. <i>dalmatica</i>									
<i>Nepeta cataria</i>									
<i>Pseudognaphalium viscosum</i>									
<i>Saponaria officinalis</i>									
<i>Taraxacum officinale</i>						P			
<i>Tithymalus myrsinites</i>									
TOTAL INTRO. PERENNIAL FORBS	2	---	5	---	---	---	---	---	---
NATIVE PERENNIAL GRASSES (cool)									
<i>Achnatherum nelsonii</i>	1	1	2		P	P	1		
<i>Achnatherum scribneri</i>									
<i>Bromopsis lanatipes</i>	P	P	P	P	P		P	2	
<i>Bromopsis</i> spp.									
<i>Carex brevior</i>						P			
<i>Carex foenea</i>									
<i>Carex occidentalis</i>						P			
<i>Carex pennsylvanica</i> ssp. <i>heliophila</i>							1		
<i>Carex petasata</i>									
<i>Carex</i> spp.	1	1	5	1	P	6	12	3	P
<i>Danthonia parryi</i>									
<i>Dicanthelium oligosanthes</i> var. <i>scribnerianum</i>									
<i>Elymus canadensis</i>	P								
<i>Elymus elymoides</i>	P	P	P	P	P	P	P	1	P
<i>Elymus glaucus</i>									
<i>Elymus lanceolatus</i> fm. <i>albicans</i>									
<i>Elymus longifolius</i>								P	
<i>Elymus trachycaulus</i>	P	1				P		P	
<i>Hesperostipa comata</i>									
<i>Hesperostipa spartea</i>								P	
<i>Juncus acuminatus</i>									
<i>Juncus arcticus</i> ssp. <i>ater</i>									
<i>Juncus interior</i>									
<i>Koeleria macrantha</i>	P	P				P			

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	ST115	ST305	ST310	ST501	ST505	ST601	ST605	ST610	ST615
NATIVE PERENN. GRASSES (cool)[conclude									
Leucopoa kingii	1	1	5						
Leymus ambiguus		6	1						
Nassella viridula									
Pascopyrum smithii									
Poa agassizensis	4		1			1	P	1	
Poa compressa			1			P	P		P
Poa cusickii ssp. epilis									
Poa spp.									
TOTAL NATIVE PERENNIAL GRASSES (c)	6	9	13	---	---	6	12	5	---
INTRODUCED PERENNIAL GRASSES (cool)									
Agropyron cristatum ssp. desertorum									
Agrostis gigantea									
Arrhenatherum elatius									
Bromopsis inermis	2								
Dactylis glomerata							P		
Elytrigia repens					P		P	P	
Phleum pratense	P		P						
Poa pratensis									
Thinopyrum intermedium									
TOTAL INTRO. PERENNIAL GRASSES (c)	2	---	---	---	---	---	---	---	---
NATIVE PERENNIAL GRASSES (warm)									
Andropogon gerardii	7			P			P	1	P
Aristida spp.									
Bouteloua curtipendula									
Chondrosium gracile									
Dichanthelium linearifolium									
Dichanthelium spp.									
Muhlenbergia montana						P	P	1	P
Muhlenbergia wrightii									
Panicum virgatum									
Schizachyrium scoparium				P					P
Sorghastrum avenaceum									
Sporobolus cryptandrus									
Sporobolus heterolepis									
TOTAL NATIVE PERENNIAL GRASSES (w)	7	---	---	---	---	---	---	1	---
NATIVE SUBSHRUBS									
Brickellia californica									
TOTAL NATIVE SUBSHRUBS	---	---	---	---	---	---	---	---	---
NATIVE SHRUBS									
Acer glabrum									
Amorpha nana									
Arctostaphylos uva-ursi						P			
Ceanothus fendleri	1	P	6	1	P		P		P
Cercocarpus montanus									
Chrysothamnus nauseosus									
Crocanthemum bicknellii									
Holodiscus discolor									
Jamesia americana									
Juniperus communis ssp. alpina			1						
Mahonia repens	3	P	1	13	8	P	1	2	
Oreobatus deliciosus						P		P	
Padus virginiana ssp. melanocarpa		10		P	P	P		7	
Physocarpus monogynus									
Prunus americana									
Rhus aromatica ssp. trilobata						1		P	
Rhus glabra									
Ribes cereum	P	1			P	P	P	P	P
Rosa woodsii						1		2	
Symphoricarpos occidentalis					P			1	
Toxicodendron rydbergii								P	
Yucca glauca									
TOTAL NATIVE SHRUBS	3	10	6	14	8	---	---	11	---

