INTERIM REPORT

BASELINE VEGETATION INVENTORY
ELKHORN PROJECT AREA
JEFFERSON COUNTY, MONTANA

For:

Gold Fields Mining Corporation
2969 Airport Road
Helena, Montana 59601

By:

Ken L. Scow, L. Dean Culwell

Western Technology and Engineering, Inc.
3005 Airport Road
P.O. Box 6045
Helena, Montana 59604

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APPENDIX L. (CONTINUED)

TYPE/ TRANSECT	CONFIGUR-ATION	TOPOGRAPHY	ASPECT (degrees)	SLOPE (percent)	ELEVA-TION (feet)
Forest/Savannah					
Juniperus scopulorum/Agropyron spicatum					
9	Undulating	Midslope	115	55	5020
24	Undulating	Upper Slope	116	32	5330
Pinus flexilis/Agropyron spicatum					
8	Undulating	Midslope	210	11	5210
20	Convex	Upper slope	273	22	5370
Pinus flexilis/Agropyron smithii Bottom					
10	Concave	Draw	225	4	5110
Pseudotsuga menziesii/ Juniperus scopulorum Bottom					
31	Concave	Draw	240	5	5410
Pseudotsuga menziesii/Festuca idahoensis					
16	Convex	Midslope	238	35	5380
18	Undulating	Midslope	095	22	5280
Pseudotsuga menziesii/Festuca scabrella					
30	Straight	Midslope	290	25	5520
Pseudotsuga menziesii/ Calamagrostis rubescens					
40	Convex	Bench	190	6	6120
41	Straight	Midslope	016	58	6380
42	Convex	Midslope	182	30	6330
43	Straight	Bottom	093	7	6150
Abies lasiocarpa-Pinus albicaulis/scree					
45	Straight	Midslope	276	61	8040
Abies lasiocarpa/Vaccinium scoparium					
46	Straight	Midslope	290	52	7600
Bottomland					
Poa pratensis/Carex praegracilis 37	Straight	Bottom	162	3	5950
Potentilla fruticosa/Deschampsia cespitosa					
38	Hummock	Bottom	143	3	5945
Salix geyeriana					
11	Concave	Bottom	190	5	4960
36	Straight	Bottom	146	3	5990
Miscellaneous					
Tame Pasture					
13	Straight	Flat	160	5	4990
Placer Mining					
2	Undulating	Bench	200	4	5035
Reclamation					
35	Undulating	Fan	040	10	5940

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TYPE/ TRANSECT	CONFIGUR-ATION	TOPOGRAPHY	ASPECT (degrees)	SLOPE (percent)	ELEVA-TION (feet)
Grassland					
Stipa comata/Bouteloua gracilis					
5	Straight	Midslope	114	7	5065
14	Convex	Bench	200	5	5180
Agropyron spicatum/Bouteloua gracilis					
1	Convex	Midslope	113	12	5150
3	Undulating	Upper slope	194	28	5240
7	Undulating	Midslope	312	30	5060
12	Convex	Midslope	280	8	5015
19	Straight	Midslope	110	13	5260
Agropyron spicatum/Poa sandbergii					
15	Convex	Midslope	010	20	5180
26	Straight	Upper slope	282	35	5600
Festuca idahoensis/Agropyron spicatum					
23	Undulating	Midslope	288	18	5480
Festuca scabrella/Agropyron spicatum					
28	Convex	Midslope	007	22	5520
Shrub/Grassland					
Artemisia nova/Agropyron spicatum					
4	Convex	Midslope	110	4	5080
6	Straight	Midslope	220	5	5145
32	Straight	Midslope	160	13	5310
33	Straight	Footslope	215	5	5060
34	Convex	Ridge	130	30	5680
Artemisia tridentata/Agropyron spicatum					
17	Straight	Midslope	048	12	5330
21	Straight	Midslope	164	4	5320
Artemisia tridentata/Festuca idahoensis					
25	Concave	Midslope	140	15	5520
Artemisia tridentata/Festuca scabrella					
27	Straight	Midslope	056	26	5560
39	Convex	Midslope	132	50	6040
Artemisia tridentata/Poa pratensis					
44	Straight	Bench	188	7	5330
Chrysothamnus nauseosus/Poa pratensis					
29	Undulating	Footslope	220	5	5200
Cercocarpus ledifolius/ Agropyron spicatum					
22	Convex	Ridge	260	27	5490

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TYPE/ TRANSECT	CONFIGUR-ATION	TOPOGRAPHY	ASPECT (degrees)	SLOPE (percent)	ELEVA-TION (feet)
Grassland					
Festuca scabrella/Festuca idahoensis					
16	Convex	Shoulder	289	36	6955
26	Convex	Shoulder	240	14	6915
Shrub/Grassland					
Artemisia tridentata/Festuca idahoensis					
2	Convex	Upper slope	140	29	7150
11	Concave	Midslope	112	17	6735
Forest/Savannah					
Pseudotsuga menziesii/Festuca idahoensis					
18	Convex	Lower slope	140	36	6760
Pseudotsuga menziesii/Festuca scabrella					
8	Convex	Midslope	240	40	6840
Pseudotsuga menziesii/ Juniperus communis					
15	Concave	Upper slope	146	44	6650
22	Concave	Upper slope	158	50	6770
24	Convex	Midslope	233	50	6560
25	Straight	Lower slope	046	25	6490
27	Undulating	Footslope	160	54	6350
Pseudotsuga menziesii/Carex geyeri					
13	Straight	Midslope	090	18	6670
Pseudotsuga menziesii/ Calamagrostis rubescens					
1	Straight	Midslope	336	58	6760
3	Undulating	Saddle	250	9	6880
4	Concave	Lower slope	260	35	6970
5	Convex	Midslope	291	40	6875
6	Undulating	Midslope	135	38	6840
7	Straight	Midslope	156	30	6780
9	Concave	Upper slope	022	48	6820
10	Convex	Midslope	292	47	6635
12	Convex	Midslope	133	45	6670
14	Undulating	Lower slope	128	12	6760
17	Convex	Midslope	030	38	6880
19	Undulating	Midslope	304	55	6750
20	Convex	Shoulder	134	13	6685
Picea engelmannii/Smilacina stellata					
21	Straight	Terrace	188	6	6665
Picea engelmannii/Galium triflorum					
23	Undulating	Bottom	220	8	6625

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	PLOT NUMBER			
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS			
SPECIES	40	41	42	43
Pinus contorta				
DBH (inches)	-	-	-	12.9
Height (feet)	-	-	-	75
Age (years)	-	-	-	98
Pseudotsuga menziesii				
DBH (inches)	18.7	11.1	25.1	-
Height (feet)	70	88	65	-
Age (years)	155	52	251	-

1.0 INTRODUCTION

A vegetation baseline inventory was conducted by Western Technology and Engineering, Inc. (WESTECH) at the Elkhorn Project area during the 1989 and 1990 field seasons. The intensive vegetation study area (inventoried in 1989) is located immediately north of Elkhorn, Jefferson County, Montana, including portions of Sections 10, 11, 14 and 15, T6N, R3W. The extensive study area (inventoried in 1990) was larger, encompassing project alternatives and access roads including approximately 14 square miles in T6N, R3W and T5N, R3W (Exhibit 1).

Objectives of the baseline vegetation study were to: 1) provide data to satisfy requirements of the Montana Department of State Lands (MDSL) and the U.S. Forest Service (USFS) for an application for an operating permit/plan; 2) collect information necessary to develop an acceptable revegetation plan for the operation; and 3) provide a description of the existing environment suitable to address agency requirements pursuant to the Montana Environmental Policy Act (MEPA) and the National Environmental Policy Act (NEPA).

The inventory was designed to map and describe vegetation types of the area; provide quantitative data on canopy cover, frequency, shrub density and tree density; and search for potentially sensitive plant species.

Table I1. Site tree information for forest types, Elkhorn study area, 1989.

TYPE	TRANSECT	Pseudotsuga menziesii			Pinus contorta			Picea engelmannii		
		DBH (inches)	Height (feet)	Age (years)	DBH (inches)	Height (feet)	Age (years)	DBH (inches)	Height (feet)	Age (years)
Pseudotsuga menziesii/Festuca scabrella	8	8.7	32	43	–	–	–	–	–	–
Pseudotsuga menziesii/Juniperus communis	15	15.3	–	77	–	–	–	–	–	–
	24	10.3	44	145	–	–	–	–	–	–
	25	1.2	8	–	9.1	55	–	–	–	–
	27	13.0	48	–	–	–	–	–	–	–
Pseudotsuga menziesii/Carex geyeri	13	12.1	56	60	12.7	63	65	–	–	–
Pseudotsuga menziesii/Calamagrostis rubescens	1	9.2	–	85	9.7	–	96	–	–	–
	3	–	–	–	8.0	–	78	–	–	–
	4	11.1	52	74	9.2	44	82		–	–
	5	11.9	42	77	10.3	40	80	–	–	–
	6	12.6	42	57	13.7	50	63	–	–	–
	7	22.5	72	88	12.6	64	62	–	–	–
	9	–	–	–	6.1	48	–	–	–	–
	10	7.6	40	60	9.5	48	76	–	–	–
	12	26.2	75	188	–	–	–	–	–	–
	14	13.7	56	84	15.5	65	94	–	–	–
	17	9.8	47	–	7.4	45	–	–	–	–
	19	7.1	43	–	7.9	46	–	–	–	–
	20	10.0	42	71	–	–	–	–	–	–
Picea engelmannii/Smilacina stellata	21	9.8	47	69	11.7	60	76	11.5	54	66
Picea engelmannii/Galium triflorum	23	–	–	–	–	–	–	26.8	86	–

2.0 METHODS

2.1 LITERATURE REVIEW

Vegetation literature pertaining to the project area was reviewed, including regional information. This was updated through contact with agency personnel and other knowledgeable specialists, primarily involving review of current mapping and status of sensitive plant species. Pertinent literature is incorporated in the results and discussion section.

2.2 MAPPING

Mapping has not been completed for this interim report. Following final data collection, black and white or color aerial photographs will be used to map vegetation types and other surface features (e.g. rock outcrops) on a topographic base map. Subsequent field reconnaissance will be used to verify mapping unit boundaries.

Forest stands will be mapped according to habitat types (potential climax) following Pfister *et al.* (1977). Grassland and shrubland types will be mapped following the habitat type classification of Mueggler and Stewart (1980), with minor modifications to reflect some non-climax community types. Riparian communities will be mapped using Hansen *et al.* (1989 and 1990). Acreage of all mapping units will be determined with a digital planimeter, and presented in tabular format by vegetation type (or other surface feature) for the entire study area.

Table H3. (Continued)

SPECIES/ DBH CLASS	ECODATA PLOT NUMBER							
	PSE MEN/CAL RUB					ABI LAS Series		
	40	41	42	43	Mean n=4	45	46	Mean n=2
Pinus flexilis								
<1"	–	–	–	–	–	–	–	–
1–5"	–	–	–	–	–	–	–	–
5–9"	–	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–
Total	–	–	–	–	–	–	–	–
Pinus ponderosa								
<1"	–	–	–	–	–	–	–	–
1–5"	–	–	–	–	–	–	–	–
5–9"	–	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–
Total	–	–	–	–	–	–	–	–
Pseudotsuga menziesii								
<1"	1090	40	690	440	565	–	310	155
1–5"	30	280	210	–	130	–	20	10
5–9"	20	230	90	10	88	–	20	10
9–12"	–	60	10	–	18	–	10	5
>12"	10	–	30	–	10	–	–	–
Total	1150	610	1030	450	810	–	360	180
All Trees								
<1"	1200	40	700	450	598	150	550	350
1–5"	200	310	240	70	205	110	160	135
5–9"	160	250	110	220	185	70	190	130
9–12"	100	60	20	50	58	10	20	15
>12"	30	–	30	40	25	–	–	–
Total	1690	660	1100	830	1071	340	920	630

2.3 COLLECTION AND IDENTIFICATION OF PLANT TAXA

Voucher specimens of vascular plant taxa not positively identified in the field were collected and preserved for identification. To account for phenological variability, collections were made throughout the growing season (August 1989 and June - September 1990), with particularly intensive collection during the quantitative sampling periods (August 14-18, 1989 and August 30 - September 30, 1990).

A comprehensive plant species list was prepared, arranged alphabetically by binomial (Appendix A) using scientific nomenclature in USDA Forest Service (1987). Species were grouped by life form: perennial or annual graminoid, perennial or annual forb, subshrub, shrub and tree, and also identified by common name and origin (native or introduced). Taxonomic references included Hitchcock *et al.* (1955-1969), Hitchcock and Cronquist (1973), Dorn (1984), Cronquist *et al.* (1977), Hermann (1970) and Brunsfeld and Johnson (1985).

2.4 PLANT SPECIES OF SPECIAL CONCERN

Mr. John Joy of the Deerlodge National Forest, Mr. Stephen Shelly of the Montana Natural Heritage Program/U.S. Forest Service and Mr. Peter Lesica (consulting botanist) were consulted for information to target candidate sensitive plants in the study area. Searches were conducted for candidate taxa during all stages of field inventory, geared toward phenology and appropriate habitats. The comprehensive species list (Appendix A) was checked to document the occurrence of taxa listed by Mumma (1991), Lesica and Shelly (1991) and Reel *et al.* (1989).

Table H3. (Continued)

SPECIES/ DBH CLASS	ECODATA PLOT NUMBER							
	PSE MEN/CAL RUB					ABI LAS Series		
	40	41	42	43	Mean n=4	45	46	Mean n=2
Abies lasiocarpa								
<1"	–	–	–	–	–	80	30	55
1–5"	–	–	–	–	–	60	10	35
5–9"	–	–	–	–	–	20	–	10
9–12"	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–
Total	–	–	–	–	–	160	40	100
Juniperus scopulorum								
<1"	–	–	10	–	3	–	–	–
1–5"	–	–	–	–	–	–	–	–
5–9"	–	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–
Total	–	–	10	–	3	–	–	–
Picea engelmannii								
<1"	20	–	–	–	5	–	–	–
1–5"	10	–	–	–	3	–	–	–
5–9"	–	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–
Total	30	–	–	–	8	–	–	–
Pinus albicaulis								
<1"	–	–	–	–	–	70	60	65
1–5"	–	–	–	–	–	50	110	80
5–9"	–	–	–	–	–	50	30	40
9–12"	–	–	–	–	–	10	–	5
>12"	–	–	–	–	–	–	–	–
Total	–	–	–	–	–	180	200	190
Pinus contorta								
<1"	90	–	–	10	25	–	150	75
1–5"	160	30	30	70	73	–	20	10
5–9"	140	20	20	210	98	–	140	70
9–12"	100	–	10	50	40	–	10	5
>12"	20	–	–	40	15	–	–	–
Total	510	50	60	380	250	–	320	160

2.5 QUANTITATIVE SAMPLING

Sample sites were arbitrarily located and oriented insofar as they occurred in homogeneous vegetation units identified during reconnaissance of the study area. Sampling was conducted in 1989 using a transect/quadrat method. After consultation with the Deerlodge National Forest, sampling in 1990 was conducted using USFS (1987) ecodata plot methodology.

2.5.1 Sample Size

Transects and ecodata plots were located to characterize habitat/community types and sample inherent variability within types. A minimum of two samples was located in each major vegetation type and one sample was located in relatively minor types. The total of 73 quantitative sample sites included 27 transects sampled in the intensive study area in 1989 and 46 ecodata plots in the extensive study area in 1990 (Exhibit 1).

2.5.2 Cover Data

During 1989, canopy cover and frequency of occurrence were quantified using a system modified from Daubenmire (1968). At each transect site, a 50-meter fiberglass tape was stretched along the terrain contour or drainage bottom. Twenty 2x5 dm rectangular plots (Daubenmire frames) were placed at two-meter intervals on alternate sides of the tape. Non-stratified cover of each vascular plant species, bare ground, rock, litter, lichens, and mosses was estimated to the nearest percent. Total vegetation canopy cover values are reported as both non-stratified and stratified. Vascular plant species found on a transect site but not recorded in cover quadrats were listed as incidental species. A site description was also recorded for each transect including

Table H3. (Continued)

SPECIES/ DBH CLASS	ECODATA PLOT NUMBER											
	JUN SCO/AGR SPI			PIN FLE/AGR SPI			PIN FLE/ AGR SMI Bottom	PSE MEN/ JUN SCO Bottom	PSE MEN/FES IDA			PSE MEN/ FES SCA
	9	24	Mean n=2	8	20	Mean n=2	10	31	16	18	Mean n=2	30
Pinus flexilis												
<1"	10	10	10	170	10	90	20	10	20	80	50	40
1–5"	–	–	–	60	20	40	10	20	–	20	10	10
5–9"	–	–	–	–	60	30	10	30	–	20	10	–
9–12"	–	–	–	–	10	5	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–	–	–	–	–
Total	10	10	10	230	100	165	40	60	20	120	70	50
Pinus ponderosa												
<1"	–	–	–	–	–	–	–	–	–	–	–	–
1–5"	–	–	–	–	–	–	–	–	–	–	–	10
5–9"	–	–	–	–	–	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–	–	–	–	–
Total	–	–	–	–	–	–	–	–	–	–	–	10
Pseudotsuga menziesii												
<1"	–	–	–	20	20	20	–	700	70	390	230	120
1–5"	–	–	–	–	20	10	–	140	90	130	110	30
5–9"	–	–	–	–	–	–	–	110	30	70	50	140
9–12"	–	–	–	–	–	–	–	10	20	10	15	90
>12"	–	–	–	–	–	–	–	–	–	–	–	–
Total	–	–	–	20	40	30	–	960	210	600	405	380
All Trees												
<1"	40	270	155	430	530	480	290	1120	350	770	560	460
1–5"	30	20	25	200	200	200	380	360	210	450	330	90
5–9"	–	–	–	–	60	30	10	150	30	90	60	150
9–12"	–	–	–	–	10	5	–	10	20	10	15	90
>12"	–	–	–	–	–	–	–	–	–	–	–	–
Total	70	290	180	630	800	715	680	1640	610	1320	965	790

location, date, personnel, percent slope, aspect, transect azimuth, general soil type, elevation, topography and configuration. Slope was determined using a clinometer; aspect and azimuth were measured with a compass.

During 1990, cover values were recorded by species and cover class at each sample site using Ecodata methods developed by the U.S. Forest Service (Handbook 2090.11, Chapter 4). Data were recorded on General Plot Data Form 3 and Ocular Plant Species Data Form 4. Site descriptions were recorded for each 0.1-acre circular plot similarly to 1989 transect sites.

2.5.3 Shrub Density Data

Shrub densities were determined in 1989 using a 1x50-meter belt transect at each sample location and counting individuals of each shrub species rooted in the belt transect. Low shrubs were counted, but not subshrubs (*e.g. Artemisia frigida*). Shrub densities are presented in tabular format to include density by species and total shrub density by vegetation type.

During 1990 sampling, shrub densities were determined using the Ecodata method at each plot and recorded on USFS Form 8, Shrub Data. Low shrubs and tall shrubs were counted, but not subshrubs. Five 1/1000 acre, circular plots were randomly located in each ecodata plot. Shrub densities are presented in tabular format similarly to 1989 data.

2.5.4 Tree Data

Collection of tree data emphasized density rather than volume. During 1989 sampling, tree density was assessed by counting in a 10x10-meter square plot

Table H3. Live tree density (trees per acre) by species and plot for eight SAVANNAH and FOREST types, Elkhorn study area, 1990.

SPECIES/ DBH CLASS	ECODATA PLOT NUMBER											
	JUN SCO/AGR SPI			PIN FLE/AGR SPI			PIN FLE/ AGR SMI Bottom	PSE MEN/ JUN SCO Bottom	PSE MEN/FES IDA			PSE MEN/ FES SCA
	9	24	Mean n=2	8	20	Mean n=2	10	31	16	18	Mean n=2	30
Abies lasiocarpa												
<1"	–	–	–	–	–	–	–	–	–	–	–	–
1–5"	–	–	–	–	–	–	–	–	–	–	–	–
5–9"	–	–	–	–	–	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–	–	–	–	–
Total	–	–	–	–	–	–	–	–	–	–	–	–
Juniperus scopulorum												
<1"	30	260	145	240	500	370	270	410	260	300	280	300
1–5"	30	20	25	140	160	150	370	200	120	300	210	40
5–9"	–	–	–	–	–	–	–	10	–	–	–	10
9–12"	–	–	–	–	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–	–	–	–	–
Total	60	280	170	380	660	520	640	620	380	600	490	350
Picea engelmannii												
<1"	–	–	–	–	–	–	–	–	–	–	–	–
1–5"	–	–	–	–	–	–	–	–	–	–	–	–
5–9"	–	–	–	–	–	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–	–	–	–	–
Total	–	–	–	–	–	–	–	–	–	–	–	–
Pinus albicaulis												
<1"	–	–	–	–	–	–	–	–	–	–	–	–
1–5"	–	–	–	–	–	–	–	–	–	–	–	–
5–9"	–	–	–	–	–	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–	–	–	–	–
Total	–	–	–	–	–	–	–	–	–	–	–	–
Pinus contorta												
<1"	–	–	–	–	–	–	–	–	–	–	–	–
1–5"	–	–	–	–	–	–	–	–	–	–	–	–
5–9"	–	–	–	–	–	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–	–	–	–	–
Total	–	–	–	–	–	–	–	–	–	–	–	–

centered on each cover transect. Trees were separated by species and size class: less than 1-inch dbh (diameter at breast height), 1 to 6-inch dbh and greater than 6-inch dbh. Selected trees were measured to obtain data on height, diameter (dbh) and age.

During 1990 sampling, tree density was assessed by counting in each 0.1-acre ecodata plot. Trees were recorded by species and size class: less than 1-inch dbh, 1 to 5-inch dbh, 5 to 9-inch dbh, 9 to 12-inch dbh and greater than 12-inch dbh.

2.6 NOXIOUS WEEDS

Noxious weeds were quantitatively inventoried on transects and ecodata plots, and qualitatively inventoried throughout the study area to determine relative abundance and distribution.

2.7 EVALUATION OF DISTURBED AREAS

To aid in determining plant species suitable for revegetation, existing mine disturbances in the area were qualitatively evaluated to determine natural and artificial revegetation.

3.0 RESULTS AND DISCUSSION

Data are summarized for each type in appendix tables following the text. Narrative descriptions and tabular information provide a summary of site characteristics and vegetation parameters for the study area. Detailed plot data are also given in the appendices following the narrative section.

Table H2. Live tree density (trees per acre) by species and plot for seven SHRUB/GRASSLAND types, Elkhorn study area, 1990.

SPECIES/ DBH CLASS	ECODATA PLOT NUMBER												
	ART NOV/AGR SPI				ART TRI/AGR SPI			ART TRI/ FES IDA	ART TRI/FES SCA		ART TRI/ POA PRA	CHR NAU/ POA PRA	CER LED/ AGR SPI
	4	6	34	Mean n=5	17	21	Mean n=2	25	39	Mean n=2	n=1	n=1	22
Juniperus scopulorum													
<1"	40	10	70	24	20	40	30	10	50	25	–	–	170
1–5"	–	–	–	–	20	10	15	–	10	5	–	–	–
5–9"	–	–	–	–	–	–	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	40	10	70	24	40	50	45	10	60	30	–	–	170
Pinus flexilis													
<1"	10	–	–	2	–	–	–	–	–	–	–	–	40
1–5"	–	–	–	–	–	–	–	–	–	–	–	–	10
5–9"	–	–	–	–	–	–	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	10	–	–	2	–	–	–	–	–	–	–	–	50
Pseudotsuga menziesii													
<1"	–	–	–	–	–	–	–	–	10	5	–	–	20
1–5"	–	–	–	–	–	–	–	–	20	10	–	–	–
5–9"	–	–	–	–	–	–	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	–	–	–	–	–	–	–	–	30	15	–	–	20
All Trees													
<1"	50	10	70	26	20	40	30	10	60	30	–	–	230
1–5"	–	–	–	–	20	10	15	–	30	15	–	–	10
5–9"	–	–	–	–	–	–	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	50	10	70	26	40	50	45	10	90	45	–	–	240

Note: No trees were present in plots 32, 33 (Art nov/Agr spi type) and plot 27 (Art tri/Fes sca type).

3.1 VEGETATION TYPE DESCRIPTIONS

Thirty-two vegetation types identified in the Elkhorn Project study area were quantitatively sampled during 1989 and 1990 (Table 1). The study area and sample locations are shown on Exhibit 1. Types sampled included six grassland types, seven shrub/grassland types, thirteen forest and savannah types, three bottomland types and three miscellaneous types. Disturbed areas were qualitatively described.

3.1.1 Grassland Types

Mueggler and Stewart (1980) have defined grassland habitat types for Montana. The six grassland habitat types identified for the Elkhorn study area (Table 1) are listed in approximate order of low to high elevation and dry to moist water regime. The first three types, found in the southern half of the study area, show affinities with Great Plains flora and are common to the intermontane valleys of western Montana. The other three grassland types are common to foothills and mountains of western Montana. Summary data for each type may be found in Appendix Tables B1, D1 and D2 (canopy cover), E1 and F1 (shrub density), and G1 and H1 (tree density).

Stipa comata/Bouteloua gracilis type

The *Stipa comata/Bouteloua gracilis* habitat type was sampled on two gently sloping sites of southerly aspect. Elevations were 5065-5180 feet (Appendix L). This is the driest grassland habitat type in western Montana (Mueggler and Stewart 1980). It occupies gently sloping alluvial/colluvial fans, benches and flats in the southern half of the study area.

Table H1. Live tree density (trees per acre) by species and plot for five GRASSLAND types, Elkhorn study area, 1990.

SPECIES/ DBH CLASS	ECODATA PLOT NUMBER						
	STI COM/ BOU GRA	AGR SPI/POA SAN		AGR SPI/BOU GRA		FES IDA/ AGR SPI	FES SCA/ AGR SPI
	n=2	26	Mean n=2	3	Mean n=5	n=1	n=1
Juniperus scopulorum							
<1"	–	90	45	20	4	–	–
1–5"	–	–	–	10	2	–	–
5–9"	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–
Total	–	90	45	30	6	–	–
						–	–
Pinus flexilis						–	–
<1"	–	10	5	–	–	–	–
1–5"	–	–	–	–	–	–	–
5–9"	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–
Total	–	10	5	–	–	–	–
						–	–
All Trees						–	–
<1"	–	100	50	20	4	–	–
1–5"	–	–	–	10	2	–	–
5–9"	–	–	–	–	–	–	–
9–12"	–	–	–	–	–	–	–
>12"	–	–	–	–	–	–	–
Total	–	100	50	30	6	–	–

Note: No trees were present in plot 15 (Agr spi/Poa san type) and plots 1, 7, 12, 19 (Agr spi/Bou gra type).