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	---- SAMPLE NUMBER ----								
	ST115	ST305	ST310	ST501	ST505	ST601	ST605	ST610	ST615
INTRODUCED SHRUBS									
<i>Colutea arborescens</i>									
TOTAL INTRODUCED SHRUBS	---	---	---	---	---	---	---	---	---
NATIVE TREES									
<i>Cerasus pensylvanica</i>									
<i>Pinus ponderosa</i> ssp. <i>scopulorum</i>	2	1	3	1	2	3	1	1	1
<i>Pseudotsuga menziesii</i>	2	8	1	1	3	1	1	1	1
<i>Sabina scopulorum</i>	P	2				2		2	
TOTAL NATIVE TREES	4	10	4	---	5	6	---	2	1
NATIVE VINES									
<i>Clematis ligusticifolia</i>									
TOTAL NATIVE VINES	---	---	---	---	---	---	---	---	---
FERNS									
<i>Cystopteris fragilis</i>				P					
<i>Selaginella densa</i>									
TOTAL FERNS	---	---	---	---	---	---	---	---	---
SUCCULENT									
<i>Coryphantha missouriensis</i>									
<i>Opuntia fragilis</i>									
<i>Opuntia macrorhiza</i>	P			P				P	P
<i>Opuntia polyacantha</i>									
TOTAL SUCCULENT	---	---	---	---	---	---	---	---	---
EPIPHYTE(PARASITE)									
<i>Corallorhiza</i> spp.									
TOTAL EPIPHYTE(PARASITE)	---	---	---	---	---	---	---	---	---
UNKNOWN SPECIES									
Unknown forb									
Unknown forb 1									
Unknown grass									
Unknown grass 1									
Unknown grass 2									
Unknown grass 3									
TOTAL UNKNOWN SPECIES	---	---	---	---	---	---	---	---	---
Litter	55	49	57	53	82	71	70	50	91
Bare soil	1					1		6	2
Rock	3	9	1	28	6	3	4	12	5
Water									
TOTALS	95	97	96	96	100	94	96	96	98
TOTAL VEGETATION COVER	38	40	38	15	12	20	22	29	1
GROUND COVER (Litter + Rock + Veg + St.D)	95	97	96	96	100	94	96	91	97
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE = 39.9 Std.Dev. = 10.9)	41	40	35	30	16	57	39	47	23

Page 31 of 40

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Page 32 of 40

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Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	ST701	ST705	ST801	ST805	ST901	ST905	WITE05	WITE10	WITNE01
NATIVE PERENNIAL FORBS (concluded)									
<i>Pseudognaphalium canescens</i>							P	P	
<i>Pseudostellaria jamesiana</i>									
<i>Psoralea tenuiflorum</i>		P	2		P	P	P		
<i>Pterospora andromedea</i>									
<i>Pulsatilla patens</i> ssp. <i>hirsutissima</i>	2								
<i>Ratibida columnifera</i>									
<i>Rubus idaeus</i> ssp. <i>melanolasius</i>		P							
<i>Rumex crispus</i>									
<i>Scrophularia lanceolata</i>									
<i>Scutellaria brittonii</i>			P			P			
<i>Senecio integerrimus</i>									
<i>Senecio spartioides</i>									
<i>Senecio</i> spp.		P							
<i>Silene scouleri</i> ssp. <i>hallii</i>									
<i>Solidago nana</i>		3			P				
<i>Solidago</i> spp.								P	P
<i>Thalictrum fendleri</i>									
<i>Thermopsis divaricarpa</i>	3	2	1						
<i>Townsendia grandiflora</i>									
<i>Toxicoscordion venenosum</i>									
<i>Tradescantia occidentalis</i>			P						
<i>Tragia ramosa</i>							1		
<i>Viola</i> spp.									
<i>Virgulus falcatus</i>									
TOTAL NATIVE PERENNIAL FORBS	35	18	20	3	26	9	---	---	1
INTRODUCED PERENNIAL FORBS									
<i>Barea arvensis</i>						P			
<i>Convolvulus arvensis</i>									
<i>Hypericum formosum</i>									
<i>Hypericum perforatum</i>									
<i>Linaria genistifolia</i> ssp. <i>dalmatica</i>									
<i>Nepeta cataria</i>									
<i>Pseudognaphalium viscosum</i>									
<i>Saponaria officinalis</i>									
<i>Taraxacum officinale</i>	P					P			
<i>Tithymalus myrsinites</i>									
TOTAL INTRO. PERENNIAL FORBS	---	---	---	---	---	---	---	---	---
NATIVE PERENNIAL GRASSES (cool)									
<i>Achnatherum nelsonii</i>	1			P	P	1			
<i>Achnatherum scribneri</i>									P
<i>Bromopsis lanatipes</i>			1				1	1	
<i>Bromopsis</i> spp.									
<i>Carex brevior</i>									
<i>Carex foenea</i>									
<i>Carex occidentalis</i>			1		1				
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>		1			P				
<i>Carex petasata</i>									
<i>Carex</i> spp.	2	2	5	3	1	3	4	8	1
<i>Danthonia parryi</i>									
<i>Dicanthelium oligosanthos</i> var. <i>scribnerianum</i>									
<i>Elymus canadensis</i>									
<i>Elymus elymoides</i>			1				P	P	
<i>Elymus glaucus</i>									
<i>Elymus lanceolatus</i> fm. <i>albicans</i>	P		P						
<i>Elymus longifolius</i>									
<i>Elymus trachycaulus</i>			P						
<i>Hesperostipa comata</i>			P				P	1	1
<i>Hesperostipa spartea</i>									
<i>Juncus acuminatus</i>									
<i>Juncus arcticus</i> ssp. <i>ater</i>									
<i>Juncus interior</i>					4				
<i>Koeleria macrantha</i>	1	1	P	P	P	P	P		

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	ST701	ST705	ST801	ST805	ST901	ST905	WITE05	WITE10	WITNE01
NATIVE PERENN. GRASSES (cool)[conclude									
Leucopoa kingii	P							1	1
Leymus ambiguus									P
Nassella viridula									
Pascopyrum smithii			1						
Poa agassizensis	2	P	2		3	1	P	P	
Poa compressa	1	1	1		P	1			P
Poa cusickii ssp. epilis									
Poa spp.							P		
TOTAL NATIVE PERENNIAL GRASSES (c)	5	3	8	3	8	4	4	9	2
INTRODUCED PERENNIAL GRASSES (cool)									
Agropyron cristatum ssp. desertorum									
Agrostis gigantea									
Arrhenatherum elatius	1								
Bromopsis inermis	1								
Dactylis glomerata									
Elytrigia repens								P	
Phleum pratense	P	1	P		1	P			
Poa pratensis									
Thinopyrum intermedium									
TOTAL INTRO. PERENNIAL GRASSES (c)	---	---	---	---	1	---	---	---	---
NATIVE PERENNIAL GRASSES (warm)									
Andropogon gerardii		3	3	P			1	1	
Aristida spp.									
Bouteloua curtipendula									
Chondrosium gracile									
Dichanthelium linearifolium									
Dichanthelium spp.									
Muhlenbergia montana			1			1		P	1
Muhlenbergia wrightii							P		
Panicum virgatum									
Schizachyrium scoparium			1	1		P			P
Sorghastrum avenaceum									
Sporobolus cryptandrus								P	
Sporobolus heterolepis									
TOTAL NATIVE PERENNIAL GRASSES (w)	---	3	4	1	---	---	---	---	---
NATIVE SUBSHRUBS									
Brickellia californica								P	
TOTAL NATIVE SUBSHRUBS	---	---	---	---	---	---	---	---	---
NATIVE SHRUBS									
Acer glabrum						P			
Amorpha nana									
Arctostaphylos uva-ursi		P		4		1			
Ceanothus fendleri	P	1	P	P	12	2	P	P	P
Cercocarpus montanus									
Chrysothamnus nauseosus									
Crocanthemum bicknellii									
Holodiscus discolor									
Jamesia americana				1					
Juniperus communis ssp. alpina	P			3					
Mahonia repens	1	P	17	P		8	9	1	
Oreobatus deliciosus		P						P	
Padus virginiana ssp. melanocarpa	P		P	P	P	P	1		P
Physocarpus monogynus									
Prunus americana									
Rhus aromatica ssp. trilobata	P		P				P		
Rhus glabra									
Ribes cereum	P		P	P	P	P	P	P	
Rosa woodsii	1	P	1	P	1	P	P		
Symphoricarpos occidentalis	4				P	1	P		
Toxicodendron rydbergii									
Yucca glauca			P				P		1
TOTAL NATIVE SHRUBS	5	---	17	7	12	11	9	---	1