Table 1. Vegetation type classification of transects and plots sampled in the Gold Fields Elkhorn study area, Jefferson County, Montana, 1989-1990.

VEGETATION TYPES	1989 TRANSECTS	1990 ECODATA PLOTS
Grassland		
Stipa comata/Bouteloua gracilis	-	5,14
Agropyron spicatum/Bouteloua gracilis	-	1,3,7,12,19
Agropyron spicatum/Poa sandbergii	-	15,26
Festuca idahoensis/Agropyron spicatum	-	23
Festuca scabrella/Agropyron spicatum	-	28
Festuca scabrella/Festuca idahoensis	16,26	-
Shrub/Grassland		
Artemisia nova/Agropyron spicatum	-	4,6,32,33,34
Artemisia tridentata/Agropyron spicatum	-	17,21
Artemisia tridentata/Festuca idahoensis	2,11	25
Artemisia tridentata/Festuca scabrella	-	27,39
Artemisia tridentata/Poa pratensis c.t.	-	44
Chrysothamnus nauseosus/Poa pratensis c.t.	-	29
Cercocarpus ledifolius/Agropyron spicatum	-	22
Forest/Savannah		
Juniperus scopulorum/Agropyron spicatum	-	9,24
Pinus flexilis/Agropyron spicatum	-	8,20
Pinus flexilis/Agropyron smithii bottom	-	10
Pseudotsuga menziesii/Juniperus scopulorum bottom	-	31
Pseudotsuga menziesii/Festuca idahoensis	18	16,18
Pseudotsuga menziesii/Festuca scabrella	8	30
Pseudotsuga menziesii/Juniperus communis	15,22,24,25,27	-
Pseudotsuga menziesii/Carex geyeri	13	-
Pseudotsuga menziesii/Calamagrostis rubescens	1,3,4,5,6,7,9,10,12, 14,17,19,20	40,41,42,43
Picea engelmannii/Smilacina stellata	21	-
Picea engelmannii/Galium triflorum	23	-
Abies lasiocarpa-Pinus albicaulis/scree	-	45
Abies lasiocarpa/Vaccinium scoparium	-	46
Bottomland		
Poa pratensis/Carex praegracilis	-	37
Potentilla fruticosa/Deschampsia cespitosa	-	38
Salix geyeriana	-	11,36
Miscellaneous		
Tame Pasture	-	13
Placer Mining	-	2
Reclamation	-	35
TOTAL SAMPLE SITES	27	46

Perennial graminoids averaged 57 percent cover, primarily *Bouteloua gracilis* (20 percent cover), *Koeleria cristata* (11), *Stipa comata* (9), *Poa sandbergii* (7), *Aristida longiseta* (6) and *Carex stenophylla* (3). Perennial forbs averaged only 8 percent cover, the most conspicuous being *Phlox muscoides* (2) and *Opuntia polyacantha* (1). Subshrubs were prominent at about 17 percent cover, reflecting historic grazing use (*Gutierrezia sarothrae* averaged 10 percent and *Artemisia frigida* 7 percent). Shrubs were an inconspicuous component of study area *Stipa comata/Bouteloua gracilis* stands.

Agropyron spicatum/Bouteloua gracilis type

The *Agropyron spicatum/Bouteloua gracilis* habitat type was sampled at five sites on gentle and moderately steep slopes of variable (except northeasterly) aspect. Elevations were 5015-5260 feet. This was an extensive type in the southern part of the study area.

Perennial graminoids averaged 59 percent cover, dominated by *Bouteloua gracilis* (16 percent cover), *Koeleria cristata* (13), *Agropyron spicatum* (9), *Poa sandbergii* (8) and *Stipa comata* (7). Perennial forbs averaged 14 percent cover, primarily *Opuntia polyacantha* (2 percent cover), *Antennaria parvifolia* (1), *Artemisia dracunculus* (1), *Liatris punctata* (1) and *Phlox muscoides* (1). Similarly to other low-elevation grassland types in the study area, historic grazing pressure was evidenced by relatively high cover values of *Gutierrezia sarothrae* (11 percent), *Artemisia frigida* (9) and *Selaginella densa* (9). The shrub component was insignificant.

APPENDIX H

Tree Density (trees per acre) by transect for twenty-three vegetation types sampled in the Elkhorn study area, 1990.

Table	Vegetation Types	Page
H1	GRASSLAND (five types)	H-2
H2	SHRUB/GRASSLAND (seven types)	H-3
H3	FOREST/SAVANNAH (eight types)	H-4

Agropyron spicatum/Poa sandbergii type

The *Agropyron spicatum/Poa sandbergii* habitat type was sampled on two moderately steep middle and upper slopes of westerly and northerly aspect. Elevations were 5180-5600 feet. The type was confined to the southern half of the study area.

Perennial graminoids averaged 52 percent cover, dominated by *Agropyron spicatum* (20 percent cover), *Poa sandbergii* (15), *Koeleria cristata* (12) and *Stipa comata* (3). Perennial forbs averaged 15 percent cover, primarily *Allium cernuum*, *Antennaria microphylla*, *Astragalus adsurgens*, *Erigeron compositus*, *Linum lewisii* and *Phlox alyssifolia*. *Selaginella densa* averaged 16 percent cover. Subshrub cover was high at 17 percent, including *Gutierrezia sarothrae* (10 percent) and *Artemisia frigida* (7). *Artemisia nova* was the only notable shrub (2 percent cover), indicating site affinities with adjacent black sagebrush stands.

Festuca idahoensis/Agropyron spicatum type

The *Festuca idahoensis/Agropyron spicatum* habitat type was sampled on an 18 percent midslope of westerly aspect. Elevation was 5480 feet. The type is a relatively minor type in foothill portions of the study area.

Perennial graminoids averaged 55 percent cover, primarily *Festuca idahoensis* (30 percent cover) and *Agropyron spicatum* (20). Perennial forbs averaged 16 percent cover, chiefly *Antennaria microphylla* and *Arenaria congesta* each at 3 percent cover. *Selaginella densa* coverage (30 percent) indicated shallow

Table G4. Live tree density (trees per acre) by species and transect for the PICEA ENGELMANNII/ SMILACINA STELLATA, PICEA ENGELMANNII/GALIUM TRIFLORUM and PICEA ENGELMANNII series types, Elkhorn study area, 1989.

SPECIES/ DBH CLASS	TRANSECT NUMBER		
	Picea engelmannii/ Smilacina stellata	Picea engelmannii/ Galium triflorum	Picea engelmannii Series
	21	23	Mean n=2
Juniperus scopulorum			
<1"	–	–	–
1–6"	–	–	–
>6"	–	–	–
Total	–	–	–
Picea engelmannii			
<1"	81	81	81.0
1–6"	202	81	141.5
>6"	81	162	121.5
Total	364	324	344.0
Pinus contorta			
<1"	–	–	–
1–6"	–	–	–
>6"	243	–	121.5
Total	243	–	121.5
Pinus flexilis			
<1"	–	–	–
1–6"	–	–	–
>6"	–	–	–
Total	–	–	–
Pseudotsuga menziesii			
<1"	–	40	20.0
1–6"	–	40	20.0
>6"	40	40	40.0
Total	40	121	80.9
All Trees			
<1"	81	121	101.0
1–6"	202	121	162.0
>6"	364	202	283.0
Total	647	445	546.0

substrate in conjunction with historic grazing. Subshrubs and shrubs were relatively minor components of the site sampled.

Festuca scabrella/Agropyron spicatum type

The *Festuca scabrella/Agropyron spicatum* habitat type (a minor type) was sampled on a 22 percent midslope of northerly aspect. Elevation was 5520 feet.

Perennial graminoids averaged 72 percent cover, dominated by *Festuca idahoensis* (30 percent cover), *Agropyron spicatum* (20), *Festuca scabrella* (10) and *Koeleria cristata* (10). Perennial forbs averaged 21 percent cover, including *Achillea millefolium*, *Antennaria microphylla*, *Arenaria congesta*, *Comandra umbellata* and *Haplopappus acaulis*, each at 3 percent cover. *Selaginella densa* averaged 10 percent cover. Subshrubs and shrubs were minor components.

Festuca scabrella/Festuca idahoensis type

The *Festuca scabrella/Festuca idahoensis* habitat type was sampled on two moderately sloping sites of westerly aspect. Elevations were 6915-6955 feet (Appendix K). Sites sampled represent the drier phase of the type described by Mueggler and Stewart (1980), and are generally situated in relatively small parks on ridge shoulders in the northern half of the study area.

Perennial graminoids averaged 39 percent cover, dominated by *Festuca scabrella* (18 percent cover), *Festuca idahoensis* (8), *Koeleria cristata* (5), *Poa scabrella* (2), *Agropyron spicatum* (2) and *Danthonia intermedia* (2). Perennial forbs averaged 26 percent cover, including *Arenaria congesta* (8 percent cover),

Table G3. Live tree density (trees per acre) by species and transect for the PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS type, Elkhorn study area, 1989.

SPECIES/ DBH CLASS	TRANSECT NUMBER													
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS													
	1	3	4	5	6	7	9	10	12	14	17	19	20	Mean n=13
Juniperus scopulorum														
<1"	–	–	–	–	–	162	–	–	–	–	–	–	–	12.5
1–6"	–	–	–	–	–	–	–	–	–	–	–	–	121	9.3
>6"	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	–	–	–	–	–	162	–	–	–	–	–	–	121	21.8
Picea engelmannii														
<1"	–	–	–	–	–	–	–	–	–	40	–	–	–	3.1
1–6"	–	–	–	–	–	–	–	–	–	–	–	–	–	–
>6"	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	–	–	–	–	–	–	–	–	–	40	–	–	–	3.1
Pinus contorta														
<1"	40	81	–	–	–	40	364	–	–	–	–	40	–	43.5
1–6"	567	2671	283	162	–	–	–	81	–	40	324	1457	–	429.6
>6"	243	243	405	121	40	243	202	202	–	121	162	162	–	164.9
Total	850	2995	688	283	40	283	566	283	–	161	486	1659	–	638.0
Pinus flexilis									–				–	
<1"	81	–	–	–	–	–	121	–	–	40	–	–	–	18.6
1–6"	–	–	–	–	–	–	–	–	–	–	–	–	–	–
>6"	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	81	–	–	–	–	–	121	–	–	40	–	–	–	18.6
Pseudotsuga menziesii														
<1"	1052	40	–	121	121	1781	283	162	40	40	121	40	809	354.8
1–6"	162	–	–	40	283	40	243	–	445	40	486	40	121	146.3
>6"	81	–	40	81	40	40	81	40	202	81	162	40	121	77.8
Total	1295	40	40	243	445	1862	607	202	688	162	769	121	1051	578.9
All Trees														
<1"	1173	121	–	121	121	1983	768	162	40	121	121	81	809	432.4
1–6"	729	2671	283	202	283	40	243	81	445	81	810	1497	243	585.2
>6"	324	243	445	202	80	283	283	243	202	202	324	202	121	242.7
Total	2226	3035	728	525	486	2306	1294	486	688	404	1255	1780	1172	1260.3

Antennaria microphylla (6), *Agoseris glauca* (2) and *Erigeron caespitosus* (2). *Selaginella densa* averaged 7 percent cover.

3.1.2 Shrub/Grassland Types

Shrub/grass types in the study area were identified using the habitat type classification of Mueggler and Stewart (1980). The five shrub habitat types identified (Table 1) included one in the *Artemisia nova* series, three in the *Artemisia tridentata* series and one in the *Cercocarpus ledifolius* series. Two shrub types which showed pronounced compositional disturbance due to historic grazing, *Artemisia tridentata/Poa pratensis* and *Chrysothamnus nauseosus/Poa pratensis*, were named as community types based on existing species dominance. Similar to grassland, shrubland types were more prevalent and diverse in the plains and rolling hills of the southern half of the study area. In the northern half, big sagebrush stands generally occupied lower slopes and toeslopes on warm aspects, and relatively small, mesic parks at higher elevations. All shrub/grassland types identified are common in southwestern Montana. Summary data for each type may be found in Appendix Tables B1, D3 and D4 (canopy cover), E1 and F2 (shrub density), and G1 and H2 (tree density).

Artemisia nova/Agropyron spicatum type

The *Artemisia nova/Agropyron spicatum* habitat type was sampled at five sites on various slope positions (footslopes to ridges) of southerly aspect and gentle to moderately steep slopes. Soils were well drained and this is "one of the driest mountain shrubland types occurring in western Montana" (Mueggler and

Table G2. Live tree density (trees per acre) by species and transect for the PSEUDOTSUGA MENZIESII/FESTUCA IDAHOENSIS, PSEUDOTSUGA MENZIESII/FESTUCA SCABRELLA, PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS and PSEUDOTSUGA MENZIESII/CAREX GEYERI types, Elkhorn study area, 1989.

SPECIES/ DBH CLASS	TRANSECT NUMBER								
	PSE MEN/ FES IDA	PSE MEN/ FES SCA	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS						PSE MEN/ CAR GEY
	18	8	15	22	24	25	27	Mean n=5	13
Juniperus scopulorum									
<1"	40	81	607	121	162	81	243	242.8	81
1–6"	–	–	40	162	–	–	202	80.8	–
>6"	–	–	–	–	–	–	–	–	–
Total	40	81	647	283	162	81	445	323.6	81
Picea engelmannii									
<1"	–	–	–	–	–	243	–	48.6	–
1–6"	–	–	–	–	–	–	–	–	–
>6"	–	–	–	–	–	–	–	–	–
Total	–	–	–	–	–	243	–	48.6	–
Pinus contorta									–
<1"	–	–	–	–	–	243	–	48.6	–
1–6"	–	–	–	–	–	324	–	64.8	–
>6"	–	–	–	–	–	364	–	72.8	121
Total	–	–	–	–	–	931	–	186.2	121
Pinus flexilis									
<1"	–	–	–	–	–	–	–	–	–
1–6"	–	–	–	–	–	–	40	8.0	–
>6"	–	–	–	–	–	–	–	–	–
Total	–	–	–	–	–	–	40	8.0	–
Pseudotsuga menziesii									
<1"	688	162	728	162	202	890	2833	963.0	1700
1–6"	81	121	202	121	202	40	–	113.2	–
>6"	–	121	243	–	202	–	40	97.2	202
Total	769	404	1173	283	606	930	2873	1173.4	1902
All Trees									
<1"	728	243	1335	283	364	1457	3076	1303.0	1781
1–6"	81	121	243	283	202	364	243	267.0	–
>6"	–	121	243	–	202	364	40	169.8	323
Total	809	485	1821	566	768	2185	3358	1739.8	2104

Stewart 1980). Elevations were 5060-5680 feet. The type was extensive in the southeastern part of the study area.

Shrubs averaged 27 percent cover, primarily *Artemisia nova* (26 percent). Perennial graminoids averaged 36 percent cover, including *Stipa comata* (8 percent cover), *Koeleria cristata* (7), *Agropyron spicatum* (6), *Bouteloua gracilis* (5) and *Poa sandbergii* (4), reflecting elements of adjacent grassland stands. Perennial forbs averaged 12 percent cover, including *Phlox muscoides*, *Opuntia polyacantha*, *Paronychia sessiliflora*, *Phlox hoodii* and *Taraxacum officinale*, each averaging about 1 percent cover. Subshrubs, at 7 percent cover, included *Gutierrezia sarothrae* (6 percent) and *Artemisia frigida* (1). Scattered, generally small *Juniperus scopulorum* plants were present in some *Artemisia nova* stands (averaging nearly 1 percent cover); these stands showed site and compositional similarities to, and may be early successional to, the *Juniperus scopulorum/ Agropyron spicatum* type.

Artemisia tridentata/Agropyron spicatum type

The *Artemisia tridentata/Agropyron spicatum* habitat type was sampled on two midslopes of 4-12 percent slope. One site was a northeast aspect, and the other a southeast aspect. Elevations were 5320-5330 feet (Appendix L). This is a relatively common type in the study area.

The type was compositionally similar to the *Artemisia nova/Agropyron spicatum* type, except for the exchange of sagebrush species. Shrubs averaged 27 percent cover, almost entirely *Artemisia tridentata*. Perennial graminoids averaged 54 percent cover, primarily *Agropyron spicatum* (20 percent cover),

Table G1. Live tree density (trees per acre) by species and transect for the FESTUCA SCABRELLA/ FESTUCA IDAHOENSIS and ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS types, Elkhorn study area, 1989.

SPECIES/ DBH CLASS	TRANSECT NUMBER					
	FESTUCA SCABRELLA/ FESTUCA IDAHOENSIS			ARTEMISIA TRIDENTATA/ FESTUCA IDAHOENSIS		
	16	26	Mean n=2	2	11	Mean n=2
Juniperus scopulorum						
<1"	–	–	–	–	–	–
1–6"	–	–	–	–	–	–
>6"	–	–	–	–	–	–
Total	–	–	–	–	–	–
Picea engelmannii						
<1"	–	–	–	–	–	–
1–6"	–	–	–	–	–	–
>6"	–	–	–	–	–	–
Total	–	–	–	–	–	–
Pinus contorta						
<1"	–	–	–	–	–	–
1–6"	–	–	–	–	–	–
>6"	–	–	–	–	–	–
Total	–	–	–	–	–	–
Pinus flexilis						
<1"	–	–	–	–	–	–
1–6"	–	–	–	–	–	–
>6"	–	–	–	–	–	–
Total	–	–	–	–	–	–
Pseudotsuga menziesii						
<1"	–	81	40.5	40	–	20.0
1–6"	–	–	–	–	–	–
>6"	–	–	–	–	–	–
Total	–	81	40.5	40	–	20.0
All Trees						
<1"	–	81	40.5	40	–	20.0
1–6"	–	–	–	–	–	–
>6"	–	–	–	–	–	–
Total	–	81	40.5	40	–	20.0

Koeleria cristata (15) and *Poa sandbergii* (10). *Bouteloua gracilis, Agropyron smithii* and *Carex stenophylla* each averaged about 2 percent cover. Perennial forbs averaged 18 percent cover, including *Astragalus adsurgens* (3 percent cover), *Antennaria microphylla* (2), *Opuntia polyacantha* (2) and *Phlox hoodii* (1). *Selaginella densa* averaged 5 percent cover. Subshrubs averaged only about 3 percent cover, chiefly *Gutierrezia sarothrae*. *Juniperus scopulorum* was well represented in area *Artemisia tridentata/Agropyron spicatum* stands, averaging 4 percent cover.

Artemisia tridentata/Festuca idahoensis type

The *Artemisia tridentata/Festuca idahoensis* habitat type was sampled on three moderate to moderately steep, often mesic middle to upper slopes. Aspects were southeasterly and elevations were 5520-7150 feet.

The herbaceous union in particular indicated the more mesic nature of this type compared to the *Artemisia nova/Agropyron spicatum* and *Artemisia tridentata/Agropyron spicatum* types. Shrubs averaged 24 percent cover, entirely *Artemisia tridentata*, ranging from 8 to 40 percent cover on the three sites sampled. Perennial graminoids averaged 57 percent cover, primarily *Poa pratensis* (20 percent cover, reflecting historic livestock utilization), *Festuca idahoensis* (10) and *Agropyron spicatum* (9). Other important graminoids were *Agropyron caninum, Bromus carinatus* and *Stipa occidentalis* (each at 2 percent cover), as well as *Festuca scabrella* and *Koeleria cristata* (each at 1 percent). Perennial forbs averaged 37 percent cover, including *Lupinus sericeus* (5 percent cover), *Cerastium arvense* (4), *Balsamorhiza sagittata* (3), *Helianthella uniflora* (3), *Achillea millefolium* (3), *Eriogonum umbellatum* (3), *Galium boreale*

(3) and *Senecio serra* (2). Annual/biennial forbs averaged about 2 percent cover. Subshrubs and trees were insignificant components of the *Artemisia tridentata/Festuca idahoensis* stands sampled.

Artemisia tridentata/Festuca scabrella type

The *Artemisia tridentata/Festuca scabrella* habitat type was sampled on two relatively steep midslopes of easterly aspect. Elevations were 5560-6040 feet.

This type is compositionally more mesic than *Artemisia tridentata/Festuca idahoensis*; relatively low cover values for *Festuca scabrella* indicate historic grazing. Shrubs averaged 22 percent cover, almost entirely *Artemisia tridentata*. Perennial graminoids averaged 50 percent cover, dominated by *Festuca idahoensis* (15 percent cover), *Festuca scabrella* (14), *Agropyron spicatum* (13) and *Koeleria cristata* (5). Perennial forbs averaged 20 percent cover, including *Lupinus sericeus* (6 percent cover), *Antennaria microphylla* (3), *Arenaria congesta* (3), *Eriogonum umbellatum* (2), *Haplopappus acaulis* (2) and *Potentilla glandulosa* (1). *Selaginella densa* averaged 5 percent cover, and annual/biennial forbs about 4 percent cover. Subshrubs, at 3 percent cover, included *Gutierrezia sarothrae* (2) and *Berberis repens* (1). Scattered, young trees, including *Juniperus scopulorum* and *Pseudotsuga menziesii*, have invaded some *Artemisia tridentata/Festuca scabrella* sites.

Artemisia tridentata/Poa pratensis type

The *Artemisia tridentata/Poa pratensis* community type was sampled on a gently sloping bench of south aspect in the southern half of the study area. Elevation was 5330 feet. This type is relatively minor.

APPENDIX G

Tree Density (trees per acre) by transect for nine vegetation types sampled in the Elkhorn study area, 1989.

Table	Vegetation Types	Page
	GRASSLAND	
G1	*Festuca scabrella/Festuca idahoensis*	G-2
	SHRUB/GRASSLAND	
G1	*Artemisia tridentata/Festuca idahoensis*	G-2
	FOREST/SAVANNAH	
G2	*Pseudotsuga menziesii/Festuca idahoensis*	G-3
G2	*Pseudotsuga menziesii/Festuca scabrella*	G-3
G2	*Pseudotsuga menziesii/Juniperus communis*	G-3
G2	*Pseudotsuga menziesii/Carex geyeri*	G-3
G3	*Pseudotsuga menziesii/Calamagrostis rubescens*	G-4
G4	*Picea engelmannii/Smilacina stellata*	G-5
G4	*Picea engelmannii/Galium triflorum*	G-5

The type is a highly degraded, grazing-induced sere of a big sagebrush or grassland type (perhaps *Artemisia tridentata/Festuca idahoensis* or *Festuca idahoensis/Agropyron spicatum*) where big sagebrush and introduced grasses have largely replaced native decreaser species. Shrubs averaged 60 percent cover, with *Artemisia tridentata* at 50 percent and *Chrysothamnus nauseosus* at 10 percent. Perennial graminoids averaged 63 percent cover, primarily *Poa pratensis* (48 percent cover) and *Agropyron repens* (8). Other grasses were *Poa juncifolia* (3 percent cover), *Koeleria cristata* (2) and *Bromus inermis* (2). Perennial forbs averaged only 6 percent cover, chiefly *Taraxacum officinale*. Annual/biennial forbs had 2 percent cover and a subshrub (*Artemisia frigida*) was at 5 percent cover.

Chrysothamnus nauseosus/Poa pratensis type

The *Chrysothamnus nauseosus/Poa pratensis* community type was sampled on a 5 percent footslope of southwesterly aspect. Elevation was 5200 feet.

Like the *Artemisia tridentata/Poa pratensis* type, this community is a severely degraded grazing sere of rather limited extent in the study area. Shrubs averaged 34 percent cover, primarily *Chrysothamnus nauseosus* (30 percent) and *Rosa woodsii* (3). Perennial graminoids averaged 75 percent cover, primarily *Poa pratensis* (40 percent cover), *Agropyron smithii* (30) and *Poa juncifolia* (3). Annual grass (*Bromus tectorum*) had 10 percent cover. Perennial forbs averaged 16 percent cover, including *Taraxacum officinale* (10 percent cover) and *Achillea millefolium* (3). Annual/biennial forbs had 4 percent cover and subshrubs (mostly *Artemisia frigida*) about 4 percent.

Table F4. Shrub density (plants per acre) by species and plot for three BOTTOMLAND types, Elkhorn study area, 1990.

SPECIES/AGE CLASS	ECODATA PLOT NUMBER				
	POA PRA/ CAR PRA	POT FRU/ DES CES	SAL GEY		
	37	38	11	36	Mean n=2
Potentilla fruticosa					
seedling	–	–	–	–	–
immature	–	1400	–	–	–
mature	–	2600	–	–	–
decadent	–	–	–	–	–
dead	–	200	–	–	–
Total live	–	4000	–	–	–
Ribes inerme					
seedling	–	–	–	–	–
immature	–	–	–	–	–
mature	–	–	–	1400	700
decadent	–	–	–	–	–
dead	–	–	–	–	–
Total live	–	–	–	1400	700
Ribes setosum					
seedling	–	–	–	–	–
immature	–	–	–	–	–
mature	–	–	1200	–	600
decadent	–	–	–	–	–
dead	–	–	–	–	–
Total live	–	–	1200	–	600
Rosa woodsii					
seedling	–	–	–	–	–
immature	–	–	–	–	–
mature	–	–	4600	–	2300
decadent	–	–	–	–	–
dead	–	–	–	–	–
Total live	–	–	4600	–	2300
Rubus idaeus					
seedling	–	–	–	–	–
immature	–	–	–	–	–
mature	–	–	400	2400	1400
decadent	–	–	–	–	–
dead	–	–	–	–	–
Total live	–	–	400	2400	1400
Salix bebbiana					
seedling	–	–	–	–	–
immature	–	200	–	–	–
mature	–	1200	–	–	–
decadent	–	–	–	–	–
dead	–	–	–	–	–
Total live	–	1400	–	–	–
Salix boothii					
seedling	–	–	–	–	–
immature	–	–	–	–	–
mature	–	–	–	1000	500
decadent	–	–	–	–	–
dead	–	–	–	–	–
Total live	–	–	–	1000	500
Salix drummondiana					
seedling	–	–	–	–	–
immature	–	–	–	–	–
mature	–	–	–	800	400
decadent	–	–	–	400	200
dead	–	–	–	–	–
Total live	–	–	–	1200	600
Salix geyeriana					
seedling	–	–	–	–	–
immature	–	200	3000	–	1500
mature	–	200	3800	800	2300
decadent	–	–	–	200	100
dead	–	–	–	–	–
Total live	–	400	6800	1000	3900
TOTAL SHRUBS					
SEEDLING	–	–	–	–	–
IMMATURE	–	1800	3000	–	1500
MATURE	–	4000	10,000	6400	8200
DECADENT	–	–	–	600	300
DEAD	–	200	–	–	–
TOTAL LIVE	–	5800	13,000	7000	10,000

Cercocarpus ledifolius/Agropyron spicatum type

The *Cercocarpus ledifolius/Agropyron spicatum* habitat type was sampled on a moderately steep ridge of westerly aspect. Elevation was 5490 feet. Soils were shallow and very rocky, typical of dry sites occupied by this type. This was a minor type on limestone ridges.