Page 35 of 40

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	ST701	ST705	ST801	ST805	ST901	ST905	WITE05	WITE10	WITNE01
INTRODUCED SHRUBS									
<i>Colutea arborescens</i>									
TOTAL INTRODUCED SHRUBS	---	---	---	---	---	---	---	---	---
NATIVE TREES									
<i>Cerasus pensylvanica</i>									
<i>Pinus ponderosa</i> ssp. <i>scopulorum</i>	1	1	1	2	1	1	2	4	2
<i>Pseudotsuga menziesii</i>	3	2		3	P	13			
<i>Sabina scopulorum</i>	P		1		P	P			
TOTAL NATIVE TREES	4	2	---	5	---	13	2	4	2
NATIVE VINES									
<i>Clematis ligusticifolia</i>									
TOTAL NATIVE VINES	---	---	---	---	---	---	---	---	---
FERNS									
<i>Cystopteris fragilis</i>			1				P		P
<i>Selaginella densa</i>									
TOTAL FERNS	---	---	---	---	---	---	---	---	---
SUCCULENT									
<i>Coryphantha missouriensis</i>									
<i>Opuntia fragilis</i>									
<i>Opuntia macrorhiza</i>			P				1	1	P
<i>Opuntia polyacantha</i>							P	P	P
TOTAL SUCCULENT	---	---	---	---	---	---	1	---	---
EPIPHYTE(PARASITE)									
<i>Corallorhiza</i> spp.		P			P				
TOTAL EPIPHYTE(PARASITE)	---	---	---	---	---	---	---	---	---
UNKNOWN SPECIES									
Unknown forb	6					1			
Unknown forb 1									
Unknown grass					2				
Unknown grass 1									
Unknown grass 2									
Unknown grass 3									
TOTAL UNKNOWN SPECIES	6	---	---	---	2	1	---	---	---
Litter	37	67	39	74	48	50	63	65	71
Bare soil	1			1		1	1		
Rock	3	5	5	5		7	19	17	21
Water								2	1
TOTALS	95	96	91	97	97	95	96	97	98
TOTAL VEGETATION COVER	55	25	48	18	49	37	15	14	6
GROUND COVER (Litter + Rock + Veg + St.D	95	96	91	97	97	94	96	97	98
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE = 39.9 Std.Dev. = 10.9)	54	37	55	29	37	47	43	43	39