Shrubs averaged 30 percent cover, entirely *Cercocarpus ledifolius*. The understory was quite sparse, with perennial graminoids averaging 8 percent cover, primarily *Carex rossii* and *Oryzopsis hymenoides* (each at 3 percent cover). Perennial forbs averaged 10 percent cover, with *Phlox alyssifolia* the only noteworthy forb at 3 percent. Annual/biennial forbs had 2 percent cover and subshrubs only 1 percent. *Juniperus scopulorum* was usually associated with *Cercocarpus ledifolius*, averaging 3 percent cover in the stand sampled.

3.1.3 Forest and Savannah Types

Pfister *et al.* (1977) have defined forest habitat types for Montana. Joy and Cole (1975) have done the same for the Deerlodge National Forest. The thirteen forest types identified for the Elkhorn study area (Table 1) are listed in approximate order of low to high elevation and dry to moist water regime. The first four types, found in the southern half of the study area, are mostly associated with foothills topography. Of these four, only *Pinus flexilis/ Agropyron spicatum* is described by Pfister *et al.* (1977); the other three were named for this study as community types based on existing species dominance. The remaining nine forest habitat types are common to higher foothills and mountains of western Montana. Summary data for each type may be found in Appendix Tables B2, B3, D5, D6 and D7 (canopy cover), E2, E3, E4 and F3

Table F3. (Continued)

SPECIES/AGE CLASS	ECODATA PLOT NUMBER																			
	JUN SCO/AGR SPI			PIN FLE/AGR SPI			PIN FLE/ AGR SMI Bottom	PSE MEN/ JUN SCO Bottom	PSE MEN/FES IDA			PSE MEN/ FES SCA	PSE MEN/CAL RUB					ABI LAS Series		
	9	24	Mean n=2	8	20	Mean n=2	10	31	16	18	Mean n=2	30	40	41	42	43	Mean n=4	45	46	Mean n=2
Rosa acicularis																				
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
immature	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
mature	–	–	–	–	–	–	–	–	–	–	–	–	800	5200	–	6600	3150	–	–	–
decadent	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total live	–	–	–	–	–	–	–	–	–	–	–	–	800	5200	–	6600	3150	–	–	–
Rosa arkansana																				
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
immature	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
mature	200	–	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
decadent	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total live	200	–	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Spirea betulifolia																				
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
immature	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
mature	–	–	–	–	–	–	–	–	–	–	–	–	13,400	6600	8800	10,200	9750	–	–	–
decadent	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total live	–	–	–	–	–	–	–	–	–	–	–	–	13,400	6600	8800	10,200	9750	–	–	–
Vaccinium scoparium																				
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
immature	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
mature	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3200	800	8800	–	4400
decadent	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total live	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3200	800	8800	–	4400
TOTAL SHRUBS																				
SEEDLING	–	–	–	1400	–	700	–	–	–	–	–	–	–	–	–	–	–	–	–	–
IMMATURE	200	200	200	–	600	300	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MATURE	800	2200	1500	3800	2800	3300	1000	200	200	–	100	–	17,400	13,400	9800	20,600	15,300	9400	800	5100
DECADENT	–	–	–	1400	600	1000	–	–	–	–	–	–	–	–	–	–	–	–	–	–
DEAD	–	200	100	1400	400	900	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL LIVE	1000	2400	1700	6600	4000	5300	1000	200	200	–	100	–	17,400	13,400	9800	20,600	15,300	9400	800	5100

(shrub density), G2, G3, G4 and H3 (tree density) and I1 and J1 (site tree information).

Juniperus scopulorum/Agropyron spicatum type

The *Juniperus scopulorum/Agropyron spicatum* community type was sampled on two moderately steep to steep sites, on middle and upper slopes. Aspect was southeasterly and elevations were 5020-5330 feet. This type is fairly common in the southern half of the study area.

The type is compositionally very similar to the *Artemisia nova/Agropyron spicatum* and *Artemisia tridentata/Agropyron spicatum* types except for the prevalence of *Juniperus scopulorum*. Trees averaged 16 percent cover, with *Juniperus scopulorum* at 15 percent and trace coverage of *Pinus flexilis*. Perennial graminoids averaged 41 percent cover, primarily *Agropyron spicatum* (20 percent cover), *Aristida longiseta* (5), *Stipa comata* (5), *Poa sandbergii* (3) and *Koeleria cristata* (2). Perennial forbs averaged 20 percent cover, including *Eriogonum ovalifolium* (5 percent cover), *Paronychia sessiliflora* (2) and *Phlox alyssifolia* (2). Other conspicuous forbs were *Chrysopsis villosa*, *Hedeoma drummondii* and *Opuntia polyacantha*. Annual/biennial forbs had less than 2 percent cover and subshrubs had 5 percent, including *Gutierrezia sarothrae* (3) and *Artemisia frigida* (2). Shrubs were well represented in study area stands at 8 percent cover, chiefly *Artemisia nova* (5 percent) and *Artemisia tridentata* (about 2 percent).

Table F3. Shrub density (plants per acre) by species and plot for eight SAVANNAH and FOREST types, Elkhorn study area, 1990.

SPECIES/AGE CLASS	ECODATA PLOT NUMBER																			
	JUN SCO/AGR SPI			PIN FLE/AGR SPI			PIN FLE/ AGR SMI Bottom	PSE MEN/ JUN SCO Bottom	PSE MEN/FES IDA			PSE MEN/ FES SCA	PSE MEN/CAL RUB					ABI LAS Series		
	9	24	Mean n=2	8	20	Mean n=2	10	31	16	18	Mean n=2	30	40	41	42	43	Mean n=4	45	46	Mean n=2
Amelanchier alnifolia																				
seedling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
mature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200	-	50	-	-	-
decadent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total live	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200	-	50	-	-	-
Artemisia nova																				
seedling	-	-	-	1400	-	700	-	-	-	-	-	-	-	-	-	-	-	-	-	-
immature	-	200	100	-	600	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-
mature	-	2200	1100	3800	2800	3300	600	-	-	-	-	-	-	-	-	-	-	-	-	-
decadent	-	-	-	1400	600	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dead	-	200	100	1400	400	900	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total live	-	2400	1200	6600	4000	5300	600	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia tridentata																				
seedling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
mature	600	-	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
decadent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total live	600	-	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juniperus communis																				
seedling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
mature	-	-	-	-	-	-	-	-	-	-	-	-	3200	600	800	600	1300	600	600	600
decadent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total live	-	-	-	-	-	-	-	-	-	-	-	-	3200	600	800	600	1300	600	600	600
Lonicera utahensis																				
seedling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
mature	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-	-	250	-	-	-
decadent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total live	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-	-	250	-	-	-
Rhus aromatica																				
seedling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
immature	200	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
mature	-	-	-	-	-	-	400	-	-	-	-	-	-	-	-	-	-	-	-	-
decadent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total live	200	-	100	-	-	-	400	-	-	-	-	-	-	-	-	-	-	-	-	-
Ribes cereum																				
seedling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
mature	-	-	-	-	-	-	-	200	200	-	100	-	-	-	-	-	-	-	-	-
decadent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total live	-	-	-	-	-	-	-	200	200	-	100	-	-	-	-	-	-	-	-	-
Ribes montigenum																				
seedling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
mature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200	100
decadent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total live	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200	100

Pinus flexilis/Agropyron spicatum type

The *Pinus flexilis/Agropyron spicatum* habitat type was sampled on moderately sloping middle and upper slopes of southwesterly and westerly aspect. Elevations were 5210-5370 feet.

Species composition was similar to *Juniperus scopulorum/Agropyron spicatum*, with the addition of *Pinus flexilis* in the overstory. Trees averaged 27 percent cover, with *Juniperus scopulorum* at 15 percent, *Pinus flexilis* at 10 percent and *Pseudotsuga menziesii* at 2 percent. Perennial graminoids averaged 25 percent cover, primarily *Agropyron spicatum* (15 percent cover), *Koeleria cristata* (5), *Poa sandbergii* (2) and *Carex rossii* (2). Perennial forbs averaged 12 percent cover, including *Penstemon aridus* (2 percent cover) and *Douglasia montana* (2). Annual/biennial forbs had 2 percent cover and subshrubs had 5 percent with *Gutierrezia sarothrae* at 3 percent and *Artemisia frigida* at about 2 percent. Shrubs were conspicuous in study area stands at 21 percent cover, chiefly *Artemisia nova* at 20 percent.

Pinus flexilis/Agropyron smithii bottom type

The *Pinus flexilis/Agropyron smithii* bottom community was sampled on a 4 percent draw bottom of southwesterly aspect at 5110 feet elevation. Trees averaged 43 percent cover, with *Pinus flexilis* at 40 percent and *Juniperus scopulorum* at 3 percent. Perennial graminoids averaged 19 percent cover, primarily *Agropyron smithii* (10 percent cover), *Koeleria cristata* (3) and *Poa sandbergii* (3). Perennial forbs averaged only 10 percent cover, with all species at trace coverage values. Subshrubs had 6 percent cover, with *Artemisia frigida* and *Gutierrezia sarothrae* each at 3 percent. Shrubs were conspicuous

Table F2. (Continued)

SPECIES/AGE CLASS	ECODATA PLOT NUMBER															
	ART NOV/AGR SPI						ART TRI/AGR SPI			ART TRI/ FES IDA	ART TRI/FES SCA			ART TRI/ POA PRA	CHR NAU/ POA PRA	CER LED/ AGR SPI
	4	6	32	33	34	Mean n=5	17	21	Mean n=2	25	27	39	Mean n=2	44	29	22
Tetradymia canescens																
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
immature	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
mature	400	200	–	–	–	120	–	–	–	–	–	–	–	–	–	–
decadent	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total live	400	200	–	–	–	120	–	–	–	–	–	–	–	–	–	–
TOTAL SHRUBS																
SEEDLING	1400	2400	–	–	–	760	400	200	300	–	–	400	200	91,200	–	600
IMMATURE	–	–	1200	1600	–	560	2800	200	1500	–	1200	1600	1400	7200	–	1600
MATURE	17,600	8800	12400	10200	4600	10,720	3000	3000	3000	4600	4800	3400	4100	12,600	4200	2800
DECADENT	2400	1200	200	1400	1800	1400	1000	1400	1200	1800	600	400	500	800	400	400
DEAD	2000	1000	200	400	1200	960	400	1600	1000	1200	400	2200	1300	1400	–	200
TOTAL LIVE	**21,400**	**12,400**	**13,800**	**13,200**	**6400**	**13,440**	**7200**	**4800**	**6000**	**6400**	**6600**	**5800**	**6200**	**111,800**	**4600**	**5400**

at 15 percent cover, chiefly *Artemisia nova* (10 percent) and *Rhus aromatica* (3). This and the following type are minor types on ephemeral draws in the southern study area.

Pseudotsuga menziesii/Juniperus scopulorum bottom type

The *Pseudotsuga menziesii/Juniperus scopulorum* bottom community was sampled on a 5 percent draw bottom of westerly aspect at 5410 feet elevation. Trees averaged 73 percent cover, with *Pseudotsuga menziesii* at 40 percent, *Juniperus scopulorum* at 30 percent and *Pinus flexilis* at 3 percent. Due to the dense tree canopy, understory cover was depauperate with perennial graminoids at only 3 percent cover and perennial forbs at about 8 percent cover. The only significant herbaceous species was *Solidago missouriensis* at 3 percent cover. Shrubs were also a minor component at 2 percent cover.

Pseudotsuga menziesii/Festuca idahoensis type

The *Pseudotsuga menziesii/Festuca idahoensis* habitat type was sampled at three sites on moderately steep (22-36 percent) lower and middle slopes. Aspects were southerly and easterly. Elevations were 5280-6760 feet.

Trees averaged 42 percent cover, with *Pseudotsuga menziesii* at 30 percent, *Juniperus scopulorum* at 7 percent and *Pinus flexilis* at 5 percent. Perennial graminoids averaged 22 percent cover, primarily *Festuca idahoensis* (13 percent cover), *Agropyron spicatum* (4), *Poa pratensis* (2) and *Carex geyeri* (about 1). Perennial forbs averaged only 4 percent cover, including *Astragalus miser* and *Solidago missouriensis* as the most conspicuous. *Selaginella densa* had 4 percent cover and subshrubs about 2 percent cover, mostly *Berberis repens*.

Table F2. Shrub density (plants per acre) by species and plot for seven SHRUB/GRASSLAND types, Elkhorn study area, 1990.

SPECIES/AGE CLASS	ECODATA PLOT NUMBER															
	ART NOV/AGR SPI						ART TRI/AGR SPI			ART TRI/ FES IDA	ART TRI/FES SCA			ART TRI/ POA PRA	CHR NAU/ POA PRA	CER LED/ AGR SPI
	4	6	32	33	34	Mean n=5	17	21	Mean n=2	25	27	39	Mean n=2	44	29	22
Artemisia nova																
seedling	1400	2400	–	–	–	760	–	–	–	–	–	–	–	–	–	–
immature	–	–	1200	1600	–	560	–	–	–	–	–	–	–	–	–	–
mature	17,200	8600	12,200	10,200	4600	10,560	–	–	–	–	–	–	–	–	–	–
decadent	2400	1200	200	1400	1800	1400	–	–	–	–	–	–	–	–	–	–
dead	2000	1000	200	400	1200	960	–	–	–	–	–	–	–	–	–	–
Total live	21,000	12,200	13,600	13,200	6400	13,280	–	–	–	–	–	–	–	–	–	–
Artemisia tridentata																
seedling	–	–	–	–	–	–	400	200	300	–	–	400	200	91,000	–	–
immature	–	–	–	–	–	–	2800	200	1500	–	1200	1600	1400	6800	–	–
mature	–	–	–	–	–	–	3000	3000	3000	4600	4800	3400	4100	9800	–	–
decadent	–	–	–	–	–	–	1000	1400	1200	1800	600	400	500	800	–	–
dead	–	–	–	–	–	–	400	1600	1000	1200	400	2200	1300	400	–	–
Total live	–	–	–	–	–	–	7200	4800	6000	6400	6600	5800	6200	108,400	–	–
Ceratoides lanata																
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
immature	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
mature	–	–	200	–	–	40	–	–	–	–	–	–	–	–	–	–
decadent	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total live	–	–	200	–	–	40	–	–	–	–	–	–	–	–	–	–
Cercocarpus ledifolius																
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	600
immature	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1600
mature	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2800
decadent	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	400
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	200
Total live	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5400
Chrysothamnus nauseosus																
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	200	–	–
immature	–	–	–	–	–	–	–	–	–	–	–	–	–	400	–	–
mature	–	–	–	–	–	–	–	–	–	–	–	–	–	2800	3800	–
decadent	–	–	–	–	–	–	–	–	–	–	–	–	–	–	400	–
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	1000	–	–
Total live	–	–	–	–	–	–	–	–	–	–	–	–	–	3400	4200	–
Rosa woodsii																
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
immature	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
mature	–	–	–	–	–	–	–	–	–	–	–	–	–	–	400	–
decadent	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total live	–	–	–	–	–	–	–	–	–	–	–	–	–	–	400	–

Shrubs were also a relatively minor component in study area stands at 3 percent cover, chiefly *Artemisia tridentata*.

Pseudotsuga menziesii/Festuca scabrella type

The *Pseudotsuga menziesii/Festuca scabrella* habitat type was sampled at two sites on moderately steep (25-40 percent) middle slopes on westerly aspects. Elevations were 5520-6840 feet.

Trees averaged 62 percent cover, with *Pseudotsuga menziesii* at 49 percent, *Juniperus scopulorum* at 11 percent and *Pinus flexilis* at 2 percent. Perennial graminoids averaged 23 percent cover, primarily *Festuca idahoensis* (8 percent cover), *Festuca scabrella* (7), *Agropyron spicatum* (3), *Poa scabrella* (2), *Calamagrostis rubescens* (1) and *Poa juncifolia* (1). Perennial forbs averaged 12 percent cover, including *Arenaria congesta* (2 percent cover), *Solidago missouriensis* (2), and *Achillea millefolium*, *Allium cernuum*, *Eriogonum umbellatum* and *Fragaria virginiana* each at 1 percent cover. Annual/biennial forbs averaged about 3 percent cover. Shrubs were a minor component at 2 percent cover, chiefly *Juniperus communis*.

Pseudotsuga menziesii/Juniperus communis type

The *Pseudotsuga menziesii/Juniperus communis* habitat type was sampled at five sites on moderately steep to steep (22-54 percent) footslopes to upper slopes. Aspects were usually southerly and elevations were 6350-6770 feet. This type is relatively abundant in the northern study area.

Table F1. Shrub density (plants per acre) by species and plot for five GRASSLAND types, Elkhorn study area, 1990.

SPECIES/AGE CLASS	ECODATA PLOT NUMBER													
	STI COM / BOU GRA			AGR SPI / POA SAN			AGR SPI / BOU GRA						FES IDA/ AGR SPI	FES SCA/ AGR SPI
	5	14	Mean n=2	15	26	Mean n=2	1	3	7	12	19	Mean n=5	23	28
Artemisia nova														
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	–
immature	–	–	–	–	–	–	–	–	–	200	–	40	–	–
mature	–	–	–	–	400	200	–	–	–	–	–	–	–	–
decadent	–	–	–	–	–	–	–	–	–	–	–	–	–	–
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total live	–	–	–	–	400	200	–	–	–	200	–	40	–	–
Artemisia tridentata														
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	–
immature	–	–	–	–	–	–	–	–	–	–	–	–	–	–
mature	–	–	–	–	–	–	–	200	–	–	–	40	–	200
decadent	–	–	–	–	–	–	–	–	–	–	–	–	–	–
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total live	–	–	–	–	–	–	–	200	–	–	–	40	–	200
Ceratoides lanata														
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	–
immature	–	–	–	–	–	–	–	–	–	–	–	–	–	–
mature	–	1200	600	–	400	200	–	–	–	200	–	40	–	–
decadent	–	–	–	–	–	–	–	–	–	–	–	–	–	–
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total live	–	1200	600	–	400	200	–	–	–	200	–	40	–	–
Chrysothamnus nauseosus														
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	–
immature	–	–	–	–	–	–	–	–	–	–	–	–	–	–
mature	–	–	–	–	–	–	400	–	–	–	–	80	200	200
decadent	–	–	–	–	–	–	400	–	–	–	–	80	–	–
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total live	–	–	–	–	–	–	800	–	–	–	–	160	200	200
Chrysothamnus viscidiflorus														
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	–
immature	–	–	–	–	–	–	–	–	–	–	–	–	–	–
mature	–	–	–	–	–	–	–	–	–	–	–	–	–	200
decadent	–	–	–	–	–	–	–	–	–	–	–	–	–	–
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total live	–	–	–	–	–	–	–	–	–	–	–	–	–	200
Tetradymia canescens														
seedling	–	–	–	–	–	–	–	–	–	–	–	–	–	–
immature	–	–	–	–	–	–	200	–	–	–	–	40	–	–
mature	–	–	–	–	–	–	–	–	–	600	–	120	–	–
decadent	–	–	–	–	–	–	–	–	–	–	–	–	–	–
dead	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total live	–	–	–	–	–	–	200	–	–	600	–	160	–	–
TOTAL SHRUBS														
SEEDLING	–	–	–	–	–	–	–	–	–	–	–	–	–	–
IMMATURE	–	–	–	–	–	–	200	–	–	200	–	80	–	–
MATURE	–	1200	600	–	800	400	400	200	–	800	–	280	200	600
DECADENT	–	–	–	–	–	–	400	–	–	–	–	80	–	–
DEAD	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL LIVE	–	1200	600	–	800	400	1000	200	–	1000	–	440	200	600

Understories were sparse except for the shrub component. Trees averaged 61 percent cover, with *Pseudotsuga menziesii* at 40 percent, *Pinus contorta* at 12 percent, *Juniperus scopulorum* at 7 percent and *Pinus flexilis* at 2 percent. Perennial graminoids averaged 6 percent cover, primarily *Agropyron spicatum* (2 percent cover), *Carex rossii* (1), *Festuca idahoensis* (1) and *Poa pratensis* (1). Perennial forbs averaged only 5 percent cover, with only *Solidago missouriensis* having at least 1 percent cover. Annual/biennial forbs had 1 percent cover and subshrubs (*Berberis repens*) 2 percent. Shrubs were at 21 percent cover, almost entirely *Juniperus communis*.

Pseudotsuga menziesii/Carex geyeri type

The *Pseudotsuga menziesii/Carex geyeri* habitat type is a relatively minor type in the study area, and was sampled on an 18 percent midslope of east aspect at 6670 feet elevation.

Tree canopy was dense, averaging 91 percent cover, with *Pseudotsuga menziesii* at 74 percent and *Pinus contorta* at 17 percent. Perennial graminoids averaged 35 percent cover, primarily *Carex rossii* (18 percent cover), *Carex geyeri* (10) and *Poa nervosa* (4). Perennial forbs averaged 9 percent cover, including *Fragaria virginiana* (3 percent cover), *Galium boreale* (2) and *Antennaria microphylla* (2). Shrubs were a very minor component in the sampled stand.

Pseudotsuga menziesii/Calamagrostis rubescens type

The *Pseudotsuga menziesii/Calamagrostis rubescens* habitat type was sampled at 17 sites on all slope positions and variable aspects. Slope steepness was

also variable, ranging from 6-58 percent. Elevations were 6120-6970 feet. This is the prevalent forest habitat type in the northern half of the study area.

Trees averaged 64 percent cover, with seral *Pinus contorta* at 33 percent and *Pseudotsuga menziesii* at 30 percent. At 9 of the 17 sample sites, *Pinus contorta* was dominant, with relatively low cover of *Pseudotsuga menziesii*. Perennial graminoids averaged 23 percent cover, primarily *Calamagrostis rubescens* (16 percent cover) and *Carex geyeri* (4). *Poa nervosa* was often also conspicuous. Perennial forbs averaged 12 percent cover, including *Antennaria racemosa* (3 percent cover), *Astragalus miser* (2), *Arnica cordifolia* (1) and *Fragaria virginiana* (1). Occasionally important forbs were *Aster conspicuus* and *Pyrola secunda*. Subshrubs had 3 percent cover, primarily *Berberis repens* and *Arctostaphylos uva-ursi*, each at 1 percent. Shrubs were at 9 percent cover, chiefly *Juniperus communis* (4), *Vaccinium scoparium* (2) and *Spiraea betulifolia* (1).

Picea engelmannii series

The *Picea engelmannii* series is restricted to cool drainage bottoms at higher elevations in the study area, representing sites intermediate between the drier, warmer *Pseudotsuga menziesii* series and the moister, cooler *Abies lasiocarpa* series (Pfister *et al.* 1977). Two habitat types were identified in the intensive study area, *Picea engelmannii/Smilacina stellata* and *Picea engelmannii/Galium triflorum*, and a representative site was sampled for each. The former type was sampled on a stream terrace of southerly aspect at 6665 feet elevation (Appendix K), and the latter type on a stream bottom of southwest aspect at 6625 feet elevation.

APPENDIX F

Shrub Density (plants per acre) by transect for twenty-three vegetation types sampled in the Elkhorn study area, 1990.

Table	Vegetation Types	Page
F1	GRASSLAND (five types)	F-2
F2	SHRUB/GRASSLAND (seven types)	F-3
F3	FOREST/SAVANNAH (eight types)	F-5
F4	BOTTOMLAND (three types)	F-7

Due to similarities of vegetation composition and site features, the two types are here considered collectively as the *Picea engelmannii* series. Trees averaged 67 percent cover, with *Picea engelmannii* at 49 percent, *Pinus contorta* at 13 percent and *Pseudotsuga menziesii* at 5 percent. Perennial graminoids averaged 11 percent cover, primarily *Calamagrostis rubescens* (10 percent). Perennial forbs averaged 15 percent cover, including *Arnica cordifolia*, *Mitella pentandra* and *Saxifraga arguta* (each at 2 percent cover), as well as *Aster foliaceus*, *Mertensia ciliata*, *Osmorhiza chilensis*, *Pyrola secunda* and *Thalictrum occidentale* (each at 1 percent cover). Shrubs were a relatively minor component in study area stands at 6 percent cover, chiefly *Ribes lacustre* (2), *Vaccinium scoparium* (1) and *Rubus idaeus* (1).

Abies lasiocarpa series

The *Abies lasiocarpa* series is restricted to the highest elevations along the northern perimeter of the study area. Two habitat types were identified, *Abies lasiocarpa-Pinus albicaulis*/scree and *Abies lasiocarpa*/*Vaccinium scoparium*, and a representative site was sampled for each. Like the *Picea engelmannii* series, the two types are here treated as the *Abies lasiocarpa* series. Both types are characterized by high elevation (7600-8040 feet), steep slopes (50-60 percent), exposed rock (86 percent) and a sparse herbaceous stratum.

The scree type had considerably sparser vegetation cover than did the *Abies lasiocarpa*/*Vaccinium scoparium* type, however collective cover values characterize the mountain slope sampled as a whole. Trees averaged 31 percent cover, with *Pinus contorta* at 15 percent, *Pinus albicaulis* at 7 percent, *Pseudotsuga menziesii* at 6 percent and *Abies lasiocarpa* at 3 percent.

Table E4. Live shrub density (plants per acre) by species and transect for the **PICEA ENGELMANNII/SMILACINA STELLATA** and **PICEA ENGELMANNII/GALIUM TRIFLORUM** types, Elkhorn study area, 1989.

	TRANSECT NUMBER		
	PICEA ENGELMANNII/ SMILACINA STELLATA	PICEA ENGELMANNII/ GALIUM TRIFLORUM	PICEA ENGELMANNII SERIES
	21	23	Mean n=2
SHRUB SPECIES			
Juniperus communis	81	-	40.5
Lonicera utahensis	81	243	162.0
Ribes lacustre	405	2914	1659.5
Rosa acicularis	1052	-	526.0
Rubus idaeus	-	648	324.0
Spiraea betulifolia	2347	81	1214.0
Vaccinium scoparium	5099	-	2549.5
TOTAL SHRUBS	9065	3886	6475.5

Perennial graminoids averaged 4 percent cover, with *Calamagrostis rubescens* at 1 percent. Perennial forbs averaged 6 percent cover, with *Antennaria racemosa* at 1 percent. Shrubs were an important component at 19 percent cover, chiefly *Juniperus communis* (14), *Vaccinium scoparium* (2), *Ribes montigenum* (1) and *Salix scouleriana* (1).

3.1.4 Bottomland Types

Hansen *et al.* (1989 and 1990) have classified the vegetation of riparian and wetland sites in southwestern Montana. Three mesic or wet bottomland types were sampled in the Elkhorn study area. Two dry bottomland types occurring in ephemeral draws at lower elevations (*Pinus flexilis/Agropyron smithii* and *Pseudotsuga menziesii/Juniperus scopulorum*) have been previously discussed under Forest and Savannah types. The herbaceous community type and two shrub habitat types identified in Table 1 are listed in order of increasing moisture regime. All are common in southwestern Montana. Summary data for bottomland types are presented in Tables D8 (cover) and F4 (shrub density).

Poa pratensis/Carex praegracilis type

The *Poa pratensis/Carex praegracilis* community type was sampled near the margin of Turnley Meadows, a broad drainage bottom, on a southerly aspect at 5950 feet elevation. The site was notably drier than central portions of the meadow and has sustained prolonged livestock use, reflected in plant species composition.

Table E3. Live shrub density (plants per acre) by species and transect for the **PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS** type, Elkhorn study area, 1989.

	TRANSECT NUMBER													
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS													
	1	3	4	5	6	7	9	10	12	14	17	19	20	Mean n=13
SHRUB SPECIES														
Artemisia tridentata	-	-	-	-	-	648	-	-	-	-	-	-	-	49.8
Juniperus communis	405	243	-	1133	405	162	243	324	81	-	243	81	567	299.0
Lonicera utahensis	1619	81	-	-	-	-	648	-	-	81	-	971	-	261.5
Ribes setosum	-	-	-	-	-	-	-	486	243	324	-	-	-	81.0
Rosa acicularis	324	243	-	486	-	162	405	11,008	-	-	-	2104	-	1133.2
Shepherdia canadensis	-	-	-	-	-	-	486	81	-	-	-	486	-	81.0
Spiraea betulifolia	6475	7689	14,488	7285	-	405	8094	11,898	-	-	8094	11,574	-	5846.3
Symphoricarpos albus	-	-	-	-	-	-	-	-	-	162	-	-	-	12.5
Vaccinium globulare	-	-	-	-	-	-	405	-	-	-	-	162	-	43.6
Vaccinium scoparium	13,760	809	-	-	-	-	40,065	-	-	567	-	1781	-	4383.2
TOTAL SHRUBS	22,583	9065	14,488	8904	405	1377	50,346	23,797	324	1134	8337	17,159	567	12,191.2

Perennial graminoids had 126 percent cover, dominated by *Poa pratensis* (50 percent cover), *Carex praegracilis* (20), *Agropyron caninum* (18), *Phleum pratense* (12), *Stipa occidentalis* (10), *Carex rostrata* (5) and *Juncus balticus* (5). The last two species were primarily confined to moister microsites in the sample stand. Perennial forbs averaged 63 percent cover, principally *Fragaria virginiana* (18 percent), *Potentilla gracilis* (18), *Cirsium scariosum* (10) and *Achillea millefolium* (5); *Antennaria microphylla*, *Geum macrophyllum* and *Trifolium repens* each had 3 percent cover.

Potentilla fruticosa/Deschampsia cespitosa type

The *Potentilla fruticosa/Deschampsia cespitosa* habitat type occupied a position in Turnley Meadows similar to the previous type, but the site was wetter and strongly hummocked from past livestock use. This rather small mapping unit was on a 3 percent slope of southeast aspect at an elevation of 5945 feet.

The stand represented a wet phase of this habitat type. Shrubs averaged 26 percent cover, with *Potentilla fruticosa* at 20 percent, and *Salix bebbiana* and *Salix geyeriana* each at 3 percent. The Salices were scattered in stunted clumps. Perennial graminoid cover was 96 percent, including *Deschampsia cespitosa* (22 percent), *Juncus balticus* (22), *Carex rostrata* (12), *Carex praegracilis* (10), *Festuca idahoensis* (10) and *Poa pratensis* (10). Perennial forb cover, at 24 percent, was evenly distributed among several species: *Aster foliaceus*, *Fragaria virginiana*, *Potentilla gracilis*, *Senecio sphaerocephalus* and *Solidago canadensis* each at 3 percent cover, and *Achillea millefolium* and *Epilobium ciliatum* each at 2 percent.

Table E2. Live shrub density (plants per acre) by species and transect for the **PSEUDOTSUGA MENZIESII/FESTUCA IDAHOENSIS, PSEUDOTSUGA MENZIESII/FESTUCA SCABRELLA, PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS** and **PSEUDOTSUGA MENZIESII/CAREX GEYERI** types, Elkhorn study area, 1989.

	TRANSECT NUMBER								
	PSE MEN/ FES IDA	PSE MEN/ FES SCA	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS						PSE MEN/ CAR GEY
	18	8	15	22	24	25	27	Mean n=5	13
SHRUB SPECIES									
Artemisia tridentata	2671	-	-	-	-	-	-	-	-
Juniperus communis	243	405	486	728	890	4614	486	1440.8	81
Prunus virginiana	-	-	-	-	-	-	243	48.6	-
Spiraea betulifolia	-	-	-	-	-	14,569	-	2913.8	-
Symphoricarpos albus	-	-	-	-	-	-	81	16.2	-
TOTAL SHRUBS	2914	405	486	728	890	19,183	810	4419.4	81

Salix geyeriana type

This type is a composite of two habitat types identified in Hansen *et al.* (1990), *Salix geyeriana/Calamagrostis canadensis* (plot 11) and *Salix geyeriana/Carex rostrata* (plot 36). The two sample sites were located in the central portion of drainage bottoms near standing or flowing water, the first on lower Elkhorn Creek (4960 feet elevation) and the second in the upper reach of Turnley Meadows (5990 feet elevation).

Individual plot data may be found in Table D8. For the type collectively, shrubs averaged 101 percent cover, dominated by *Salix geyeriana* at 55 percent. Other principal shrub species were *Salix boothii* (14 percent cover), *Salix drummondiana* (10), *Rosa woodsii* (10), *Ribes setosum* (5) and *Rubus idaeus* (3). Graminoid cover, at 89 percent, was about evenly divided between native and introduced species, primarily *Poa pratensis* (20 percent cover), *Poa palustris* (20), *Calamagrostis canadensis* (15), *Carex rostrata* (14), *Bromus ciliatus* (10) and *Agrostis stolonifera* (5). Perennial forb cover was 66 percent, including *Cirsium arvense* (19 percent), *Aster foliaceus* (5), *Aster modestus* (5), *Fragaria virginiana* (5), *Solidago canadensis* (5), *Sonchus uliginosus* (5), *Geum macrophyllum* (3), *Heracleum lanatum* (3) and *Mentha arvensis* (2). Nine additional perennial forb species had at least 1 percent cover in the *Salix geyeriana* type. Annual/biennial forbs averaged 3 percent cover. For all herbaceous morphological classes, introduced species were much more prevalent in the lower elevation *Salix geyeriana/Calamagrostis canadensis* plot.

Table E1. Live shrub density (plants per acre) by species and transect for the **FESTUCA SCABRELLA/FESTUCA IDAHOENSIS** and **ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS** types, Elkhorn study area, 1989.

	TRANSECT NUMBER					
	FESTUCA SCABRELLA/FESTUCA IDAHOENSIS			ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS		
SHRUB SPECIES	16	26	Mean n=2	2	11	Mean n=2
Amelanchier alnifolia	-	-	-	81	-	40.5
Artemisia tridentata	81	324	202.5	6151	1457	3804.0
Chrysothamnus nauseosus	-	81	40.5	-	-	-
Juniperus communis	-	405	202.5	-	-	-
Shepherdia canadensis	-	81	40.5	-	-	-
Spiraea betulifolia	-	243	121.5	-	-	-
TOTAL SHRUBS	81	1134	607.5	6232	1457	3844.5

3.1.5 Miscellaneous Types

Miscellaneous types were sampled in three disturbed areas which reflect various human manipulation. A rather limited amount of tame pasture occurs in the plains in the southern half of the study area. Naturally revegetated tailings from historic placer mining are located along a section of terrace near Elkhorn Creek in the southern half of the study area. Lastly, a reclamation site was sampled on a fan near Turnley Meadows where hard rock mine disturbance has been recently revegetated.

Tame Pasture

The tame pasture sample site was on a gently sloping bench of southerly aspect at 4990 feet elevation near the southern end of the study area. The pasture has been seeded with exotic species to improve livestock forage. Perennial graminoids totaled about 80 percent cover, including *Bromus inermis* (50 percent), *Poa pratensis* (10), *Carex stenophylla* (10) and *Poa juncifolia* (10). Perennial forbs had 14 percent cover, mostly *Medicago sativa* (10) and *Aster campestris* (3). Annual/biennial forbs had high cover at 30 percent, including *Descurainia sophia* (20) and *Sisymbrium altissimum* (10), due to cattle grazing.

Placer Mining

The sample plot in naturally revegetated placer mine tailings was located on a gentle bench of south aspect at 5035 feet elevation. Vegetation cover was very sparse, totalling only 13 percent. The only species with more than one percent cover were *Populus trichocarpa* and *Verbascum thapsus*, at 3 percent each. Plant species present indicated a generally mesic composition.

Reclamation

The reclamation sample plot was on a 10 percent fan of northeast aspect at 5940 feet elevation. Grass species in the revegetation seed mix have shown the best success to date, with about 40 percent cover. Grasses with more than one percent cover were *Agropyron caninum* (12 percent), *Bromus inermis* (12), *Festuca duriuscula* (5), *Agropyron intermedium* (3), *Hordeum jubatum* (3), *Agropyron cristatum* (2) and *Agrostis stolonifera* (2). Perennial forbs, at 18 percent cover, included *Trifolium repens* (10 percent), *Astragalus cicer* (3) and *Cirsium arvense* (3). Annual/biennial forbs had about 5 percent cover. Shrubs were not established.

3.2 SHRUB DENSITY

Shrub density in grassland types ranged from 200 to 600 plants per acre. Prevalent shrub species in low elevation grassland types were *Artemisia nova*, *Ceratoides lanata*, *Chrysothamnus nauseosus* and *Tetradymia canescens*, and at higher elevations *Artemisia tridentata* and *Juniperus communis* (Tables E1 and F1).

For most shrub/grassland types, shrub density ranged from 3800 to 13,400 plants per acre (Tables E1 and F2). The *Artemisia tridentata/Poa pratensis* type was an exception at 112,000 plants/acre due to high density of seedling *Artemisia tridentata*, indicating grazing disturbance. *Artemisia nova* averaged over 13,000 plants per acre in the *Artemisia nova/Agropyron spicatum* type. In the *Artemisia tridentata* series, *Artemisia tridentata* averaged 4700, 6000 and 6200 plants per acre in the *Artemisia tridentata/Festuca idahoensis*,

APPENDIX E

Shrub Density (plants per acre) by transect for nine vegetation types sampled in the Elkhorn study area, 1989.

Table	Vegetation Types	Page
	GRASSLAND	
E1	*Festuca scabrella/Festuca idahoensis*	E-2
	SHRUB/GRASSLAND	
E1	*Artemisia tridentata/Festuca idahoensis*	E-2
	FOREST/SAVANNAH	
E2	*Pseudotsuga menziesii/Festuca idahoensis*	E-3
E2	*Pseudotsuga menziesii/Festuca scabrella*	E-3
E2	*Pseudotsuga menziesii/Juniperus communis*	E-3
E2	*Pseudotsuga menziesii/Carex geyeri*	E-3
E3	*Pseudotsuga menziesii/Calamagrostis rubescens*	E-4
E4	*Picea engelmannii/Smilacina stellata*	E-5
E4	*Picea engelmannii/Galium triflorum*	E-5

Artemisia tridentata/Agropyron spicatum and *Artemisia tridentata/Festuca scabrella* habitat types, respectively. In the *Artemisia tridentata/Poa pratensis* community type, *Artemisia tridentata* averaged about 108,000 plants per acre (84 percent seedling) and *Chrysothamnus nauseosus* averaged 3400 plants per acre. The *Chrysothamnus nauseosus/Poa pratensis* community type had 4200 *Chrysothamnus nauseosus* per acre and 400 *Rosa woodsii* per acre. The *Cercocarpus ledifolius/Agropyron spicatum* habitat type had 5400 *Cercocarpus ledifolius* per acre.

Shrub density in lower elevation forest/savannah types ranged from 200 to 5300 plants per acre (Table F3). The prevalent shrub in the *Juniperus scopulorum/Agropyron spicatum*, *Pinus flexilis/Agropyron spicatum* and *Pinus flexilis/Agropyron smithii* bottom types was *Artemisia nova*, averaging 1200, 5300 and 600 plants per acre, respectively. In the *Pseudotsuga menziesii* series, shrub density ranged from 80 to 12,900 plants per acre (Tables E2 and F3). There were about 1000 shrubs per acre in *Pseudotsuga menziesii/Festuca idahoensis* (primarily *Artemisia tridentata*) and 200 *Juniperus communis* per acre in *Pseudotsuga menziesii/Festuca scabrella*. The *Pseudotsuga menziesii/ Juniperus communis* habitat type had about 4400 shrubs per acre, primarily *Spiraea betulifolia* (2900) and *Juniperus communis* (1450). Shrub density was higher in the *Pseudotsuga menziesii/Calamagrostis rubescens* habitat type at nearly 13,000 plants per acre, chiefly *Spiraea betulifolia* (6765), *Vaccinium scoparium* (3540), *Rosa acicularis* (1610), *Juniperus communis* (535) and *Lonicera utahensis* (260). Shrubs averaged about 6500 plants per acre in the *Picea engelmannii* series, including *Vaccinium scoparium* (2550), *Ribes lacustre* (1660), *Spiraea betulifolia* (1215) and *Rosa acicularis* (525) (Table E4). In the

Abies lasiocarpa series, shrubs averaged 5100 plants per acre, primarily *Vaccinium scoparium* (4400) (Table F3).

In bottomland types, shrub density averaged 5800 plants per acre in the *Potentilla fruticosa/Deschampsia cespitosa* type, including *Potentilla fruticosa* (4000) and *Salix bebbiana* (1400). Shrub density was 10,000 plants per acre in the *Salix geyeriana* type, chiefly *Salix geyeriana* (3900), *Rosa woodsii* (2300) and *Rubus idaeus* (1400). Other important shrubs in the *Salix geyeriana* type, depending on elevation, were *Ribes inerme*, *Ribes setosum*, *Salix boothii* and *Salix drummondiana* (Table F4).

3.3 TREE DENSITY

All densities reported in this section are for trees $\geq$1-inch dbh, since seedlings generally inflate density values. In the southern half of the study area, lower elevation forest/savannah types were dominated by *Juniperus scopulorum*, *Pinus flexilis* and *Pseudotsuga menziesii* (Table H3). In the *Juniperus scopulorum/Agropyron spicatum* type, *Juniperus scopulorum* averaged 25 plants per acre. The *Pinus flexilis/Agropyron spicatum* type averaged 150 *Juniperus scopulorum*, 75 *Pinus flexilis* and 10 *Pseudotsuga menziesii* per acre. The *Pinus flexilis/Agropyron smithii* bottom type had 370 *Juniperus scopulorum* and 20 *Pinus flexilis* per acre. The *Pseudotsuga menziesii/Juniperus scopulorum* bottom sample stand had 260 *Pseudotsuga menziesii*, 210 *Juniperus scopulorum* and 50 *Pinus flexilis* per acre.

Table D9. (Continued)

	ECODATA PLOT NUMBER		
	TAME PASTURE	PLACER MINING	RECLAMATION
	13	2	35
INTRODUCED PERENNIAL FORBS			
Astragalus cicer	-	-	3
Cardaria pubescens	T	-	-
Cirsium arvense	-	-	3
Medicago sativa	10	-	-
Rumex crispus	-	-	T
Taraxacum officinale	-	T	T
Trifolium repens	-	-	10
TOTAL IPF	10.5	0.5	17.0
NATIVE ANNUAL/BIENNIAL FORBS			
Epilobium paniculatum	-	-	T
Lepidium densiflorum	-	-	T
TOTAL NAF	-	-	1.0
INTRODUCED ANNUAL/BIENNIAL FORBS			
Cirsium vulgare	-	-	T
Descurainia sophia	20	-	-
Filago arvensis	-	-	T
Melilotus officinalis	-	T	T
Sisymbrium altissimum	10	T	-
Verbascum thapsus	-	3	3
TOTAL IAF	30.0	4.0	4.5
SUBSHRUBS			
Artemisia frigida	-	T	-
SHRUBS			
Artemisia tridentata	-	T	-
Chrysothamnus nauseosus	-	T	-
Prunus virginiana	-	T	-
Rhus aromatica	-	T	-
Ribes setosum	-	T	-
Rosa acicularis	-	T	-
TOTAL SHRUBS	-	3.0	-
TREES			
Populus trichocarpa	-	3	-
TOTAL VEGETATION (Stratified)	124.5	13.0	64.0

Nomenclature follows USDA Forest Service (1987)

Footnotes are presented on cover page D-1.

With increasing elevation (and moisture) *Pseudotsuga menziesii* and seral *Pinus contorta* dominated, while *Juniperus scopulorum* and *Pinus flexilis* decreased. Density is given below for important tree species in five habitat types in the *Pseudotsuga menziesii* series in the Elkhorn study area (summarizing Tables G2, G3 and H3).

	Density (trees per acre) of trees ≥1-inch dbh				
SPECIES	Pse men/ Fes ida n=3	Pse men/ Fes sca n=2	Pse men/ Jun com n=5	Pse men/ Car gey n=1	Pse men/ Cal rub n=17
Juniperus scopulorum	140	25	81	-	7
Pinus contorta	-	-	138	121	508
Pinus flexilis	13	5	8	-	-
Pseudotsuga menziesii	144	251	210	202	229

The *Picea* series averaged 263 *Picea engelmannii*, 122 *Pinus contorta* and 60 *Pseudotsuga menziesii* per acre (Table G1). The two plots in the *Abies lasiocarpa* series averaged 125 *Pinus contorta*, 85 *Pinus albicaulis*, 25 *Abies lasiocarpa* and 25 *Pseudotsuga menziesii* per acre (Table H3).

3.4 SPECIES LIST/RARE PLANTS

Appendix A is a list of vascular plant taxa identified during field inventories (1989-1990) conducted in the Elkhorn Project study area. A total of 426 taxa were identified in the study area (Table 2), with forbs (280 species) comprising the majority (66 percent). Forbs included 215 perennial taxa (194 native, 16

Table D9. Percent canopy cover/constancy by class and species for 3 ecodata plots sampled in three miscellaneous vegetation types, Gold Fields Elkhorn study area, 1990.

	ECODATA PLOT NUMBER		
	TAME PASTURE	PLACER MINING	RECLAMATION
	13	2	35
GROUND COVER			
Bare soil	20	-	60
Gravel	T	20	30
Rock	-	80	3
Litter	70	T	3
Wood	-	T	-
Moss	-	-	-
Lichens	-	-	-
Basal vegetation	10	T	2
VEGETATION STRUCTURE (nonstratified)			
Total tree cover	-	3	-
Total shrub cover	-	3	-
Total graminoid cover	70	T	32
Total forb cover	40	3	20
CLASS\SPECIES			
NATIVE PERENNIAL GRAMINOIDS			
Agropyron caninum	-	T	12
Agrostis scabra	-	-	T
Carex stenophylla	10	-	-
Hordeum jubatum	-	-	3
Poa juncifolia	10	-	-
TOTAL NPG	20.0	0.5	15.5
INTRODUCED PERENNIAL GRAMINOIDS			
Agropyron cristatum	-	-	2
Agropyron intermedium	-	-	3
Agropyron repens	T	-	-
Agrostis stolonifera	-	-	2
Bromus inermis	50	-	12
Festuca duriuscula	-	-	5
Phleum pratense	-	-	T
Poa pratensis	10	T	T
TOTAL IPG	60.5	0.5	25.0
NATIVE PERENNIAL FORBS			
Achillea millefolium	-	-	T
Artemisia dracunculus	-	T	-
Artemisia ludoviciana	T	-	-
Aster campestris	3	-	-
Potentilla glandulosa	-	-	T
Solidago gigantea	-	T	-
TOTAL NPF	3.5	1.0	1.0

Table 2. Number of vascular plant taxa by morphological class, Elkhorn study area, 1989-1990.

CLASS	NUMBER OF TAXA	PERCENT OF TOTAL
Graminoids	85	20
Native Perennial Graminoids	70	16
Introduced Perennial Graminoids	12	3
Annual Graminoids	3	<1
Forbs	280	66
Native Perennial Forbs	194	46
Introduced Perennial Forbs	16	4
Ferns and Allies	5	1
Native Annual/Biennial Forbs	40	9
Introduced Annual/Biennial Forbs	25	6
Woody Plants	61	14
Subshrubs	5	1
Shrubs	46	11
Trees	10	2
TOTAL Vascular Taxa	**426**	**100**
FAMILY		
Asteraceae	83	19
Poaceae	60	14
Brassicaceae	24	6
Fabaceae	22	5
Rosaceae	20	5
Cyperaceae	19	4
Ranunculaceae	15	4
Scrophulariaceae	14	3
Polygonaceae	10	2
Apiaceae	8	2
Boraginaceae	8	2
Caryophyllaceae	8	2
Ericaceae	8	2
Liliaceae	8	2
Saxifragaceae	8	2
Grossulariaceae	7	2
Pinaceae	7	2
Chenopodiaceae	6	1
Juncaceae	6	1
Polemoniaceae	6	1
Salicaceae	6	1
Lamiaceae	5	1
Onagraceae	5	1

Table D8. (Continued)

	ECODATA PLOT NUMBER				
	POA PRA/ CAR PRA	POT FRU/ DES CES	SALIX GEYERIANA		
	37	38	11	36	Mean n=2
SHRUBS (Continued)					
Salix geyeriana	T	3	80	30	55.0/100
Symphoricarpos occidentalis	-	-	3	-	1.5/50
TOTAL SHRUBS	1.5	26.0	119.0	82.0	100.5/100
TREES					
Juniperus scopulorum	-	-	T	-	0.2/50
TOTAL VEGETATION (Stratified)	191.0	145.5	283.5	235.5	259.5/100

Nomenclature follows USDA Forest Service (1987)

Footnotes are presented on cover page D-1.

introduced and 5 fern allies), and 65 annual/biennial taxa (40 native and 25 introduced). Of 85 grasses and grass-like plants identified (20 percent of the total), there were 82 perennial taxa (70 native and 12 introduced), and 3 annual grass taxa. The 61 woody plant taxa (14 percent of the total) documented in the study area included 5 subshrubs, 46 shrubs and 10 tree species.

Asteraceae was represented by 83 taxa documented in the study area. Other families represented by five or more taxa were *Poaceae* (60), *Brassicaceae* (24), *Fabaceae* (22), *Rosaceae* (20), *Cyperaceae* (19), *Ranunculaceae* (15), *Scrophulariaceae* (14), *Polygonaceae* (10), *Apiaceae*, *Boraginaceae*, *Caryophyllaceae*, *Ericaceae*, *Liliaceae* and *Saxifragaceae* (8 taxa each), *Grossulariaceae* and *Pinaceae* (7 taxa each), *Chenopodiaceae*, *Juncaceae*, *Polemoniaceae* and *Salicaceae* (6 taxa each), *Lamiaceae* and *Onagraceae* (5 taxa each).

Lesica and Shelly (1991), Mumma (1991) and Reel *et al.* (1989) list plant species of special concern for the region encompassing the Elkhorn Project study area. None of the taxa listed in these sources was documented in the Elkhorn study area during this inventory.

3.5 NOXIOUS WEEDS

The county noxious weed list designates noxious weeds for Montana under the County Weed Control Act 7-22-2101(5), MCA. Four taxa on this list were documented to occur in the Elkhorn study area during the 1989-1990

Table D8. (Continued)

	ECODATA PLOT NUMBER				
	POA PRA/ CAR PRA	POT FRU/ DES CES	SALIX GEYERIANA		
	37	38	11	36	Mean n=2
TOTAL NATIVE PERENNIAL FORBS (Continued)					
Viola adunca	-	T	-	-	-
Viola canadensis	-	-	-	T	0.2/50
Viola macloskeyi	-	T	-	-	-
TOTAL NPF	59.5	24.0	32.5	46.5	39.5/100
INTRODUCED PERENNIAL FORBS					
Cerastium vulgatum	-	-	-	T	0.2/50
Cirsium arvense	-	-	38	-	19.0/50
Sonchus uliginosus	-	-	10	-	5.0/50
Taraxacum officinale	-	-	-	2	1.0/50
Trifolium repens	3	-	-	3	1.5/50
TOTAL IPF	3.0	-	48.0	5.5	26.8/100
NATIVE ANNUAL/BIENNIAL FORBS					
Cardamine pensylvanica	-	-	-	T	0.2/50
Erysimum cheiranthoides	-	-	T	-	0.2/50
Gentianella amarella	T	-	-	-	-
Hackelia floribunda	-	-	T	-	0.2/50
TOTAL NAF	0.5	-	1.0	0.5	0.8/100
INTRODUCED ANNUAL/BIENNIAL FORBS					
Arctium lappa	-	-	2	-	1.0/50
Cirsium vulgare	-	-	T	-	0.2/50
Medicago lupulina	T	-	-	-	-
Melilotus officinalis	-	-	T	-	0.2/50
Verbascum thapsus	-	-	2	-	1.0/50
TOTAL IAF	0.5	-	5.0	-	2.5/50
SUBSHRUBS					
Artemisia frigida	-	-	T	-	0.2/50
SHRUBS					
Alnus incana	-	-	-	T	0.2/50
Artemisia tridentata	T	-	-	-	-
Potentilla fruticosa	T	20	-	-	-
Ribes inerme	-	-	-	T	0.2/50
Ribes setosum	-	-	10	T	5.2/100
Rosa acicularis	-	-	-	T	0.2/50
Rosa woodsii	-	-	20	-	10.0/50
Rubus idaeus	-	-	3	2	2.5/100
Salix bebbiana	-	3	3	-	1.5/50
Salix boothii	-	-	-	28	14.0/50
Salix drummondiana	-	-	-	20	10.0/50

inventory: *Cirsium arvense* (Canada thistle), *Cardaria draba* (whitetop or hoarycress), *Centaurea maculosa* (spotted knapweed) and *Linaria dalmatica* (Dalmatian toadflax).