Page 36 of 40

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Page 37 of 40

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Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	WITNE05	WITNE15	WITNE20	WITNE25	WITNE30	WITNW15	WITNW20	WITS05	WITW05
NATIVE PERENNIAL FORBS (concluded)									
<i>Pseudognaphalium canescens</i>									
<i>Pseudostellaria jamesiana</i>									
<i>Psoralea tenuiflora</i>									
<i>Pterospora andromedea</i>									
<i>Pulsatilla patens</i> ssp. <i>hirsutissima</i>								P	P
<i>Ratibida columnifera</i>									
<i>Rubus idaeus</i> ssp. <i>melanolasius</i>				2					
<i>Rumex crispus</i>				P					
<i>Scrophularia lanceolata</i>									
<i>Scutellaria brittonii</i>	1	P							
<i>Senecio integerrimus</i>									
<i>Senecio spartioides</i>								P	
<i>Senecio</i> spp.				P					
<i>Silene scouleri</i> ssp. <i>hallii</i>									
<i>Solidago nana</i>									
<i>Solidago</i> spp.		P	P		P			P	
<i>Thalictrum fendleri</i>									
<i>Thermopsis divaricarpa</i>			P		P				
<i>Townsendia grandiflora</i>								P	
<i>Toxicoscordion venenosum</i>									
<i>Tradescantia occidentalis</i>									
<i>Tragia ramosa</i>									
<i>Viola</i> spp.									
<i>Virgulus falcatus</i>									
TOTAL NATIVE PERENNIAL FORBS	---	1	3	16	7	3	1	---	3
INTRODUCED PERENNIAL FORBS									
<i>Breia arvensis</i>				2					
<i>Convolvulus arvensis</i>									
<i>Hypericum formosum</i>									
<i>Hypericum perforatum</i>									
<i>Linaria genistifolia</i> ssp. <i>dalmatica</i>									
<i>Nepeta cataria</i>									
<i>Pseudognaphalium viscosum</i>									
<i>Saponaria officinalis</i>									
<i>Taraxacum officinale</i>		P		P					
<i>Tithymalus myrsinites</i>									
TOTAL INTRO. PERENNIAL FORBS	---	---	---	2	---	---	---	---	---
NATIVE PERENNIAL GRASSES (cool)									
<i>Achnatherum nelsonii</i>				1					4
<i>Achnatherum scribneri</i>		P	1		P			4	
<i>Bromopsis lanatipes</i>	P	P		P			P		P
<i>Bromopsis</i> spp.									
<i>Carex brevior</i>									
<i>Carex foenea</i>									
<i>Carex occidentalis</i>									
<i>Carex pennsylvanica</i> ssp. <i>heliophila</i>									
<i>Carex petasata</i>									
<i>Carex</i> spp.	1	2	1	1	2	8	12	3	14
<i>Danthonia parryi</i>									
<i>Dicanthelium oligosanthes</i> var. <i>scribnerianum</i>									
<i>Elymus canadensis</i>									
<i>Elymus elymoides</i>	P		P	3		P	P	P	P
<i>Elymus glaucus</i>									
<i>Elymus lanceolatus</i> fm. <i>albicans</i>	P					1			
<i>Elymus longifolius</i>									
<i>Elymus trachycaulus</i>							P		P
<i>Hesperostipa comata</i>						1	P	1	
<i>Hesperostipa spartea</i>									
<i>Juncus acuminatus</i>					P				
<i>Juncus arcticus</i> ssp. <i>ater</i>									
<i>Juncus interior</i>									
<i>Koeleria macrantha</i>						P		P	