In general, these species were confined to areas of recent and historic disturbance, e.g., roadsides, abandoned homesteads and mine workings, and logged areas. *Cirsium arvense* was occasionally abundant on wet or mesic sites (e.g., *Salix geyeriana* plot #11 on Elkhorn Creek), but was limited elsewhere (except reclamation plot #35). *Cardaria draba* (includes *Cardaria pubescens*) and *Centaurea maculosa* were mostly limited to roadside disturbances and abandoned homestead lots, with *Cardaria* more established on mesic sites and *Centaurea* on drier sites. On quantitative sample sites, *Cardaria* was recorded in the tame pasture plot #13 and *Centaurea maculosa* in the disturbed *Chrysothamnus nauseosus/Poa pratensis* plot #29, both at trace cover values.

Linaria dalmatica was much more widely distributed in native vegetation types than were the other three noxious weed taxa, and was more prevalent on (drier) disturbed sites as well. *Linaria dalmatica* was recorded at 10 of the 73 quantitative sample sites, most commonly at lower elevations in the southern half of the study area. These sites included two in grassland, four in shrub/grassland, and four in juniper-limber pine savannah.

Table D8. (Continued)

	ECODATA PLOT NUMBER				
	POA PRA/ CAR PRA	POT FRU/ DES CES	SALIX GEYERIANA		
	37	38	11	36	Mean n=2
INTRODUCED PERENNIAL GRAMINOIDS					
Agrostis stolonifera	-	-	10	-	5.0/50
Phleum pratense	12	T	-	T	0.2/50
Poa palustris	-	-	20	20	20.0/100
Poa pratensis	50	10	30	10	20.0/100
TOTAL IPG	62.0	10.5	60.0	30.5	45.2/100
NATIVE PERENNIAL FORBS					
Achillea millefolium	5	2	-	T	0.2/50
Anemone multifida	-	T	-	-	-
Antennaria microphylla	3	T	-	-	-
Arabis drummondii	-	-	-	T	0.2/50
Aster foliaceus	-	3	-	10	5.0/50
Aster hesperius	-	-	3	-	1.5/50
Aster integrifolius	T	-	-	-	-
Aster modestus	-	-	-	10	5.0/50
Astragalus agrestis	-	T	-	T	0.2/50
Cicuta douglasii	-	-	2	-	1.0/50
Cirsium scariosum	10	-	-	T	0.2/50
Clematis hirsutissima	T	-	-	-	-
Dodecatheon conjugens	-	T	-	-	-
Epilobium angustifolium	-	-	-	2	1.0/50
Epilobium ciliatum	-	2	-	T	0.2/50
Fragaria virginiana	18	3	-	10	5.0/50
Galium boreale	-	T	-	-	-
Galium triflorum	-	-	-	2	1.0/50
Geum macrophyllum	3	T	3	3	3.0/100
Glycyrrhiza lepidota	-	-	3	-	1.5/50
Heracleum lanatum	-	-	3	2	2.5/100
Iris missouriensis	T	-	-	-	-
Mentha arvensis	-	-	3	T	1.8/100
Mertensia ciliata	-	-	-	T	0.2/50
Potentilla gracilis	18	3	-	-	-
Pyrola asarifolia	-	-	-	T	0.2/50
Ranunculus subrigidus	-	-	-	T	0.2/50
Rumex occidentalis	-	T	-	T	0.2/50
Rumex salicifolius	T	-	-	-	-
Senecio pseudaureus	-	T	-	-	-
Senecio serra	-	-	T	-	0.2/50
Senecio sphaerocephalus	T	3	-	T	0.2/50
Smilacina stellata	-	-	-	T	0.2/50
Solidago canadensis	-	3	10	-	5.0/50
Solidago gigantea	-	-	3	-	1.5/50
Thalictrum occidentale	-	-	-	T	0.2/50
Urtica dioica	-	-	2	T	1.2/100

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Table D8. Percent canopy cover/constancy by class and species for 4 ecodata plots sampled in three **BOTTOMLAND** vegetation types, Gold Fields Elkhorn study area, 1990.

	ECODATA PLOT NUMBER				
	POA PRA/ CAR PRA	POT FRU/ DES CES	SALIX GEYERIANA		
	37	38	11	36	Mean n=2
GROUND COVER					
Bare soil	T	10	T	T	0.5/100
Gravel	-	T	-	T	0.2/50
Rock	-	-	T	-	0.2/50
Litter	85	50	72	90	81.0/100
Wood	-	T	10	3	6.5/100
Moss	T	30	T	T	0.5/100
Lichens	-	-	-	T	0.2/50
Basal vegetation	15	12	20	10	15.0/100
VEGETATION STRUCTURE (nonstratified)					
Total tree cover	-	-	T	-	0.2/50
Total shrub cover	1	25	80	72	76.0/100
Total graminoid cover	90	90	70	82	76.0/100
Total forb cover	52	30	68	50	59.0/100
CLASS\SPECIES					
NATIVE PERENNIAL GRAMINOIDS					
Agropyron caninum	18	T	T	-	0.2/50
Agropyron smithii	T	-	-	-	-
Agrostis scabra	2	T	-	-	-
Alopecurus aequalis	-	-	-	T	0.2/50
Bromus ciliatus	-	-	-	20	10.0/50
Calamagrostis canadensis	-	2	10	20	15.0/100
Carex aquatilis	-	3	-	-	-
Carex nebraskensis	T	2	-	-	-
Carex praegracilis	20	10	-	-	-
Carex rostrata	5	12	-	28	14.0/50
Carex simulata	-	T	-	-	-
Carex stipata	-	-	3	-	1.5/50
Deschampsia cespitosa	T	22	-	-	-
Elymus cinereus	-	-	3	-	1.5/50
Festuca idahoensis	-	10	-	-	-
Glyceria grandis	-	-	-	T	0.2/50
Glyceria striata	-	-	-	T	0.2/50
Hordeum brachyantherum	2	T	-	-	-
Juncus balticus	5	22	-	T	0.2/50
Koeleria cristata	T	-	-	-	-
Phalaris arundinacea	-	-	T	-	0.2/50
Scirpus microcarpus	-	-	-	T	0.2/50
Stipa occidentalis	10	-	-	-	-
TOTAL NPG	64.0	85.0	17.0	70.5	43.8/100

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Table D7. (Continued)

	ECODATA PLOT NUMBER		
	ABI LAS-PIN ALB/ SCREE	ABI LAS/ VAC SCO	ABI LAS SERIES
	45	46	Mean n=2
NATIVE PERENNIAL FORBS (Continued)			
Potentilla glandulosa	T	T	0.5/100
Pyrola secunda	-	T	0.2/50
Saxifraga bronchialis	T	-	0.2/50
Sedum lanceolatum	T	-	0.2/50
Valeriana dioica	-	T	0.2/50
TOTAL NPF	4.0	8.0	6.0/100
SUBSHRUBS			
Berberis repens	-	T	0.2/50
SHRUBS			
Juniperus communis	10	18	14.0/100
Penstemon fruticosus	T	T	0.5/100
Ribes montigenum	T	2	1.2/100
Rubus idaeus	-	T	0.2/50
Salix scouleriana	-	2	1.0/50
Symphoricarpos albus	-	T	0.2/50
Vaccinium scoparium	2	2	2.0/100
TOTAL SHRUBS	13.0	25.5	19.2/100
TREES			
Abies lasiocarpa	3	3	3.0/100
Pinus albicaulis	5	8	6.5/100
Pinus contorta	-	30	15.0/50
Pseudotsuga menziesii	-	12	6.0/50
TOTAL TREES	8.0	53.0	30.5/100
TOTAL VEGETATION (Stratified)	27.5	92.0	59.8/100

Nomenclature follows USDA Forest Service (1987)

Footnotes are presented on cover page D-1.

5.0 APPENDICES

Appendix A. List of vascular plant species, Elkhorn study area, 1989-1990 . . . . . A-1

Appendix B. Canopy cover by transect (sample site), 1989 . . . . . B-1

Appendix C. Canopy cover by "Daubenmire" quadrat, 1989 . . . . . C-1

Appendix D. Canopy cover by ecodata plot (sample site), 1990 . . . . D-1

Appendix E. Shrub density by sample site, 1989 . . . . . E-1

Appendix F. Shrub density by sample site, 1990 . . . . . F-1

Appendix G. Tree density by sample site, 1989 . . . . . G-1

Appendix H. Tree density by sample site, 1990 . . . . . H-1

Appendix I. Site tree information (age, height, dbh), 1989 . . . . . I-1

Appendix J. Site tree information (age, height, dbh), 1990 . . . . . J-1

Appendix K. Site parameters by sample site, 1989 . . . . . K-1

Appendix L. Site parameters by sample site, 1990 . . . . . L-1

Table D7. Percent canopy cover/constancy by class and species for 2 ecodata plots sampled in the **ABIES LASIOCARPA** series, Gold Fields Elkhorn study area, 1990.

	ECODATA PLOT NUMBER		
	ABI LAS-PIN ALB/ SCREE	ABI LAS/ VAC SCO	ABI LAS SERIES
	45	46	Mean n=2
GROUND COVER			
Bare soil	T	2	1.2/100
Gravel	20	20	20.0/100
Rock	72	60	66.0/100
Litter	5	10	7.5/100
Wood	3	3	3.0/100
Moss	T	T	0.5/100
Lichens	T	T	0.5/100
Basal vegetation	T	3	1.8/100
VEGETATION STRUCTURE (nonstratified)			
Total tree cover	8	48	28.0/100
Total shrub cover	10	22	16.0/100
Total graminoid cover	2	5	3.5/100
Total forb cover	2	5	3.5/100
CLASS\SPECIES			
NATIVE PERENNIAL GRAMINOIDS			
Agropyron caninum	-	T	0.2/50
Calamagrostis rubescens	-	2	1.0/50
Carex rossii	T	T	0.5/100
Oryzopsis exigua	T	-	0.2/50
Poa nervosa	T	T	0.5/100
Poa scabrella	-	T	0.2/50
Sitanion hystrix	T	T	0.5/100
Trisetum spicatum	T	T	0.5/100
TOTAL NPG	2.5	5.0	3.8/100
NATIVE PERENNIAL FORBS			
Achillea millefolium	-	T	0.2/50
Allium cernuum	-	T	0.2/50
Antennaria racemosa	T	2	1.2/100
Arenaria congesta	T	T	0.5/100
Arnica latifolia	T	-	0.2/50
Aster conspicuus	-	T	0.2/50
Epilobium angustifolium	-	T	0.2/50
Erigeron species	T	T	0.5/100
Fragaria virginiana	-	T	0.2/50
Heuchera cylindrica	T	T	0.5/100
Pedicularis contorta	-	T	0.2/50

Appendix A. List of vascular plant species documented for the Gold Fields Elkhorn Project Area, 1989 - 1990.

Binomial	Code	Common Name
NATIVE PERENNIAL GRAMINOIDS		
Agropyron caninum	Agr can	Bearded wheatgrass
Agropyron dasystachyum	Agr das	Thickspike wheatgrass
Agropyron smithii	Agr smi	Western wheatgrass
Agropyron spicatum	Agr spi	Bluebunch wheatgrass
Agrostis scabra	Agr sca	Rough bentgrass
Alopecurus aequalis	Alo aeq	Shortawn foxtail
Aristida longiseta	Ari lon	Red threeawn
Bouteloua gracilis	Bou gra	Blue grama
Bromus anomalus	Bro ano	Nodding brome
Bromus carinatus	Bro car	Mountain brome
Bromus ciliatus	Bro cil	Fringed brome
Calamagrostis canadensis	Cal can	Bluejoint reedgrass
Calamagrostis rubescens	Cal rub	Pinegrass
Carex aquatilis	Car aqu	Water sedge
Carex concinnoides	Car con	Northwest sedge
Carex disperma	Car dis	Soft-leaved sedge
Carex filifolia	Car fil	Threadleaf sedge
Carex geyeri	Car gey	Elk sedge
Carex hoodii	Car hoo	Hood's sedge
Carex microptera	Car mic	Small-winged sedge
Carex nebraskensis	Car neb	Nebraska sedge
Carex petasata	Car pet	Liddon's sedge
Carex praegracilis	Car pra	Clustered field sedge
Carex raynoldsii	Car ray	Raynold's sedge
Carex rossii	Car roi	Ross sedge
Carex rostrata	Car ros	Beaked sedge
Carex simulata	Car sim	Short-beaked sedge
Carex stenophylla	Car ste	Needleleaf sedge
Carex stipata	Car sti	Sawbeak sedge
Cinna latifolia	Cin lat	Drooping woodreed
Danthonia intermedia	Dan int	Timber oatgrass
Danthonia unispicata	Dan uni	One-spike oatgrass
Deschampsia cespitosa	Des ces	Tufted hairgrass
Eleocharis palustris	Ele pal	Common spikesedge
Elymus canadensis	Ely can	Canada wildrye
Elymus cinereus	Ely cin	Basin wildrye
Elymus glaucus	Ely gla	Blue wildrye
Festuca idahoensis	Fes ida	Idaho fescue
Festuca scabrella	Fes sca	Rough fescue
Glyceria grandis	Gly gra	American mannagrass
Glyceria striata	Gly str	Fowl mannagrass
Hordeum brachyantherum	Hor bra	Meadow barley
Hordeum jubatum	Hor jub	Foxtail barley
Juncus balticus	Jun bal	Baltic rush
Juncus confusus	Jun con	Colorado rush
Juncus ensifolius	Jun ens	Dagger-leaf rush
Juncus longistylis	Jun lon	Longstyle rush
Koeleria cristata	Koe cri	Prairie junegrass

Table D6. (Continued)

	ECODATA PLOT NUMBER									
	PSE MEN/ JUN SCO BOTTOM	PSEUDOTSUGA MENZIESII/ FESTUCA IDAHOENSIS			PSE MEN/ FES SCA	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS				
	31	16	18	Mean n=2	30	40	41	42	43	Mean n=4
SHRUBS										
Amelanchier alnifolia	-	-	-	-	-	-	-	T	-	0.1/25
Artemisia nova	T	-	T	0.2/50	-	-	-	-	-	-
Chrysothamnus nauseosus	T	-	-	-	-	-	-	-	-	-
Clematis occidentalis	-	-	-	-	-	-	3	-	-	0.8/25
Juniperus communis	-	-	-	-	-	18	2	2	T	5.6/100
Lonicera utahensis	-	-	-	-	-	T	2	-	T	0.8/75
Ribes cereum	T	T	-	0.2/50	T	-	-	-	-	-
Ribes inerme	-	-	-	-	-	-	-	-	T	0.1/25
Ribes setosum	-	-	-	-	-	-	T	-	-	0.1/25
Rosa acicularis	T	-	-	-	-	2	T	-	T	0.8/75
Spiraea betulifolia	-	-	-	-	-	3	2	T	2	1.9/100
Vaccinium scoparium	-	-	-	-	-	2	-	-	3	1.2/50
TOTAL SHRUBS	2.0	0.5	0.5	0.5/100	0.5	25.5	10.0	3.0	7.0	11.4/100
TREES										
Juniperus scopulorum	30	10	10	10.0/100	10	-	T	T	-	0.2/50
Picea engelmannii	-	-	-	-	-	T	-	-	-	0.1/25
Pinus contorta	-	-	-	-	-	58	10	12	70	37.5/100
Pinus flexilis	3	T	10	5.2/100	3	-	-	-	-	-
Pinus ponderosa	-	-	-	-	T	-	-	-	-	-
Pseudotsuga menziesii	40	30	30	30.0/100	60	18	60	58	2	34.5/100
TOTAL TREES	73.0	40.5	50.0	45.2/100	73.5	76.5	70.5	70.5	72.0	72.4/100
TOTAL VEGETATION (Stratified)	87.5	64.5	88.0	76.2/100	103.5	148.0	132.5	101.5	169.0	137.8/100

Nomenclature follows USDA Forest Service (1987)

Footnotes are presented on cover page D-1.

Appendix A. (Continued)

Binomial	Code	Common Name
NATIVE PERENNIAL GRAMINOIDS (Continued)		
Luzula campestris	Luz cam	Field woodrush
Luzula parviflora	Luz par	Small-flowered woodrush
Melica spectabilis	Mel spe	Showy oniongrass
Oryzopsis exigua	Ory exi	Little ricegrass
Oryzopsis hymenoides	Ory hym	Indian ricegrass
Phalaris arundinacea	Pha aru	Reed canarygrass
Poa cusickii	Poa cus	Cusick's bluegrass
Poa juncifolia	Poa jun	Alkali bluegrass
Poa nervosa	Poa ner	Wheeler's bluegrass
Poa sandbergii	Poa san	Sandberg's bluegrass
Poa scabrella	Poa sca	Pine bluegrass
Puccinellia pauciflora	Puc pau	Weak alkaligrass
Scirpus acutus	Sci acu	Hardstem bulrush
Scirpus microcarpus	Sci mic	Panicled bulrush
Sitanion hystrix	Sit hys	Bottlebrush squirreltail
Sporobolus cryptandrus	Spo cry	Sand dropseed
Stipa comata	Sti com	Needle-and-thread
Stipa occidentalis	Sti occ	Western needlegrass
Stipa richardsonii	Sti ric	Richardson's needlegrass
Stipa viridula	Sti vir	Green needlegrass
Trisetum spicatum	Tri spi	Spike trisetum
Trisetum wolfii	Tri wol	Wolf's trisetum
INTRODUCED PERENNIAL GRAMINOIDS		
Agropyron cristatum	Agr cri	Crested wheatgrass
Agropyron intermedium	Agr int	Intermediate wheatgrass
Agropyron repens	Agr rep	Quackgrass
Agrostis stolonifera	Agr sto	Redtop
Bromus inermis	Bro ine	Smooth brome
Dactylis glomerata	Dac glo	Orchard-grass
Festuca arundinacea	Fes aru	Reed fescue
Lolium perenne	Lol per	Perennial ryegrass
Phleum pratense	Phl pra	Common timothy
Poa compressa	Poa com	Canada bluegrass
Poa palustris	Poa pal	Fowl bluegrass
Poa pratensis	Poa pra	Kentucky bluegrass
ANNUAL GRAMINOIDS		
Avena sativa	Ave sat	Common oat
Bromus tectorum	Bro tec	Cheatgrass brome
Poa annua	Poa ann	Annual bluegrass
NATIVE PERENNIAL FORBS		
Achillea millefolium	Ach mil	Common yarrow
Actaea rubra	Act rub	Red baneberry
Agoseris glauca	Ago gla	Pale agoseris
Allium cernuum	All cer	Nodding onion
Allium textile	All tex	Textile onion
Anaphalis margaritacea	Ana mar	Pearly-everlasting
Anemone multifida	Ane mul	Ball anemone
Anemone patens	Ane pat	Pasqueflower

Table D6. (Continued)

	ECODATA PLOT NUMBER									
	PSE MEN/ JUN SCO BOTTOM	PSEUDOTSUGA MENZIESII/ FESTUCA IDAHOENSIS			PSE MEN/ FES SCA	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS				
	31	16	18	Mean n=2	30	40	41	42	43	Mean n=4
INTRODUCED PERENNIAL FORBS										
Cerastium vulgatum	-	-	-	-	-	T	-	-	-	0.1/25
Taraxacum officinale	T	-	-	-	T	-	-	-	-	-
Trifolium repens	-	-	-	-	-	-	-	-	3	0.8/25
TOTAL IPF	0.5	-	-	-	0.5	0.5	-	-	3.0	0.9/50
FERNS AND ALLIES										
Selaginella densa	-	3	10	6.5/100	-	-	-	-	-	-
Woodsia oregana	-	T	-	0.2/50	-	-	-	-	-	-
TOTAL F&A	-	3.5	10.0	6.8/100	-	-	-	-	-	-
NATIVE ANNUAL/BIENNIAL FORBS										
Arabis divaricarpa	-	-	-	-	-	-	-	T	-	0.1/25
Arabis holboellii	T	T	T	0.5/100	T	-	-	T	-	0.1/25
Collinsia parviflora	-	-	-	-	-	-	-	T	-	0.1/25
Descurainia pinnata	-	-	-	-	T	-	-	-	-	-
TOTAL NAF	0.5	0.5	0.5	0.5/100	1.0	-	-	1.5	-	0.4/25
INTRODUCED ANNUAL/BIENNIAL FORBS										
Draba nemorosa	T	-	-	-	-	-	-	-	-	-
SUBSHRUBS										
Arctostaphylos uva-ursi	-	-	-	-	-	12	-	-	10	5.5/50
Artemisia frigida	-	T	T	0.5/100	-	-	-	-	-	-
Berberis repens	-	-	-	-	-	2	2	2	2	2.0/100
Chimaphila umbellata	-	-	-	-	-	T	T	-	2	0.8/75
Gutierrezia sarothrae	-	-	T	0.2/50	-	-	-	-	-	-
TOTAL SUBSHRUBS	-	0.5	1.0	0.8/100	-	14.5	2.5	2.0	14.0	8.2/100

Appendix A. (Continued)

Binomial	Code	Common Name
NATIVE PERENNIAL FORBS (Continued)		
Angelica arguta	Ang arg	Sharptooth angelica
Antennaria anaphaloides	Ant ana	Tall pussytoes
Antennaria microphylla	Ant mic	Rosy pussytoes
Antennaria parvifolia	Ant par	Littleleaf pussytoes
Antennaria racemosa	Ant rac	Raceme pussytoes
Arabis drummondii	Ara dru	Drummond's rockcress
Arabis nuttallii	Ara nut	Nuttall's rockcress
Arenaria congesta	Are con	Ballhead sandwort
Arenaria lateriflora	Are lat	Bluntleaf sandwort
Arnica cordifolia	Arn cor	Heartleaf arnica
Arnica latifolia	Arn lat	Mountain arnica
Arnica sororia	Arn sor	Twin arnica
Artemisia campestris	Art cam	Field sagewort
Artemisia dracunculus	Art dra	False-tarragon sagewort
Artemisia ludoviciana	Art lud	Cudweed sagewort
Aster campestris	Ast cam	Meadow aster
Aster conspicuus	Ast con	Showy aster
Aster falcatus	Ast fal	Creeping white prairie aster
Aster foliaceus	Ast fol	Leafy aster
Aster hesperius	Ast hes	Siskiyou aster
Aster integrifolius	Ast int	Thickstem aster
Aster junciformis	Ast jun	Rush aster
Aster modestus	Ast mod	Few-flowered aster
Aster scopulorum	Ast sco	Crag aster
Astragalus adsurgens	Ast ads	Prairie milkvetch
Astragalus agrestis	Ast agr	Field milkvetch
Astragalus atropubescens	Ast atr	Kelsey's milkvetch
Astragalus crassicarpus	Ast cra	Groundplum milkvetch
Astragalus drummondii	Ast dru	Drummond's milkvetch
Astragalus flexuosus	Ast fle	Wiry milkvetch
Astragalus gilviflorus	Ast gil	Threeleaved milkvetch
Astragalus miser	Ast mis	Weedy milkvetch
Astragalus missouriensis	Ast mio	Missouri milkvetch
Astragalus purshii	Ast pur	Pursh's milkvetch
Balsamorhiza sagittata	Bal sag	Arrowleaf balsamroot
Besseya wyomingensis	Bes wyo	Wyoming kittentail
Calypso bulbosa	Cal bul	Fairy-slipper
Campanula rotundifolia	Cam rot	Roundleaf harebell
Castilleja miniata	Cas min	Scarlet paintbrush
Cerastium arvense	Cer arv	Field chickweed
Chaenactis douglasii	Cha dou	Douglas chaenactis
Chrysopsis villosa	Chr vil	Hairy goldenaster
Cicuta douglasii	Cic dou	Douglas water-hemlock
Cirsium scariosum	Cir sca	Elk thistle
Cirsium undulatum	Cir und	Wavyleaf thistle
Clematis hirsutissima	Cle hir	Vaseflower clematis
Comandra umbellata	Com umb	Pale bastard toadflax
Coryphantha missouriensis	Cor mis	Nipple coryphantha
Crepis acuminata	Cre acu	Tapertip hawksbeard
Crepis modocensis	Cre mod	Low hawksbeard
Crepis occidentalis	Cre occ	Western hawksbeard

Table D6. (Continued)

	ECODATA PLOT NUMBER									
	PSE MEN/ JUN SCO BOTTOM	PSEUDOTSUGA MENZIESII/ FESTUCA IDAHOENSIS			PSE MEN/ FES SCA	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS				
	31	16	18	Mean n=2	30	40	41	42	43	Mean n=4
NATIVE PERENNIAL FORBS (Continued)										
Chrysopsis villosa	-	-	-	-	T	-	-	-	-	-
Dodecatheon conjugens	-	-	-	-	-	-	-	T	-	0.1/25
Douglasia montana	T	-	-	-	-	-	-	-	-	-
Epilobium angustifolium	-	-	-	-	-	-	T	-	T	0.2/50
Erigeron caespitosus	-	T	-	0.2/50	T	-	-	-	-	-
Erigeron compositus	T	-	-	-	-	-	-	-	-	-
Erigeron speciosus	-	-	-	-	-	-	-	T	-	0.1/25
Fragaria vesca	-	-	-	-	-	-	-	-	3	0.8/25
Fragaria virginiana	-	-	-	-	-	T	T	2	8	2.8/100
Galium boreale	-	-	-	-	-	-	-	-	T	0.1/25
Geum triflorum	T	-	-	-	T	-	-	T	-	0.1/25
Heuchera cylindrica	-	-	-	-	-	-	T	-	-	0.1/25
Heuchera parvifolia	-	-	T	0.2/50	-	-	-	-	-	-
Hieracium albiflorum	-	-	-	-	-	T	-	-	T	0.2/50
Hieracium cynoglossoides	-	-	-	-	-	-	-	T	-	0.1/25
Lesquerella alpina	-	T	-	0.2/50	-	-	-	-	-	-
Lupinus sericeus	-	-	-	-	-	-	-	T	-	0.1/25
Lychnis drummondii	-	-	-	-	-	-	-	T	-	0.1/25
Opuntia polyacantha	-	T	-	0.2/50	-	-	-	-	-	-
Osmorhiza chilensis	-	-	-	-	-	T	-	-	-	0.1/25
Penstemon procerus	-	-	-	-	-	-	-	2	-	0.5/25
Phlox alyssifolia	T	-	-	-	T	-	-	-	-	-
Potentilla glandulosa	-	-	-	-	-	-	-	T	-	0.1/25
Potentilla gracilis	-	-	-	-	-	-	-	-	T	0.1/25
Potentilla hippiana	T	-	-	-	-	-	-	-	-	-
Pyrola chlorantha	-	-	-	-	-	T	-	-	T	0.2/50
Pyrola secunda	-	-	-	-	-	2	2	-	2	1.5/75
Solidago missouriensis	3	T	T	0.5/100	T	-	-	T	-	0.1/25
Valeriana dioica	-	-	-	-	-	-	T	-	T	0.2/50
TOTAL NPF	8.0	4.0	1.5	2.8/100	5.5	11.0	27.0	12.5	43.0	23.4/100

Appendix A. (Continued)

Binomial	Code	Common Name
NATIVE PERENNIAL FORBS (Continued)		
Cymopterus bipinnatus	Cym bip	Fernleaf spring parsley
Delphinium bicolor	Del bic	Low larkspur
Disporum trachycarpum	Dis tra	Wartberry fairy-bell
Dodecatheon conjugens	Dod con	Slimpod shooting star
Douglasia montana	Dou mon	Rocky Mountain douglasia
Draba oligosperma	Dra oli	Few-seeded draba
Epilobium angustifolium	Epi ang	Fireweed
Epilobium ciliatum	Epi cil	Common willow-herb
Erigeron caespitosus	Eri cae	Tufted fleabane
Erigeron compositus	Eri com	Cut-leaved daisy
Erigeron corymbosus	Eri cor	Long-leaved fleabane
Erigeron pumilus	Eri pum	Shaggy fleabane
Erigeron speciosus	Eri spe	Showy fleabane
Eriogonum flavum	Eri fla	Yellow buckwheat
Eriogonum ovalifolium	Eri ova	Oval-leaved buckwheat
Eriogonum umbellatum	Eri umb	Sulfur buckwheat
Erysimum inconspicuum	Ery inc	Smallflowered rocket
Fragaria vesca	Fra ves	Woods strawberry
Fragaria virginiana	Fra vir	Virginia strawberry
Fritillaria atropurpurea	Fri atr	Checker lily
Fritillaria pudica	Fri pud	Yellow bell
Gaillardia aristata	Gai ari	Blanket-flower
Galium boreale	Gal bor	Northern bedstraw
Galium trifidum	Gal trf	Small bedstraw
Galium triflorum	Gal tri	Sweet-scented bedstraw
Gaura coccinea	Gau coc	Scarlet gaura
Gentiana affinis	Gen aff	Pleated gentian
Geranium richardsonii	Ger ric	White geranium
Geranium viscosissimum	Ger vis	Sticky geranium
Geum macrophyllum	Geu mac	Large leaf avens
Geum triflorum	Geu tri	Prairiesmoke
Glycyrrhiza lepidota	Gly lep	American licorice
Goodyera oblongifolia	Goo obl	Western rattlesnake plantain
Hackelia micrantha	Hac mic	Blue stickseed
Haplopappus acaulis	Hap aca	Cushion goldenweed
Haplopappus spinulosus	Hap spi	Spiny goldenweed
Hedeoma drummondii	Hed dru	Drummond's pennyroyal
Helianthella uniflora	Hel uni	One flower helianthella
Heracleum lanatum	Her lan	Cow parsnip
Heuchera cylindrica	Heu cyl	Roundleaf alumroot
Heuchera parvifolia	Heu par	Littleleaf alumroot
Hieracium albiflorum	Hie alb	White-flowered hawkweed
Hieracium cynoglossoides	Hie cyn	Hounds-tongue hawkweed
Hymenopappus filifolius	Hym fil	Narrowleaf hymenopappus
Hypopitys monotropa	Hyp mon	Fringed pinesap
Iris missouriensis	Iri mis	Rocky Mountain iris
Iva axillaris	Iva axi	Poverty weed
Kuhnia eupatorioides	Kuh eup	False-boneset
Lesquerella alpina	Les alp	Alpine bladderpod
Lewisia rediviva	Lew red	Bitterroot
Liatris punctata	Lia pun	Dotted blazingstar

Table D6. (Continued)

	ECODATA PLOT NUMBER									
	PSE MEN/ JUN SCO BOTTOM	PSEUDOTSUGA MENZIESII/ FESTUCA IDAHOENSIS			PSE MEN/ FES SCA	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS				
	31	16	18	Mean n=2	30	40	41	42	43	Mean n=4
NATIVE PERENNIAL GRAMINOIDS (Continued)										
Poa nervosa	-	-	-	-	-	-	T	2	2	1.1/75
Poa sandbergii	-	-	T	0.2/50	-	-	-	-	-	-
Poa scabrella	T	-	-	-	3	-	-	-	-	-
Sitanion hystrix	-	-	-	-	-	-	-	T	-	0.1/25
Stipa occidentalis	-	-	-	-	-	-	-	2	-	0.5/25
Stipa richardsonii	-	-	-	-	-	-	-	-	T	0.1/25
Stipa viridula	T	-	-	-	-	-	-	-	-	-
Trisetum spicatum	-	-	-	-	-	-	-	2	2	1.0/50
TOTAL NPG	3.0	14.5	24.5	19.5/100	22.5	20.0	22.5	12.0	30.0	21.1/100
INTRODUCED PERENNIAL GRAMINOIDS										
Poa pratensis	-	T	-	0.2/50	-	-	-	-	-	-
NATIVE PERENNIAL FORBS										
Achillea millefolium	T	T	-	0.2/50	T	-	-	T	T	0.2/50
Allium cernuum	-	-	-	-	T	-	-	T	-	0.1/25
Anemone multifida	-	-	-	-	T	-	-	T	T	0.2/50
Antennaria microphylla	T	-	-	-	T	-	-	2	T	0.6/50
Antennaria parvifolia	-	T	T	0.5/100	T	-	-	-	-	-
Antennaria racemosa	-	-	-	-	-	T	18	T	10	7.2/100
Arenaria congesta	-	-	-	-	T	-	-	-	-	-
Arnica cordifolia	-	-	-	-	-	3	2	T	3	2.1/100
Artemisia dracunculus	-	T	-	0.2/50	-	-	-	-	-	-
Aster conspicuus	-	-	-	-	-	T	3	-	T	1.0/75
Aster falcatus	T	-	-	-	-	-	-	-	-	-
Astragalus adsurgens	-	T	-	0.2/50	-	-	-	-	-	-
Astragalus miser	T	-	-	-	-	2	-	-	12	3.5/50
Calypso bulbosa	-	-	-	-	-	T	-	-	-	0.1/25
Campanula rotundifolia	T	-	-	-	-	T	-	-	-	0.1/25

Appendix A. (Continued)

Binomial	Code	Common Name
NATIVE PERENNIAL FORBS (Continued)		
Linum lewisii	Lin lew	Blue flax
Lithophragma parviflorum	Lit par	Smallflower fringecup
Lithospermum incisum	Lit inc	Yellow gromwell
Lithospermum ruderale	Lit rud	Western gromwell
Lomatium triternatum	Lom tri	Nine-leaf lomatium
Lupinus sericeus	Lup ser	Silky lupine
Lychnis drummondii	Lyc dru	Drummond campion
Lygodesmia juncea	Lyg jun	Rush-like skeleton-weed
Mentha arvensis	Men arv	Field mint
Mertensia ciliata	Mer cil	Mountain bluebell
Mimulus guttatus	Mim gut	Common monkey-flower
Mirabilis linearis	Mir lin	Narrowleaf four-o'clock
Mitella pentandra	Mit pen	Alpine mitrewort
Musineon divaricatum	Mus div	Leafy musineon
Opuntia polyacantha	Opu pol	Plains pricklypear
Orobanche fasciculata	Oro fas	Clustered broomrape
Osmorhiza chilensis	Osm chi	Mountain sweetroot
Oxytropis deflexa	Oxy def	Pendent-pod locoweed
Oxytropis sericea	Oxy ser	Silky locoweed
Parnassia fimbriata	Par fim	Fringed grass-of-parnassus
Parnassia palustris	Par pal	Northern grass-of-parnassus
Paronychia sessiliflora	Par ses	Stemless whitlow-wort
Pedicularis contorta	Ped con	Coiled pedicularis
Penstemon aridus	Pen ari	Stiff-leaf penstemon
Penstemon attenuatus	Pen att	Sulfur penstemon
Penstemon eriantherus	Pen eri	Fuzzytongue penstemon
Penstemon procerus	Pen pro	Littleflower penstemon
Perideridia gairdneri	Per gai	Gairdner's yampa
Phacelia hastata	Pha has	Silverleaf phacelia
Phlox alyssifolia	Phl aly	Alyssum-leaved phlox
Phlox hoodii	Phl hoo	Hood's phlox
Phlox muscoides	Phl mus	Moss phlox
Polemonium viscosum	Pol vis	Sticky polemonium
Potentilla anserina	Pot ans	Common silverweed
Potentilla glandulosa	Pot gla	Sticky cinquefoil
Potentilla gracilis	Pot gra	Slender cinquefoil
Potentilla hippiana	Pot hip	Woolly cinquefoil
Potentilla pensylvanica	Pot pen	Prairie cinquefoil
Prunella vulgaris	Pru vul	Self-heal
Pyrola asarifolia	Pyr asa	Pink wintergreen
Pyrola chlorantha	Pyr chl	Green-flowered wintergreen
Pyrola secunda	Pyr sec	One-sided wintergreen
Ranunculus macounii	Ran mac	Macoun's buttercup
Ranunculus subrigidus	Ran sub	Stiff-leaved water buttercup
Ranunculus uncinatus	Ran uni	Little buttercup
Ratibida columnifera	Rat col	Prairie coneflower
Rumex occidentalis	Rum occ	Western dock
Rumex salicifolius	Rum sal	Willow dock
Saxifraga arguta	Sax arg	Brook saxifrage
Saxifraga bronchialis	Sax bro	Spotted saxifrage
Schoenocrambe linifolia	Sch lin	Flaxleaf plainsmustard

Table D6. Percent canopy cover/constancy by class and species for 8 ecodata plots sampled in the **PSEUDOTSUGA MENZIESII** series, Gold Fields Elkhorn study area, 1990.

	ECODATA PLOT NUMBER									
	PSE MEN/ JUN SCO BOTTOM	PSEUDOTSUGA MENZIESII/ FESTUCA IDAHOENSIS			PSE MEN/ FES SCA	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS				
	31	16	18	Mean n=2	30	40	41	42	43	Mean n=4
GROUND COVER										
Bare soil	10	10	10	10.0/100	3	-	-	T	T	0.2/50
Gravel	20	10	3	6.5/100	3	T	T	T	T	0.5/100
Rock	20	50	10	30.0/100	10	2	12	T	-	3.6/75
Litter	20	20	40	30.0/100	70	68	30	78	88	66.0/100
Wood	3	3	10	6.5/100	3	20	10	10	3	10.8/100
Moss	20	T	10	5.2/100	10	3	40	5	3	12.8/100
Lichens	T	T	10	5.2/100	T	2	3	3	T	2.1/100
Basal vegetation	3	3	3	3.0/100	3	5	3	5	8	5.2/100
VEGETATION STRUCTURE (nonstratified)										
Total tree cover	70	40	50	45.0/100	70	70	68	60	70	67.0/100
Total shrub cover	3	T	T	0.5/100	T	38	10	3	20	17.8/100
Total graminoid cover	3	10	20	15.0/100	20	20	22	18	32	23.0/100
Total forb cover	10	3	10	6.5/100	3	10	22	12	42	21.5/100
CLASS\SPECIES										
NATIVE PERENNIAL GRAMINOIDS										
Agropyron spicatum	T	3	3	3.0/100	3	-	-	T	-	0.1/25
Aristida longiseta	-	T	-	0.2/50	-	-	-	-	-	-
Calamagrostis rubescens	-	-	-	-	-	18	22	2	22	16.0/100
Carex concinnoides	-	-	-	-	-	-	-	-	3	0.8/25
Carex geyeri	-	-	-	-	-	2	-	-	-	0.5/25
Carex rossii	T	-	-	-	-	-	-	T	-	0.1/25
Danthonia intermedia	-	-	-	-	-	-	-	-	T	0.1/25
Festuca idahoensis	T	10	20	15.0/100	8	-	-	2	-	0.5/25
Festuca scabrella	T	-	-	-	8	-	-	T	-	0.1/25
Koeleria cristata	-	T	T	0.5/100	T	-	-	-	-	-
Oryzopsis hymenoides	-	-	T	0.2/50	-	-	-	-	-	-
Poa juncifolia	-	T	-	0.2/50	-	-	-	-	-	-

Appendix A. (Continued)

Binomial	Code	Common Name
NATIVE PERENNIAL FORBS (Continued)		
Sedum lanceolatum	Sed lan	Lanceleaf stonecrop
Senecio canus	Sen can	Woolly groundsel
Senecio pseudaureus	Sen pse	Golden groundsel
Senecio serra	Sen ser	Tall goundsel
Senecio sphaerocephalus	Sen sph	Mountain-marsh butterweed
Senecio streptanthifolius	Sen str	Rocky Mountain butterweed
Senecio triangularis	Sen tri	Arrowleaf groundsel
Sisyrinchium angustifolium	Sis ang	Common blue-eyed grass
Smilacina stellata	Smi ste	Starry false solomon's seal
Solidago canadensis	Sol can	Canada goldenrod
Solidago gigantea	Sol gig	Giant goldenrod
Solidago missouriensis	Sol mis	Missouri goldenrod
Sparganium emersum	Spa eme	Simplestem bur-reed
Sphaeralcea coccinea	Sph coc	Scarlet globemallow
Stellaria longifolia	Ste log	Longleaved starwort
Stellaria longipes	Ste lon	Longstalk starwort
Stephanomeria runcinata	Ste run	Desert wirelettuce
Streptopus amplexifolius	Str amp	Clasping-leaved twisted-stalk
Thalictrum dasycarpum	Tha das	Purple meadowrue
Thalictrum occidentale	Tha occ	Western meadowrue
Thermopsis montana	The mon	Mountain thermopsis
Townsendia hookeri	Tow hoo	Hooker's townsendia
Typha latifolia	Typ lat	Common cattail
Urtica dioica	Urt dio	Stinging nettle
Valeriana dioica	Val dio	Northern valerian
Verbena bracteata	Ver bra	Bracted verbena
Veronica americana	Ver ame	American speedwell
Vicia americana	Vic ame	American vetch
Viola adunca	Vio adu	Early blue violet
Viola canadensis	Vio can	Canada violet
Viola macloskeyi	Vio mac	Small white violet
Viola nuttallii	Vio nut	Yellow prairie violet
Zigadenus venenosus	Zig ven	Meadow death-camas
INTRODUCED PERENNIAL FORBS		
Astragalus cicer	Ast cic	Cicer milkvetch
Cardaria draba	Car dra	Heart-podded hoarycress
Cardaria pubescens	Car pub	Globepodded hoarycress
Centaurea maculosa	Cen mac	Spotted knapweed
Cerastium vulgatum	Cer vul	Common chickweed
Cirsium arvense	Cir arv	Canada thistle
Leonurus cardiaca	Leo car	Motherwort
Linaria dalmatica	Lin dal	Dalmation toadflax
Linaria vulgaris	Lin vul	Butter-and-eggs
Medicago sativa	Med sat	Alfalfa
Plantago major	Pla maj	Common plantain
Ranunculus acris	Ran acr	Tall buttercup
Rumex crispus	Rum cri	Curl dock
Sonchus uliginosus	Son uli	Marsh sow-thistle
Taraxacum officinale	Tar off	Common dandelion
Trifolium repens	Tri rep	White Dutch clover

Table D5. (Continued)

	ECODATA PLOT NUMBER						
	JUNIPERUS SCOPULORUM/ AGROPYRON SPICATUM			PINUS FLEXILIS/ AGROPYRON SPICATUM			PIN FLE/ AGR SMI BOTTOM
	9	24	Mean n=2	8	20	Mean n=2	10
SHRUBS							
Artemisia nova	-	10	5.0/50	20	20	20.0/100	10
Artemisia tridentata	3	-	1.5/50	-	-	-	-
Chrysothamnus nauseosus	-	-	-	-	-	-	T
Eriogonum microthecum	T	-	0.2/50	-	-	-	-
Rhus aromatica	T	T	0.5/100	T	-	0.2/50	3
Ribes cereum	-	-	-	-	T	0.2/50	T
Rosa arkansana	T	-	0.2/50	-	-	-	T
Tetradymia canescens	T	-	0.2/50	T	T	0.5/100	T
TOTAL SHRUBS	5.0	10.5	7.8/100	21.0	21.0	21.0/100	15.0
TREES							
Juniperus scopulorum	10	20	15.0/100	20	10	15.0/100	3
Pinus flexilis	T	T	0.5/100	10	10	10.0/100	40
Pseudotsuga menziesii	-	-	-	T	3	1.8/100	-
TOTAL TREES	10.5	20.5	15.5/100	30.5	23.0	26.8/100	43.0
TOTAL VEGETATION (Stratified)	103.5	77.0	90.2/100	95.5	87.5	91.5/100	96.5

Nomenclature follows USDA Forest Service (1987)

Footnotes are presented on cover page D-1.

Appendix A. (Continued)

Binomial	Code	Common Name
FERNS AND ALLIES		
Cystopteris fragilis	Cys fra	Brittle bladder-fern
Equisetum arvense	Equ arv	Common horsetail
Equisetum hyemale	Equ hye	Common scouring-rush
Selaginella densa	Sel den	Compact clubmoss
Woodsia oregana	Woo ore	Oregon woodsia
NATIVE ANNUAL/BIENNIAL FORBS		
Amaranthus graecizans	Ama gra	Prostrate pigweed
Androsace occidentalis	And occ	Western rockjasmine
Arabis divaricarpa	Ara div	Spreading-pod rockcress
Arabis holboellii	Ara hol	Holboell's rockcress
Cardamine pensylvanica	Car pes	Pennsylvania bittercress
Chenopodium leptophyllum	Che lep	Slimleaf goosefoot
Collinsia parviflora	Col par	Blue-eyed Mary
Collomia linearis	Col lin	Narrow-leaf collomia
Corydalis aurea	Cor aur	Golden corydalis
Cryptantha celosioides	Cry cel	Northern cryptantha
Descurainia pinnata	Des pin	Pinnate tansymustard
Dracocephalum parviflorum	Dra par	American dragonhead
Epilobium paniculatum	Epi pan	Autumn willow-herb
Erigeron lonchophyllus	Eri lon	Spearleaf fleabane
Erysimum cheiranthoides	Ery che	Treacle mustard
Galium aparine	Gal apa	Cleavers
Gentianella amarella	Gen ama	Annual gentian
Grindelia squarrosa	Gri squ	Curlycup gumweed
Hackelia floribunda	Hac flo	Showy stickseed
Helianthus annuus	Hel ann	Common sunflower
Helianthus petiolaris	Hel pet	Prairie sunflower
Iva xanthifolia	Iva xan	Tall marsh-elder
Lappula redowskii	Lap red	Western stickseed
Lepidium densiflorum	Lep den	Prairie pepperweed
Linanthus septentrionalis	Lin sep	Northern linanthus
Linum rigidum	Lin rig	Yellow flax
Matricaria matricarioides	Mat mat	Pineapple weed
Mentzelia dispersa	Men dis	Bushy mentzelia
Monolepis nuttalliana	Mon nut	Nuttall's monolepis
Oenothera strigosa (villosa)	Oen str	Common evening-primrose
Phacelia franklinii	Pha fra	Franklin's phacelia
Phacelia linearis	Pha lin	Threadleaf phacelia
Plantago patagonica	Pla pat	Woolly plantain
Polygonum aviculare	Pol avi	Prostrate knotweed
Polygonum douglasii	Pol dou	Douglas knotweed
Potentilla biennis	Pot bie	Biennial cinquefoil
Ranunculus sceleratus	Ran sce	Celery-leaved buttercup
Rorippa curvipes	Ror cur	Bluntleaved yellowcress
Rumex maritimus	Rum mar	Seaside dock
Xanthium strumarium	Xan str	Common cocklebur

Table D5. (Continued)

	ECODATA PLOT NUMBER						
	JUNIPERUS SCOPULORUM/ AGROPYRON SPICATUM			PINUS FLEXILIS/ AGROPYRON SPICATUM			PIN FLE/ AGR SMI BOTTOM
	9	24	Mean n=2	8	20	Mean n=2	10
NATIVE PERENNIAL FORBS (Continued)							
Townsendia hookeri	T	-	0.2/50	T	T	0.5/100	T
Vicia americana	T	-	0.2/50	-	-	-	-
TOTAL NPF	31.5	7.0	19.2/100	12.5	10.5	11.5/100	9.0
INTRODUCED PERENNIAL FORBS							
Linaria dalmatica	T	-	0.2/50	T	T	0.5/100	T
Taraxacum officinale	-	T	0.2/50	T	-	0.2/50	T
TOTAL IPF	0.5	0.5	0.5/100	1.0	0.5	0.8/100	1.0
NATIVE ANNUAL/BIENNIAL FORBS							
Arabis holboellii	T	-	0.2/50	T	T	0.5/100	-
Cryptantha celosioides	-	-	-	T	T	0.5/100	T
Descurainia pinnata	-	-	-	T	T	0.5/100	-
Lepidium densiflorum	T	-	0.2/50	-	-	-	-
Plantago patagonica	T	-	0.2/50	-	-	-	-
Polygonum douglasii	T	-	0.2/50	-	-	-	-
TOTAL NAF	2.0	-	1.0/50	1.5	1.5	1.5/100	0.5
INTRODUCED ANNUAL/BIENNIAL FORBS							
Medicago lupulina	-	-	-	T	-	0.2/50	-
Tragopogon dubius	T	T	0.5/100	-	T	0.2/50	-
TOTAL IAF	0.5	0.5	0.5/100	0.5	0.5	0.5/100	-
SUBSHRUBS							
Artemisia frigida	3	T	1.8/100	3	-	1.5/50	3
Gutierrezia sarothrae	3	3	3.0/100	3	3	3.0/100	3
TOTAL SUBSHRUBS	6.0	3.5	4.8/100	6.0	3.0	4.5/100	6.0

Appendix A. (Continued)

Binomial	Code	Common Name
INTRODUCED ANNUAL/BIENNIAL FORBS		
Alyssum desertorum	Aly des	Desert alyssum
Arabis glabra	Ara gla	Tower mustard
Arctium lappa	Arc lap	Great burdock
Berteroa incana	Ber inc	Berteroa
Camelina microcarpa	Cam mic	Littlepod falseflax
Capsella bursa-pastoris	Cap bur	Shepherd's-purse
Carduus nutans	Car nut	Musk thistle
Chenopodium album	Che alb	Lambsquarter
Cirsium vulgare	Cir vul	Bull thistle
Cynoglossum officinale	Cyn off	Common hound's-tongue
Descurainia sophia	Des sop	Flixweed tansymustard
Draba nemorosa	Dra nem	Woods draba
Filago arvensis	Fil arv	Field filago
Hyoscyamus niger	Hyo nig	Black henbane
Kochia scoparia	Koc sco	Belevedere summercypress
Lactuca serriola	Lac ser	Prickly lettuce
Medicago lupulina	Med lup	Black medic
Melilotus alba	Mel alb	White sweetclover
Melilotus officinalis	Mel off	Yellow sweetclover
Salsola iberica	Sal ibe	Russian thistle
Senecio vulgaris	Sen vul	Common groundsel
Sisymbrium altissimum	Sis alt	Tumblemustard
Thlaspi arvense	Thl arv	Fanweed
Tragopogon dubius	Tra dub	Common salsify
Verbascum thapsus	Ver tha	Flannel mullein
SUBSHRUBS		
Arctostaphylos uva-ursi	Arc uva	Kinnikinnick
Artemisia frigida	Art fri	Fringed sagewort
Berberis repens	Ber rep	Creeping Oregon-grape
Chimaphila umbellata	Chi umb	Common pipsissewa
Gutierrezia sarothrae	Gut sar	Broom snakeweed
SHRUBS		
Alnus incana	Aln inc	Thinleaf alder
Amelanchier alnifolia	Ame aln	Western serviceberry
Artemisia nova	Art nov	Black sagebrush
Artemisia tridentata	Art tri	Big sagebrush
Ceratoides lanata	Cer lan	Winterfat
Cercocarpus ledifolius	Cer led	Curly-leaf mountain mahogany
Chrysothamnus nauseosus	Chr nau	Rubber rabbitbrush
Chrysothamnus viscidiflorus	Chr vis	Green rabbitbrush
Clematis columbiana	Cle cou	Rocky Mountain clematis
Clematis ligusticifolia	Cle lig	Western virgins-bower
Clematis occidentalis	Cle occ	Rock clematis
Cornus stolonifera	Cor sto	Red-osier dogwood
Eriogonum microthecum	Eri mic	Slenderbush buckwheat
Juniperus communis	Jun com	Common juniper
Lonicera utahensis	Lon uta	Utah honeysuckle
Penstemon fruticosus	Pen fru	Bush penstemon
Potentilla fruticosa	Pot fru	Shrubby cinquefoil

Table D5. (Continued)