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	----- SAMPLE NUMBER -----								
	WITNE05	WITNE15	WITNE20	WITNE25	WITNE30	WITNW15	WITNW20	WITS05	WITW05
NATIVE PERENN. GRASSES (cool)[conclude									
Leucopoa kingii	1	1	1	P	1	P	4	2	
Leymus ambiguus	P								
Nassella viridula									
Pascopyrum smithii									
Poa agassizensis			3						
Poa compressa		P	3						
Poa cusickii ssp. epilis									
Poa spp.									
TOTAL NATIVE PERENNIAL GRASSES (c)	1	3	1	9	2	9	12	11	19
INTRODUCED PERENNIAL GRASSES (cool)									
Agropyron cristatum ssp. desertorum									
Agrostis gigantea									
Arrhenatherum elatius									
Bromopsis inermis									
Dactylis glomerata									
Elytrigia repens									
Phleum pratense									
Poa pratensis									
Thinopyrum intermedium									
TOTAL INTRO. PERENNIAL GRASSES (c)	---	---	---	---	---	---	---	---	---
NATIVE PERENNIAL GRASSES (warm)									
Andropogon gerardii	1		P		1	P			
Aristida spp.									
Bouteloua curtipendula	1								
Chondrosum gracile									
Dichanthelium linearifolium									
Dichanthelium spp.									
Muhlenbergia montana	P	P	P	P	1	2	P	P	
Muhlenbergia wrightii	P								
Panicum virgatum									
Schizachyrium scoparium	1		P		1	1	P		
Sorghastrum avenaceum					P				
Sporobolus cryptandrus									
Sporobolus heterolepis									
TOTAL NATIVE PERENNIAL GRASSES (w)	1	---	---	---	1	2	---	---	---
NATIVE SUBSHRUBS									
Brickellia californica									
TOTAL NATIVE SUBSHRUBS	---	---	---	---	---	---	---	---	---
NATIVE SHRUBS									
Acer glabrum									
Amorpha nana									
Arctostaphylos uva-ursi			P		1				
Ceanothus fendleri	P	P	P	1		P	P	P	P
Cercocarpus montanus						P	P		
Chrysothamnus nauseosus									
Crocanthemum bicknellii									
Holodiscus discolor									
Jamesia americana									
Juniperus communis ssp. alpina			2		P				
Mahonia repens	3								
Oreobatus deliciosus	P			P			P		
Padus virginiana ssp. melanocarpa	P	P	P	P			P		
Physocarpus monogynus									
Prunus americana									
Rhus aromatica ssp. trilobata							P		
Rhus glabra									
Ribes cereum	1	P		1			P	P	P
Rosa woodsii		P			P				
Symphoricarpos occidentalis									P
Toxicodendron rydbergii									
Yucca glauca		P							
TOTAL NATIVE SHRUBS	3	---	2	1	1	---	---	---	---

Table E. Understory Cover Data - Community E, FEWG Study, BCOS, CO - 1997

PLANT SPECIES	Percent Foliar Cover*								
	---- SAMPLE NUMBER ----								
	WITNE05	WITNE15	WITNE20	WITNE25	WITNE30	WITNW15	WITNW20	WITS05	WITW05
INTRODUCED SHRUBS									
Colutea arborescens	P			P					
TOTAL INTRODUCED SHRUBS	---	---	---	---	---	---	---	---	---
NATIVE TREES									
Cerasus pensylvanica									
Pinus ponderosa ssp. scopulorum	2	2	8	2	5	2	2	2	1
Pseudotsuga menziesii									
Sabina scopulorum			1		2				
TOTAL NATIVE TREES	2	2	9	2	7	2	2	2	1
NATIVE VINES									
Clematis ligusticifolia									
TOTAL NATIVE VINES	---	---	---	---	---	---	---	---	---
FERNS									
Cystopteris fragilis								1	
Selaginella densa									
TOTAL FERNS	---	---	---	---	---	---	---	---	---
SUCCULENT									
Coryphantha missouriensis									
Opuntia fragilis									
Opuntia macrorhiza	P	P			P	P	P	P	
Opuntia polyacantha	P	P			P		P	P	
TOTAL SUCCULENT	---	---	---	---	---	---	---	---	---
EPIPHYTE(PARASITE)									
Corallorhiza spp.									
TOTAL EPIPHYTE(PARASITE)	---	---	---	---	---	---	---	---	---
UNKNOWN SPECIES									
Unknown forb									
Unknown forb 1									
Unknown grass									
Unknown grass 1									
Unknown grass 2									
Unknown grass 3									
TOTAL UNKNOWN SPECIES	---	---	---	---	---	---	---	---	---
Litter	77	69	72	49	63	74	78	69	73
Bare soil		1				2	1		
Rock	11	14	10	7	7	6	6	11	2
Water	3	9	4	3	12			5	
TOTALS	98	98	99	96	99	97	99	98	100
TOTAL VEGETATION COVER	7	6	14	38	17	15	15	13	25
GROUND COVER (Litter + Rock + Veg + St.D)	98	98	99	96	99	95	99	98	100
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE = 39.9 Std.Dev. = 10.9)	40	38	33	49	32	40	35	38	28