	ECODATA PLOT NUMBER						
	JUNIPERUS SCOPULORUM/ AGROPYRON SPICATUM			PINUS FLEXILIS/ AGROPYRON SPICATUM			PIN FLE/ AGR SMI BOTTOM
	9	24	Mean n=2	8	20	Mean n=2	10
NATIVE PERENNIAL FORBS (Continued)							
Douglasia montana	-	-	-	-	3	1.5/50	-
Draba oligosperma	-	-	-	-	T	0.2/50	-
Erigeron caespitosus	-	-	-	T	T	0.5/100	-
Erigeron compositus	-	-	-	T	T	0.5/100	T
Erigeron pumilus	T	-	0.2/50	T	-	0.2/50	-
Eriogonum ovalifolium	10	-	5.0/50	-	-	-	-
Erysimum inconspicuum	T	-	0.2/50	T	-	0.2/50	-
Gaura coccinea	T	-	0.2/50	T	-	0.2/50	T
Haplopappus acaulis	-	-	-	T	T	0.5/100	-
Hedeoma drummondii	-	3	1.5/50	-	-	-	-
Heuchera parvifolia	-	T	0.2/50	-	-	-	-
Kuhnia eupatorioides	T	-	0.2/50	-	-	-	-
Lesquerella alpina	-	-	-	-	T	0.2/50	T
Liatris punctata	T	-	0.2/50	-	-	-	T
Linum lewisii	-	T	0.2/50	T	T	0.5/100	-
Opuntia polyacantha	3	-	1.5/50	T	-	0.2/50	T
Paronychia sessiliflora	3	T	1.8/100	T	T	0.5/100	T
Penstemon aridus	-	T	0.2/50	3	T	1.8/100	-
Penstemon eriantherus	T	-	0.2/50	T	-	0.2/50	-
Phlox alyssifolia	3	T	1.8/100	T	T	0.5/100	T
Phlox hoodii	-	-	-	T	-	0.2/50	T
Polemonium viscosum	-	T	0.2/50	-	-	-	-
Ratibida columnifera	T	-	0.2/50	-	-	-	-
Senecio canus	T	T	0.5/100	T	T	0.5/100	T
Solidago missouriensis	-	-	-	-	-	-	T
Sphaeralcea coccinea	T	-	0.2/50	-	-	-	T
Stephanomeria runcinata	-	-	-	T	-	0.2/50	-

Appendix A. (Continued)

Binomial	Code	Common Name
SHRUBS (Continued)		
Prunus virginiana	Pru vir	Common chokecherry
Purshia tridentata	Pur tri	Antelope bitterbrush
Rhus aromatica	Rhu aro	Skunkbush sumac
Ribes cereum	Rib cer	Wax currant
Ribes hudsonianum	Rib hud	Hudson Bay currant
Ribes inerme	Rib ine	Whitestem gooseberry
Ribes lacustre	Rib lac	Swamp gooseberry
Ribes montigenum	Rib mon	Mountain gooseberry
Ribes setosum	Rib set	Bristly gooseberry
Ribes viscosissimum	Rib vis	Sticky currant
Rosa acicularis	Ros aci	Prickly rose
Rosa arkansana	Ros ark	Prairie rose
Rosa woodsii	Ros woo	Wood's rose
Rubus idaeus	Rub ida	Red raspberry
Salix bebbiana	Sal beb	Bebb willow
Salix boothii	Sal boo	Blueberry willow
Salix drummondiana	Sal dru	Drummond willow
Salix exigua	Sal exi	Sandbar willow
Salix geyeriana	Sal gey	Geyer willow
Salix scouleriana	Sal sco	Scouler willow
Sambucus racemosa	Sam rac	Black elderberry
Shepherdia canadensis	She can	Canada buffaloberry
Spiraea betulifolia	Spi bet	White spirea
Symphoricarpos albus	Sym alb	Common snowberry
Symphoricarpos occidentalis	Sym occ	Western snowberry
Syringa vulgaris	Syr vul	Lilac
Tetradymia canescens	Tet can	Gray horsebrush
Vaccinium globulare	Vac glo	Globe huckleberry
Vaccinium scoparium	Vac sco	Grouse whortleberry
TREES		
Abies lasiocarpa	Abi las	Subalpine fir
Juniperus scopulorum	Jun sco	Rocky Mountain juniper
Picea engelmannii	Pic eng	Engelmann spruce
Pinus albicaulis	Pin alb	White bark pine
Pinus contorta	Pin con	Lodgepole pine
Pinus flexilis	Pin fle	Limber pine
Pinus ponderosa	Pin pon	Ponderosa pine
Populus tremuloides	Pop tre	Quaking aspen
Populus trichocarpa	Pop tri	Black cottonwood
Pseudotsuga menziesii	Pse men	Douglas-fir

Nomenclature follows USDA Forest Service (1987).

Table D5. (Continued)

	ECODATA PLOT NUMBER						
	JUNIPERUS SCOPULORUM/ AGROPYRON SPICATUM			PINUS FLEXILIS/ AGROPYRON SPICATUM			PIN FLE/ AGR SMI BOTTOM
	9	24	Mean n=2	8	20	Mean n=2	10
NATIVE PERENNIAL GRAMINOIDS (Continued)							
Poa juncifolia	-	-	-	T	-	0.2/50	T
Poa sandbergii	3	3	3.0/100	T	3	1.8/100	3
Sporobolus cryptandrus	-	T	0.2/50	-	-	-	-
Stipa comata	10	T	5.2/100	T	-	0.2/50	T
TOTAL NPG	47.5	34.0	40.8/100	22.5	27.5	25.0/100	19.0
INTRODUCED PERENNIAL GRAMINOIDS							
Poa pratensis	-	-	-	-	-	-	3
ANNUAL GRAMINOIDS							
Bromus tectorum	-	T	0.2/50	-	-	-	-
NATIVE PERENNIAL FORBS							
Achillea millefolium	-	-	-	-	T	0.2/50	T
Allium cernuum	-	T	0.2/50	T	T	0.5/100	T
Antennaria microphylla	-	-	-	T	-	0.2/50	-
Antennaria parvifolia	T	-	0.2/50	-	T	0.2/50	T
Artemisia dracunculus	T	-	0.2/50	-	-	-	T
Artemisia ludoviciana	T	-	0.2/50	-	-	-	-
Astragalus adsurgens	T	-	0.2/50	-	-	-	-
Astragalus drummondii	T	-	0.2/50	-	-	-	-
Astragalus gilviflorus	T	-	0.2/50	-	-	-	-
Chrysopsis villosa	3	-	1.5/50	-	-	-	T
Cirsium undulatum	T	-	0.2/50	T	-	0.2/50	T
Comandra umbellata	-	-	-	T	T	0.5/100	-
Coryphantha missouriensis	T	-	0.2/50	-	-	-	-

APPENDIX B

Mean percent canopy cover/frequency by transect for nine vegetation types sampled in the Elkhorn study area, 1989.

Table	Vegetation Types	Page
	GRASSLAND	
B1	*Festuca scabrella/Festuca idahoensis*	B-2
	SHRUB/GRASSLAND	
B1	*Artemisia tridentata/Festuca idahoensis*	B-2
	FOREST/SAVANNAH	
B2	*Pseudotsuga menziesii/Festuca idahoensis*	B-7
B2	*Pseudotsuga menziesii/Festuca scabrella*	B-7
B2	*Pseudotsuga menziesii/Juniperus communis*	B-7
B2	*Pseudotsuga menziesii/Carex geyeri*	B-7
B3	*Pseudotsuga menziesii/Calamagrostis rubescens*	B-13
B3	*Picea engelmannii/Smilacina stellata*	B-20
B3	*Picea engelmannii/Galium triflorum*	B-20

Footnotes for the tables in Appendix B:

T (Trace) is a cover value less than 0.1 percent or a frequency value less than 1 percent

X = Incidental species recorded on a transect site, but not within the 0.2 x 0.5m cover quadrats

Table D5. Percent canopy cover/constancy by class and species for 5 ecodata plots sampled in the **JUNIPERUS SCOPULORUM** and **PINUS FLEXILIS** vegetation types, Gold Fields Elkhorn study area, 1990.

	ECODATA PLOT NUMBER						
	JUNIPERUS SCOPULORUM/ AGROPYRON SPICATUM			PINUS FLEXILIS/ AGROPYRON SPICATUM			PIN FLE/ AGR SMI BOTTOM
	9	24	Mean n=2	8	20	Mean n=2	10
GROUND COVER							
Bare soil	20	10	15.0/100	20	20	20.0/100	20
Gravel	20	50	35.0/100	50	40	45.0/100	30
Rock	30	20	25.0/100	3	20	11.5/100	10
Litter	25	10	17.5/100	20	10	15.0/100	25
Wood	T	3	1.8/100	3	3	3.0/100	3
Moss	T	T	0.5/100	T	T	0.5/100	3
Lichens	3	-	1.5/50	T	T	0.5/100	T
Basal vegetation	5	3	4.0/100	3	3	3.0/100	5
VEGETATION STRUCTURE (nonstratified)							
Total tree cover	10	20	15.0/100	30	30	30.0/100	40
Total shrub cover	18	20	19.0/100	30	20	25.0/100	20
Total graminoid cover	52	30	41.0/100	20	30	25.0/100	20
Total forb cover	30	10	20.0/100	10	10	10.0/100	10
CLASS\SPECIES							
NATIVE PERENNIAL GRAMINOIDS							
Agropyron smithii	T	-	0.2/50	-	-	-	10
Agropyron spicatum	20	20	20.0/100	10	20	15.0/100	T
Aristida longiseta	10	T	5.2/100	-	-	-	T
Bouteloua gracilis	3	-	1.5/50	T	-	0.2/50	T
Carex filifolia	-	3	1.5/50	-	-	-	-
Carex rossii	-	T	0.2/50	-	3	1.5/50	T
Carex stenophylla	T	-	0.2/50	-	-	-	-
Festuca idahoensis	-	-	-	-	T	0.2/50	-
Koeleria cristata	T	3	1.8/100	10	T	5.2/100	3
Oryzopsis hymenoides	-	3	1.5/50	T	T	0.5/100	-

Table B1. Mean percent canopy cover/frequency by class and species for four transects sampled in the **FESTUCA SCABRELLA/FESTUCA IDAHOENSIS** and **ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS** habitat types, Gold Fields Elkhorn study area, 1989.

	TRANSECT NUMBER					
	FESTUCA SCABRELLA/FESTUCA IDAHOENSIS			ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS		
	16	26	Mean n=2	2	11	Mean n=2
GROUND COVER						
Bare soil	T/10	14.5/90	7.3/50	5.0/60	2.5/50	3.8/55
Rock	4.2/75	5.0/95	4.6/85	2.5/35	T/15	1.3/25
Litter	77.4/100	65.7/100	71.6/100	83.9/100	87.7/100	85.8/100
Moss	-	2.2/15	1.1/8	0.6/30	0.2/15	0.4/22
Lichens	10.5/95	5.9/100	8.2/98	-	-	-
Basal vegetation	7.8/100	6.7/100	7.2/100	8.0/100	9.5/100	8.8/100
TOTAL VEG. (non-stratified)	66.8/100	68.3/100	67.6/100	74.5/100	90.3/100	82.4/100
CLASS\SPECIES						
NATIVE PERENNIAL GRAMINOIDS						
Agropyron caninum	-	T/5	T/2	1.9/25	4.0/80	3.0/52
Agropyron spicatum	3.6/35	0.5/10	2.0/22	5.6/40	X	2.8/20
Bromus anomalus	-	-	-	-	1.3/40	0.6/20
Bromus carinatus	-	-	-	0.4/20	5.6/70	3.0/45
Calamagrostis rubescens	-	0.2/5	0.1/2	X	5.6/10	2.8/5
Carex hoodii	-	-	-	X	3.1/35	1.6/18
Carex petasata	-	2.8/25	1.4/12	2.6/20	1.7/25	2.2/22
Carex raynoldsii	-	-	-	-	2.6/45	1.3/22
Carex rossii	-	1.7/25	0.8/12	2.4/40	0.8/5	1.6/22
Danthonia intermedia	-	3.7/70	1.8/35	X	3.1/40	1.6/20
Festuca idahoensis	8.6/95	6.9/70	7.8/82	7.3/60	3.9/30	5.6/45
Festuca scabrella	28.9/100	6.8/65	17.8/82	-	-	-
Juncus balticus	-	-	-	-	0.3/10	0.2/5
Koeleria cristata	3.7/75	5.3/75	4.5/75	0.1/5	T/10	T/8
Melica spectabilis	-	-	-	X	0.5/20	0.2/10
Poa juncifolia	-	0.3/5	0.2/2	0.7/20	0.3/10	0.5/15
Poa scabrella	0.2/10	4.3/70	2.2/40	0.4/5	-	0.2/2
Sitanion hystrix	-	-	-	X	-	X
Stipa occidentalis	-	1.1/30	0.6/15	0.7/15	5.6/70	3.2/42

Table D4. (Continued)

	ECODATA PLOT NUMBER									
	ARTEMISIA TRIDENTATA/ AGROPYRON SPICATUM			ART TRI/ FES IDA	ARTEMISIA TRIDENTATA/ FESTUCA SCABRELLA			ART TRI/ POA PRA	CHR NAU/ POA PRA	CER LED/ AGR SPI
	17	21	Mean n=2	25	27	39	Mean n=2	44	29	22
SUBSHRUBS										
Artemisia frigida	3	3	3.0/100	T	T	-	0.2/50	5	3	T
Berberis repens	-	-	-	-	-	2	1.0/50	-	-	-
Gutierrezia sarothrae	T	T	0.5/100	-	3	-	1.5/50	-	T	T
TOTAL SUBSHRUBS	3.5	3.5	3.5/100	0.5	3.5	2.0	2.8/100	5.0	3.5	1.0
SHRUBS										
Artemisia tridentata	22	30	26.0/100	40	20	22	21.0/100	50	T	-
Cercocarpus ledifolius	-	-	-	-	-	-	-	-	-	30
Chrysothamnus nauseosus	-	T	0.2/50	-	-	T	0.2/50	10	30	-
Ribes cereum	-	-	-	-	-	T	0.2/50	-	-	-
Rosa woodsii	-	-	-	-	-	-	-	-	3	-
Tetradymia canescens	T	-	0.2/50	-	-	-	-	-	-	-
TOTAL SHRUBS	22.5	30.5	26.5/100	40.0	20.0	23.0	21.5/100	60.0	33.5	30.0
TREES										
Juniperus scopulorum	5	3	4.0/100	T	-	5	2.5/50	-	-	3
Pinus flexilis	-	T	0.2/50	-	-	-	-	-	-	T
Pseudotsuga menziesii	-	-	-	-	-	2	1.0/50	-	-	T
TOTAL TREES	5.0	3.5	4.2/100	0.5	-	7.0	3.5/50	-	-	4.0
TOTAL VEGETATION (Stratified)	119.0	106.0	112.5/100	114.0	89.5	125.5	107.5/100	136.0	141.5	55.0

Nomenclature follows USDA Forest Service (1987)

Footnotes are presented on cover page D-1.

Table B1. (Continued)

	TRANSECT NUMBER					
	FESTUCA SCABRELLA/FESTUCA IDAHOENSIS			ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS		
	16	26	Mean n=2	2	11	Mean n=2
NATIVE PERENNIAL GRAMINOIDS (Continued)						
Stipa richardsonii	-	X	X	-	-	-
Trisetum spicatum	-	-	-	X	-	X
TOTAL NPG	45.0/100	33.3/100	39.2/100	22.4/100	39.1/100	30.8/100
INTRODUCED PERENNIAL GRAMINOIDS						
Phleum pratense	-	0.4/5	0.2/2	-	X	X
Poa pratensis	-	4.9/40	2.4/20	21.1/80	36.2/95	28.6/88
TOTAL IPG	-	5.3/40	2.6/20	21.1/80	36.2/95	28.6/88
NATIVE PERENNIAL FORBS						
Achillea millefolium	0.8/30	0.4/25	0.6/28	0.8/35	6.4/100	3.6/68
Agoseris glauca	0.1/10	4.3/85	2.2/48	-	1.6/35	0.8/18
Allium cernuum	0.2/15	T/10	0.1/12	X	-	X
Anemone multifida	-	0.5/10	0.2/5	-	-	-
Antennaria microphylla	0.5/20	11.8/100	6.2/60	X	X	X
Arabis drummondii	-	-	-	0.1/10	0.3/20	0.2/15
Arabis nuttallii	-	T/5	T/2	0.1/15	-	T/8
Arenaria congesta	6.8/90	9.2/100	8.0/95	-	-	-
Arenaria lateriflora	-	-	-	-	0.6/30	0.3/15
Aster campestris	-	0.2/10	0.1/5	-	-	-
Aster foliaceus	-	-	-	-	1.5/25	0.8/12
Aster integrifolius	-	-	-	0.5/5	-	0.2/2
Astragalus adsurgens	0.8/20	-	0.4/10	-	-	-
Astragalus agrestis	-	0.6/30	0.3/15	-	-	-
Astragalus miser	0.6/15	1.5/5	1.0/10	1.6/10	-	0.8/5
Besseya wyomingensis	0.2/15	T/5	0.1/10	-	0.1/5	T/2
Campanula rotundifolia	T/5	0.8/25	0.4/15	0.7/25	1.9/55	1.3/40
Cerastium arvense	0.7/25	1.1/50	0.9/38	7.2/85	3.5/40	5.4/62
Chrysopsis villosa	-	X	X	-	-	-

Table D4. (Continued)

	ECODATA PLOT NUMBER									
	ARTEMISIA TRIDENTATA/ AGROPYRON SPICATUM			ART TRI/ FES IDA	ARTEMISIA TRIDENTATA/ FESTUCA SCABRELLA			ART TRI/ POA PRA	CHR NAU/ POA PRA	CER LED/ AGR SPI
	17	21	Mean n=2	25	27	39	Mean n=2	44	29	22
NATIVE ANNUAL/BIENNIAL FORBS										
Arabis holboellii	T	T	0.5/100	T	-	T	0.2/50	T	-	T
Chenopodium leptophyllum	-	-	-	-	-	-	-	-	T	-
Collinsia parviflora	-	-	-	-	-	T	0.2/50	-	-	-
Collomia linearis	-	-	-	-	-	2	1.0/50	-	-	-
Cryptantha celosioides	-	-	-	-	-	-	-	-	-	T
Descurainia pinnata	-	-	-	T	-	-	-	-	T	T
Grindelia squarrosa	-	-	-	-	-	-	-	-	T	-
Lepidium densiflorum	T	-	0.2/50	-	-	-	-	-	-	-
Linanthus septentrionalis	-	-	-	-	-	T	0.2/50	-	-	-
Phacelia linearis	-	-	-	T	-	T	0.2/50	-	-	-
Polygonum douglasii	-	-	-	-	-	T	0.2/50	-	-	-
TOTAL NAF	1.0	0.5	0.8/100	1.5	-	4.5	2.2/50	0.5	1.5	1.5
INTRODUCED ANNUAL/BIENNIAL FORBS										
Berteroa incana	-	-	-	-	-	-	-	-	T	-
Carduus nutans	-	-	-	-	-	-	-	-	T	-
Chenopodium album	-	-	-	-	-	T	0.2/50	-	-	-
Cirsium vulgare	-	-	-	-	-	-	-	-	T	-
Descurainia sophia	-	-	-	-	-	T	0.2/50	-	-	-
Filago arvensis	-	-	-	-	-	T	0.2/50	-	-	-
Melilotus officinalis	-	-	-	-	-	-	-	T	-	-
Sisymbrium altissimum	-	-	-	-	-	-	-	-	T	-
Thlaspi arvense	-	-	-	-	-	T	0.2/50	-	-	-
Tragopogon dubius	-	T	0.2/50	-	T	T	0.5/100	T	-	-
Verbascum thapsus	-	-	-	-	-	-	-	T	T	T
TOTAL IAF	-	0.5	0.2/50	-	0.5	2.5	1.5/100	1.5	2.5	0.5

Table B1. (Continued)

	TRANSECT NUMBER					
	FESTUCA SCABRELLA/FESTUCA IDAHOENSIS			ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS		
	16	26	Mean n=2	2	11	Mean n=2
NATIVE PERENNIAL FORBS (Continued)						
Comandra umbellata	0.3/20	0.2/20	0.2/20	1.0/15	-	0.5/8
Delphinium bicolor	0.1/5	-	T/2	-	-	-
Dodecatheon conjugens	-	-	-	T/5	-	T/2
Douglasia montana	0.5/15	-	0.2/8	-	-	-
Epilobium angustifolium	-	-	-	-	0.5/15	0.2/8
Erigeron caespitosus	3.4/70	0.2/5	1.8/38	-	-	-
Erigeron compositus	0.8/15	-	0.4/8	-	-	-
Erigeron speciosus	-	-	-	-	X	X
Eriogonum umbellatum	T/5	0.4/20	0.2/12	4.5/45	3.2/15	3.8/30
Fragaria vesca	-	-	-	-	X	-
Fragaria virginiana	-	0.3/10	0.2/5	0.8/20	2.4/60	1.6/40
Gaillardia aristata	-	0.2/5	0.1/2	0.1/5	X	T/2
Galium boreale	-	-	-	-	7.7/100	3.8/50
Geranium viscosissimum	-	0.3/10	0.2/5	X	0.5/15	0.2/8
Geum triflorum	X	0.2/5	0.1/2	T/5	X	T/2
Hackelia micrantha	-	-	-	X	2.1/35	1.0/18
Helianthella uniflora	-	0.6/15	0.3/8	8.9/75	X	4.4/38
Heuchera parvifolia	-	X	X	-	-	-
Hieracium cynoglossoides	-	0.3/10	0.2/5	0.3/10	-	0.2/5
Iris missouriensis	-	X	X	-	-	-
Linum lewisii	0.1/5	-	T/2	-	-	-
Lithospermum ruderale	-	X	X	0.2/5	X	0.1/2
Lomatium triternatum	-	-	-	0.3/10	-	0.2/5
Lupinus sericeus	0.1/5	0.4/5	0.2/5	15.5/80	-	7.8/40
Penstemon procerus	-	T/5	T/2	X	1.9/25	1.0/12
Perideridia gairdneri	-	-	-	0.2/5	1.8/45	1.0/25
Phlox alyssifolia	1.0/45	-	0.5/22	-	-	-
Potentilla glandulosa	-	X	X	T/5	-	T/2
Potentilla gracilis	-	0.3/10	0.2/5	1.0/15	1.0/25	1.0/20
Sedum lanceolatum	0.1/10	0.5/40	0.3/25	-	-	-

Table D4. (Continued)

	ECODATA PLOT NUMBER									
	ARTEMISIA TRIDENTATA/ AGROPYRON SPICATUM			ART TRI/ FES IDA	ARTEMISIA TRIDENTATA/ FESTUCA SCABRELLA			ART TRI/ POA PRA	CHR NAU/ POA PRA	CER LED/ AGR SPI
	17	21	Mean n=2	25	27	39	Mean n=2	44	29	22
NATIVE PERENNIAL FORBS (Continued)										
Paronychia sessiliflora	-	T	0.2/50	-	-	-	-	-	-	-
Penstemon aridus	-	-	-	-	T	-	0.2/50	-	-	-
Penstemon eriantherus	-	T	0.2/50	-	-	-	-	-	-	-
Phlox alyssifolia	-	T	0.2/50	T	T	-	0.2/50	-	-	3
Phlox hoodii	3	-	1.5/50	-	-	-	-	-	-	-
Phlox muscoides	T	-	0.2/50	-	-	-	-	-	-	-
Polemonium viscosum	-	-	-	-	-	-	-	-	-	T
Potentilla glandulosa	-	-	-	-	-	2	1.0/50	-	-	-
Potentilla hippiana	T	-	0.2/50	T	-	-	-	-	-	-
Potentilla pensylvanica	-	-	-	-	-	-	-	T	T	-
Sedum lanceolatum	-	-	-	-	T	T	0.5/100	-	-	-
Senecio canus	T	-	0.2/50	-	-	-	-	-	-	T
Sphaeralcea coccinea	T	T	0.5/100	-	-	-	-	-	-	-
Townsendia hookeri	T	T	0.5/100	-	-	-	-	-	-	-
Vicia americana	T	-	0.2/50	-	-	-	-	T	-	-
TOTAL NPF	21.0	14.5	17.8/100	20.0	19.0	21.5	20.2/100	2.5	4.5	9.5
INTRODUCED PERENNIAL FORBS										
Centaurea maculosa	-	-	-	-	-	-	-	-	T	-
Cirsium arvense	-	-	-	-	-	-	-	-	-	T
Linaria dalmatica	T	-	0.2/50	-	-	-	-	-	T	-
Linaria vulgaris	-	-	-	-	-	-	-	T	T	-
Taraxacum officinale	-	T	0.2/50	T	-	-	-	3	10	-
TOTAL IPF	0.5	0.5	0.5/100	0.5	-	-	-	3.5	11.5	0.5
FERNS AND ALLIES										
Cystopteris fragilis	-	-	-	-	-	T	0.2/50	-	-	-
Selaginella densa	10	-	5.0/50	-	-	10	5.0/50	-	-	-
TOTAL F&A	10.0	-	5.0/50	-	-	10.5	5.2/50	-	-	-

Table B1. (Continued)

	TRANSECT NUMBER					
	FESTUCA SCABRELLA/FESTUCA IDAHOENSIS			ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS		
	16	26	Mean n=2	2	11	Mean n=2
NATIVE PERENNIAL FORBS (Continued)						
Senecio serra	-	-	-	-	6.0/35	3.0/18
Smilacina stellata	-	-	-	-	X	X
Solidago canadensis	-	-	-	-	X	X
Solidago missouriensis	-	0.8/20	0.4/10	-	0.2/15	0.1/8
Zigadenus venenosus	X	T/5	T/2	X	-	X
TOTAL NPF	17.0/100	35.0/100	26.0/100	44.4/100	43.8/100	44.1/100
INTRODUCED PERENNIAL FORBS						
Linaria dalmatica	X	-	X	-	-	-
Taraxacum officinale	-	2.4/70	1.2/35	1.0/25	0.3/10	0.6/18
TOTAL IPF	X	2.4/70	1.2/35	1.0/25	0.3/10	0.6/18
FERNS AND ALLIES						
Selaginella densa	13.1/95	-	6.6/48	-	-	-
TOTAL F&A	13.1/95	-	6.6/48	-	-	-
NATIVE ANNUAL/BIENNIAL FORBS						
Androsace occidentalis	-	-	-	0.2/20	-	0.1/10
Arabis divaricarpa	-	X	X	-	-	-
Collinsia parviflora	-	0.2/20	0.1/10	X	-	X
Collomia linearis	X	0.7/25	0.4/12	1.5/60	T/10	0.8/35
Polygonum douglasii	-	X	X	0.1/15	1.2/10	0.6/12
TOTAL NAF	X	0.9/25	0.4/12	1.8/70	1.3/20	1.6/45
INTRODUCED ANNUAL/BIENNIAL FORBS						
Chenopodium album	-	-	-	-	T/5	T/2
Filago arvensis	-	X	X	-	-	-
Thlaspi arvense	-	-	-	-	0.2/15	0.1/8
Tragopogon dubius	-	X	X	0.4/15	0.3/5	0.4/10
TOTAL IAF	-	X	X	0.4/15	0.7/25	0.6/20

Table D4. (Continued)

	ECODATA PLOT NUMBER									
	ARTEMISIA TRIDENTATA/ AGROPYRON SPICATUM			ART TRI/ FES IDA	ARTEMISIA TRIDENTATA/ FESTUCA SCABRELLA			ART TRI/ POA PRA	CHR NAU/ POA PRA	CER LED/ AGR SPI
	17	21	Mean n=2	25	27	39	Mean n=2	44	29	22
NATIVE PERENNIAL FORBS (Continued)										
Cirsium undulatum	-	T	0.2/50	-	-	-	-	-	T	-
Comandra umbellata	T	T	0.5/100	T	T	-	0.2/50	-	-	T
Coryphantha missouriensis	T	-	0.2/50	-	-	-	-	-	-	-
Crepis modocensis	T	-	0.2/50	-	-	-	-	-	-	-
Delphinium bicolor	-	-	-	T	-	-	-	-	-	-
Erigeron caespitosus	-	T	0.2/50	-	-	-	-	-	-	T
Erigeron compositus	T	T	0.5/100	T	-	-	-	-	-	T
Erigeron corymbosus	-	-	-	-	-	T	0.2/50	-	-	-
Erigeron pumilus	T	T	0.5/100	-	-	-	-	-	-	-
Eriogonum flavum	-	-	-	-	-	-	-	-	-	T
Eriogonum ovalifolium	T	T	0.5/100	T	-	-	-	-	-	-
Eriogonum umbellatum	-	-	-	T	T	3	1.8/100	T	-	-
Erysimum inconspicuum	T	-	0.2/50	-	-	-	-	-	-	-
Gaura coccinea	-	T	0.2/50	T	-	-	-	-	-	-
Haplopappus acaulis	-	T	0.2/50	T	3	-	1.5/50	-	-	T
Hedeoma drummondii	-	-	-	-	-	-	-	-	-	T
Hieracium cynoglossoides	-	-	-	-	-	T	0.2/50	-	-	-
Hymenopappus filifolius	-	-	-	-	-	-	-	-	-	T
Kuhnia eupatorioides	-	-	-	T	-	-	-	-	-	-
Lesquerella alpina	-	-	-	-	-	-	-	-	-	T
Liatris punctata	T	T	0.5/100	-	T	-	0.2/50	-	-	-
Linum lewisii	-	-	-	-	-	-	-	-	-	T
Lithospermum incisum	-	-	-	-	T	-	0.2/50	-	-	-
Lithospermum ruderale	-	-	-	T	-	-	-	-	-	-
Lomatium triternatum	-	-	-	-	-	T	0.2/50	-	-	-
Lupinus sericeus	-	-	-	T	3	8	5.5/100	-	-	-
Mirabilis linearis	-	-	-	-	-	-	-	-	T	-
Musineon divaricatum	-	-	-	-	T	-	0.2/50	-	-	-
Opuntia polyacantha	3	T	1.8/100	T	-	-	-	-	-	-
Oxytropis sericea	T	T	0.5/100	-	-	-	-	-	-	-

Table B1. (Continued)

	TRANSECT NUMBER					
	FESTUCA SCABRELLA/FESTUCA IDAHOENSIS			ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS		
	16	26	Mean n=2	2	11	Mean n=2
SUBSHRUBS						
Berberis repens	-	0.6/15	0.3/8	-	-	-
TOTAL SUBSHRUBS	-	0.6/15	0.3/8	-	-	-
SHRUBS						
Amelanchier alnifolia	-	-	-	X	-	X
Artemisia tridentata	X	X	X	23.5/55	7.5/25	15.5/40
Chrysothamnus nauseosus	-	X	X	-	-	-
Juniperus communis	-	0.1/5	T/2	X	X	X
Shepherdia canadensis	-	X	X	-	-	-
Spiraea betulifolia	-	0.4/10	0.2/5	-	-	-
TOTAL SHRUBS	X	0.5/15	0.2/8	23.5/55	7.5/25	15.5/40
TREES						
Juniperus scopulorum	-	X	X	-	-	-
Pinus contorta	-	X	X	-	-	-
Pinus flexilis	-	X	X	-	-	-
Pinus ponderosa	X	X	X	-	-	-
Pseudotsuga menziesii	X	X	X	X	X	X
TOTAL TREES	X	X	X	X	X	X
TOTAL VEGETATION (stratified)	75.1/100	78.0/100	76.6/100	119.5/100	128.9/100	124.2/100

Nomenclature follows USDA Forest Service (1987)

Footnotes are presented on cover page B-1.

Table D4. (Continued)

	ECODATA PLOT NUMBER									
	ARTEMISIA TRIDENTATA/ AGROPYRON SPICATUM			ART TRI/ FES IDA	ARTEMISIA TRIDENTATA/ FESTUCA SCABRELLA			ART TRI/ POA PRA	CHR NAU/ POA PRA	CER LED/ AGR SPI
	17	21	Mean n=2	25	27	39	Mean n=2	44	29	22
NATIVE PERENNIAL GRAMINOIDS (Continued)										
Poa sandbergii	10	10	10.0/100	-	3	-	1.5/50	-	-	T
Poa scabrella	-	-	-	-	-	3	1.5/50	-	-	-
Stipa comata	2	T	1.2/100	T	-	-	-	-	-	T
Stipa viridula	-	-	-	T	-	-	-	-	T	-
TOTAL NPG	55.5	49.5	52.5/100	48.0	46.5	54.0	50.2/100	5.0	34.5	8.0
INTRODUCED PERENNIAL GRAMINOIDS										
Agropyron repens	-	-	-	-	-	-	-	8	-	-
Bromus inermis	-	-	-	-	-	-	-	2	-	-
Poa pratensis	-	3	1.5/50	3	-	-	-	48	40	-
TOTAL IPG	-	3.0	1.5/50	3.0	-	-	-	58.0	40.0	-
ANNUAL GRAMINOIDS										
Bromus tectorum	-	-	-	-	-	T	0.2/50	-	10	-
NATIVE PERENNIAL FORBS										
Achillea millefolium	-	-	-	T	T	T	0.5/100	T	3	T
Allium cernuum	-	-	-	-	T	T	0.5/100	-	-	T
Antennaria microphylla	3	T	1.8/100	T	3	3	3.0/100	T	-	-
Antennaria parvifolia	T	T	0.5/100	T	T	-	0.2/50	-	-	-
Arenaria congesta	-	T	0.2/50	-	3	2	2.5/100	-	-	-
Arnica sororia	-	-	-	-	-	T	0.2/50	-	-	-
Artemisia dracunculus	T	T	0.5/100	T	-	-	-	-	-	-
Astragalus adsurgens	3	3	3.0/100	-	-	-	-	-	-	-
Astragalus drummondii	-	-	-	T	T	-	0.2/50	-	-	-
Astragalus flexuosus	-	-	-	T	T	-	0.2/50	-	-	-
Astragalus gilviflorus	-	T	0.2/50	-	-	-	-	-	-	-
Astragalus missouriensis	-	T	0.2/50	-	-	-	-	-	-	-
Balsamorhiza sagittata	-	-	-	10	-	-	-	-	-	-
Chrysopsis villosa	T	T	0.5/100	T	T	-	0.2/50	-	-	-

Table B2. Mean percent canopy cover/frequency by class and species for eight transects sampled in the **PSEUDOTSUGA MENZIESII/FESTUCA IDAHOENSIS, PSEUDOTSUGA MENZIESII/FESTUCA SCABRELLA, PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS** and **PSEUDOTSUGA MENZIESII/CAREX GEYERI** habitat types, Gold Fields Elkhorn study area, 1989.

	TRANSECT NUMBER								
	PSEUDOTSUGA MENZIESII/ FESTUCA IDAHOENSIS	PSEUDOTSUGA MENZIESII/ FESTUCA SCABRELLA	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS						PSEUDOTSUGA MENZIESII/ CAREX GEYERI
	18	8	15	22	24	25	27	Mean n=5	13
GROUND COVER									
Bare soil	7.1/80	6.8/50	4.9/20	18.1/70	2.0/30	0.2/15	4.5/40	5.9/35	1.1/30
Rock	13.8/100	3.1/55	7.9/80	14.4/90	4.0/40	4.1/30	11.5/75	8.4/63	-
Litter	74.6/100	74.6/100	81.3/100	64.5/100	89.5/100	86.5/100	77.2/100	79.8/100	88.6/100
Moss	0.3/25	10.2/80	3.2/35	0.6/30	0.4/15	6.1/60	4.3/45	2.9/37	5.5/60
Lichens	0.5/25	2.2/50	1.4/75	0.8/20	T/10	1.3/55	1.6/70	1.0/46	0.1/15
Basal vegetation	3.7/100	3.3/100	1.3/80	1.6/95	4.0/45	1.8/100	0.9/100	1.9/84	4.7/95
TOTAL VEG. (non-stratified)	63.1/100	72.9/100	76.9/100	54.1/100	83.0/100	81.0/100	72.0/100	73.4/100	89.4/100
TOTAL UNDERSTORY VEG.	40.6/100	43.0/100	30.4/100	40.2/95	40.5/90	37.1/100	45.4/100	38.7/97	42.5/95
CLASS\SPECIES									
NATIVE PERENNIAL GRAMINOIDS									
Agropyron spicatum	7.1/85	2.1/25	2.4/40	1.9/40	0.9/15	-	3.4/50	1.7/29	-
Agrostis scabra	-	-	-	-	-	-	X	X	-
Bromus carinatus	-	1.0/10	-	-	-	-	-	-	-
Calamagrostis rubescens	0.3/15	2.4/40	-	0.5/10	-	1.9/25	-	0.5/7	1.4/20
Carex concinnoides	-	-	-	-	-	X	-	X	-
Carex geyeri	2.2/10	X	-	0.2/5	T/5	0.2/5	X	0.1/3	9.5/40
Carex hoodii	-	-	X	-	-	-	-	X	-
Carex petasata	-	-	-	-	-	-	0.3/5	T/1	-
Carex raynoldsii	-	-	-	-	-	-	-	-	1.9/30
Carex rossii	0.5/10	0.8/15	0.6/20	0.7/15	-	-	3.1/50	0.9/17	18.0/70
Danthonia intermedia	-	-	-	-	-	-	-	-	0.4/10
Festuca idahoensis	8.6/85	7.0/75	0.3/15	3.8/55	0.2/10	-	X	0.9/16	-
Festuca scabrella	X	5.5/50	X	X	-	-	T/10	T/2	0.2/5
Koeleria cristata	0.8/10	0.2/5	-	1.6/40	-	-	X	0.3/8	-

Table D4. Percent canopy cover/constancy by class and species for 8 ecodata plots sampled in the **ARTEMISIA TRIDENTATA** series, **CHRYSOTHAMNUS NAUSEOSUS** community type and **CERCOCARPUS LEDIFOLIUS** habitat type, Gold Fields Elkhorn study area, 1990.

	ECODATA PLOT NUMBER									
	ARTEMISIA TRIDENTATA/ AGROPYRON SPICATUM			ART TRI/ FES IDA	ARTEMISIA TRIDENTATA/ FESTUCA SCABRELLA			ART TRI/ POA PRA	CHR NAU/ POA PRA	CER LED/ AGR SPI
	17	21	Mean n=2	25	27	39	Mean n=2	44	29	22
GROUND COVER										
Bare soil	20	30	25.0/100	30	20	22	21.0/100	32	10	3
Gravel	40	30	35.0/100	20	30	3	16.5/100	T	3	40
Rock	3	3	3.0/100	3	10	3	6.5/100	T	3	40
Litter	25	25	25.0/100	25	20	58	39.0/100	52	72	10
Wood	3	3	3.0/100	10	3	2	2.5/100	2	3	3
Moss	T	-	0.2/50	T	-	T	0.2/50	T	3	-
Lichens	T	T	0.5/100	T	T	5	2.8/100	2	T	-
Basal vegetation	5	5	5.0/100	5	8	8	8.0/100	8	5	3
VEGETATION STRUCTURE (nonstratified)										
Total tree cover	5	3	4.0/100	T	-	8	4.0/50	-	-	3
Total shrub cover	30	30	30.0/100	40	20	22	21.0/100	60	40	30
Total graminoid cover	48	40	44.0/100	40	50	50	50.0/100	58	80	10
Total forb cover	18	10	14.0/100	20	20	28	24.0/100	5	20	10
CLASS\SPECIES										
NATIVE PERENNIAL GRAMINOIDS										
Agropyron smithii	T	3	1.8/100	-	-	-	-	-	30	-
Agropyron spicatum	20	20	20.0/100	20	3	22	12.5/100	-	-	T
Aristida longiseta	T	-	0.2/50	-	-	-	-	-	-	T
Bouteloua gracilis	2	3	2.5/100	T	-	-	-	-	T	-
Carex petasata	-	-	-	-	-	T	0.2/50	-	-	-
Carex rossii	-	-	-	T	T	-	0.2/50	-	-	3
Carex stenophylla	T	3	1.8/100	-	-	-	-	-	-	-
Elymus cinereus	-	-	-	-	-	-	-	-	T	-
Festuca idahoensis	-	-	-	20	10	20	15.0/100	-	-	-
Festuca scabrella	-	-	-	3	20	8	14.0/100	-	-	-
Koeleria cristata	20	10	15.0/100	3	10	T	5.2/100	2	-	-
Oryzopsis hymenoides	-	-	-	-	-	-	-	-	-	3
Poa juncifolia	-	-	-	-	-	-	-	3	3	-

Table B2. (Continued)

	TRANSECT NUMBER								
	PSEUDOTSUGA MENZIESII/ FESTUCA IDAHOENSIS	PSEUDOTSUGA MENZIESII/ FESTUCA SCABRELLA	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS						PSEUDOTSUGA MENZIESII/ CAREX GEYERI
	18	8	15	22	24	25	27	Mean n=5	13
NATIVE PERENNIAL GRAMINOIDS (Continued)									
Poa juncifolia	-	2.2/25	-	-	-	-	-	-	-
Poa nervosa	-	-	-	-	-	-	-	-	4.1/35
Poa scabrella	-	0.2/5	0.6/15	-	T/5	-	-	0.1/4	-
Sitanion hystrix	-	-	X	-	-	X	-	X	-
Stipa occidentalis	-	1.2/20	0.1/5	-	-	-	1.4/50	0.3/11	X
Stipa viridula	0.4/15	-	-	T/5	-	-	-	T/1	-
Trisetum spicatum	-	-	X	-	-	-	-	X	-
TOTAL NPG	19.8/100	22.5/95	4.0/65	8.7/70	1.1/20	2.1/30	8.2/80	4.8/53	35.4/95
INTRODUCED PERENNIAL GRAMINOIDS									
Phleum pratense	X	-	-	-	X	-	X	X	-
Poa pratensis	6.1/55	0.4/10	-	2.2/25	-	-	2.0/45	0.8/14	-
TOTAL IPG	6.1/55	0.4/10	-	2.2/25	X	-	2.0/45	0.8/14	-
NATIVE PERENNIAL FORBS									
Achillea millefolium	0.7/30	1.8/30	0.8/10	0.5/15	X	-	0.1/5	0.3/6	0.1/15
Allium cernuum	0.4/10	1.8/40	0.5/20	0.1/10	T/10	-	0.4/20	0.2/12	X
Anemone multifida	-	X	-	X	0.1/5	-	-	T/1	-
Antennaria anaphaloides	-	-	-	-	-	-	-	-	0.4/15
Antennaria microphylla	0.2/10	0.6/15	X	X	X	-	1.0/10	0.2/2	1.7/15
Antennaria racemosa	-	-	-	-	-	0.6/10	-	0.1/2	-
Arabis drummondii	T/10	-	-	-	-	-	-	-	0.1/10
Arabis nuttallii	-	-	-	0.1/10	-	-	-	T/2	-
Arenaria congesta	-	3.5/35	-	-	-	-	-	-	-
Arnica cordifolia	0.1/5	0.1/5	-	-	-	0.2/5	-	T/1	0.4/5
Aster conspicuus	-	-	0.7/35	-	-	X	X	0.1/7	T/5
Astragalus adsurgens	T/5	-	-	-	-	-	-	-	-

Table D3. (Continued)

	ECODATA PLOT NUMBER					
	ARTEMISIA NOVA/AGROPYRON SPICATUM					
	4	6	32	33	34	Mean n=5
SHRUBS						
Artemisia nova	30	30	30	20	20	26.0/100
Ceratoides lanata	T	T	T	T	-	0.4/80
Chrysothamnus nauseosus	T	-	T	T	-	0.3/60
Eriogonum microthecum	T	-	-	-	-	0.1/20
Tetradymia canescens	T	T	-	-	-	0.2/40
TOTAL SHRUBS	32.0	31.0	31.0	21.0	20.0	27.0/100
TREES						
Juniperus scopulorum	T	T	-	-	3	0.8/60
Pinus flexilis	T	-	-	-	-	0.1/20
TOTAL TREES	1.0	0.5	-	-	3.0	0.9/60
TOTAL VEGETATION (Stratified)	55.0	57.0	67.0	68.0	41.0	57.6/100

Nomenclature follows USDA Forest Service (1987)

Footnotes are presented on cover page D-1.

Table B2. (Continued)

	TRANSECT NUMBER								
	PSEUDOTSUGA MENZIESII/ FESTUCA IDAHOENSIS	PSEUDOTSUGA MENZIESII/ FESTUCA SCABRELLA	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS						PSEUDOTSUGA MENZIESII/ CAREX GEYERI
	18	8	15	22	24	25	27	Mean n=5	13
NATIVE PERENNIAL FORBS (Continued)									
Astragalus miser	1.4/25	T/5	-	0.3/5	X	-	-	T/1	-
Campanula rotundifolia	0.1/10	0.6/20	-	0.7/15	-	-	X	0.1/3	0.4/15
Cerastium arvense	0.2/5	0.8/20	-	-	-	-	X	X	-
Comandra umbellata	X	-	-	-	-	-	-	-	-
Crepis acuminata	X	-	-	-	-	-	-	-	-
Dodecatheon conjugens	-	X	-	-	-	-	-	-	X
Epilobium angustifolium	-	-	-	-	0.2/5	X	-	T/1	-
Erigeron caespitosus	0.6/10	-	-	X	-	-	-	X	-
Erigeron compositus	-	-	-	-	X	-	-	X	-
Eriogonum umbellatum	0.7/10	1.6/25	-	-	-	-	0.1/5	T/1	-
Erysimum inconspicuum	-	-	-	-	-	-	X	X	-
Fragaria virginiana	-	2.0/35	-	-	-	2.5/65	-	0.5/13	2.6/70
Fritillaria atropurpurea	-	-	-	-	-	-	X	X	-
Galium boreale	-	-	-	0.4/10	-	-	-	0.1/2	1.8/30
Geranium viscosissimum	X	-	-	-	-	-	0.2/10	T/2	-
Geum triflorum	-	-	-	-	-	-	-	-	X
Hackelia micrantha	-	-	-	-	-	-	-	-	X
Helianthella uniflora	X	-	-	0.8/15	T/5	-	-	0.2/4	-
Hieracium albiflorum	-	0.1/5	-	-	-	0.2/5	-	T/1	-
Linum lewisii	-	-	-	X	X	-	-	X	-
Lithospermum ruderale	X	X	0.3/10	1.3/15	X	-	0.4/10	0.4/7	X
Lomatium triternatum	-	X	-	-	-	-	X	X	-
Lupinus sericeus	0.5/15	T/5	0.3/5	-	-	-	0.2/5	0.1/2	-
Lychnis drummondii	-	-	-	-	-	-	X	X	-
Penstemon attenuatus	-	-	1.4/40	-	-	-	X	0.3/8	-
Penstemon procerus	-	-	-	0.6/5	0.2/5	-	-	0.2/2	0.6/15
Phacelia hastata	X	X	-	-	-	-	X	X	-
Phlox alyssifolia	-	-	-	0.7/25	-	-	-	0.1/5	-

Table D3. (Continued)

	ECODATA PLOT NUMBER					
	ARTEMISIA NOVA/AGROPYRON SPICATUM					
	4	6	32	33	34	Mean n=5
NATIVE PERENNIAL FORBS (Continued)						
Solidago missouriensis	-	-	3	T	-	0.7/40
Sphaeralcea coccinea	T	T	T	T	-	0.4/80
Stephanomeria runcinata	T	T	-	-	-	0.2/40
Townsendia hookeri	-	-	-	T	-	0.1/20
TOTAL NPF	7.5	10.0	13.0	14.5	8.0	10.6/100
INTRODUCED PERENNIAL FORBS						
Linaria dalmatica	T	-	-	3	-	0.7/40
Taraxacum officinale	T	T	-	3	-	0.8/60
TOTAL IPF	1.0	0.5	-	6.0	-	1.5/60
FERNS AND ALLIES						
Selaginella densa	T	-	-	-	-	0.1/20
NATIVE ANNUAL/BIENNIAL FORBS						
Arabis holboellii	T	T	-	-	-	0.2/40
Cryptantha celosioides	T	T	-	T	T	0.4/80
Descurainia pinnata	-	T	-	-	T	0.2/40
Linum rigidum	-	T	-	T	-	0.2/40
TOTAL NAF	1.0	2.0	-	1.0	1.0	1.0/80
INTRODUCED ANNUAL/BIENNIAL FORBS						
Camelina microcarpa	-	T	-	-	-	0.1/20
Tragopogon dubius	-	T	T	T	T	0.4/80
TOTAL IAF	-	1.0	0.5	0.5	0.5	0.5/80
SUBSHRUBS						
Artemisia frigida	3	T	T	3	T	1.5/100
Gutierrezia sarothrae	10	10	3	3	3	5.8/100
TOTAL SUBSHRUBS	13.0	10.5	3.5	6.0	3.5	7.3/100

Table B2. (Continued)

	TRANSECT NUMBER								
	PSEUDOTSUGA MENZIESII/ FESTUCA IDAHOENSIS	PSEUDOTSUGA MENZIESII/ FESTUCA SCABRELLA	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS						PSEUDOTSUGA MENZIESII/ CAREX GEYERI
	18	8	15	22	24	25	27	Mean n=5	13
NATIVE PERENNIAL FORBS (Continued)									
Potentilla glandulosa	-	-	-	-	-	X	-	X	X
Potentilla gracilis	-	0.1/5	-	-	-	-	-	-	0.2/5
Pyrola chlorantha	-	-	-	-	-	X	-	X	-
Pyrola secunda	-	-	-	-	-	0.8/25	-	0.2/5	0.2/5
Sedum lanceolatum	0.2/10	0.3/25	X	0.2/15	-	-	-	T/3	-
Senecio serra	-	-	-	-	-	-	-	-	X
Senecio streptanthifolius	-	-	-	-	-	-	-	-	X
Smilacina stellata	-	-	-	-	-	-	-	-	0.1/10
Solidago missouriensis	0.8/25	4.0/60	0.7/25	3.7/60	T/5	X	1.2/30	1.1/24	-
Thalictrum occidentale	-	-	-	-	-	-	-	-	X
Valeriana dioica	-	-	-	-	-	-	-	-	0.5/10
Viola nuttallii	-	-	-	-	-	-	-	-	T/5
Zigadenus venenosus	-	-	-	0.1/5	-	-	-	T/1	-
TOTAL NPF	5.8/80	17.4/100	4.6/70	9.5/90	0.7/30	4.2/75	3.5/55	4.5/64	9.0/90
INTRODUCED PERENNIAL FORBS									
Taraxacum officinale	-	0.1/5	-	T/5	-	-	-	T/1	0.1/5
TOTAL IPF	-	0.1/5	-	T/5	-	-	-	T/1	0.1/5
FERNS AND ALLIES									
Cystopteris fragilis	-	-	-	-	-	-	X	X	-
TOTAL F&A	-	-	-	-	-	-	X	X	-
NATIVE ANNUAL/BIENNIAL FORBS									
Androsace occidentalis	0.2/25	3.2/50	-	0.1/25	-	-	-	T/5	-
Arabis divaricarpa	-	0.9/25	-	-	-	-	-	-	-
Arabis holboellii	-	-	T/5	-	-	-	0.3/10	T/3	-
Collinsia parviflora	-	-	0.5/20	-	-	-	1.3/40	0.4/12	-

Table D3. (Continued)

	ECODATA PLOT NUMBER					
	ARTEMISIA NOVA/AGROPYRON SPICATUM					
	4	6	32	33	34	Mean n=5
INTRODUCED PERENNIAL GRAMINOIDS						
Poa pratensis	T	-	T	-	-	0.2/40
NATIVE PERENNIAL FORBS						
Allium cernuum	-	-	T	-	-	0.1/20
Allium textile	-	T	-	-	-	0.1/20
Antennaria microphylla	-	T	T	-	-	0.2/40
Antennaria parvifolia	T	T	T	-	-	0.3/60
Artemisia dracunculus	T	-	-	-	-	0.1/20
Astragalus adsurgens	T	-	-	-	-	0.1/20
Astragalus flexuosus	-	T	-	-	-	0.1/20
Astragalus gilviflorus	T	T	T	T	-	0.4/80
Chaenactis douglasii	-	T	-	-	-	0.1/20
Chrysopsis villosa	T	-	T	-	-	0.2/40
Cirsium undulatum	-	-	T	T	-	0.2/40
Comandra umbellata	T	T	-	T	-	0.3/60
Erigeron caespitosus	-	-	T	-	T	0.2/40
Erigeron pumilus	T	-	-	T	-	0.2/40
Gaura coccinea	T	T	T	T	-	0.4/80
Haplopappus acaulis	-	-	-	-	3	0.6/20
Lesquerella alpina	-	T	-	-	T	0.2/40
Liatris punctata	T	-	T	-	-	0.2/40
Linum lewisii	-	-	-	T	3	0.7/40
Lithospermum incisum	T	-	T	T	-	0.3/60
Opuntia polyacantha	T	-	T	3	T	0.9/80
Paronychia sessiliflora	T	T	-	3	-	0.8/60
Penstemon eriantherus	-	T	-	-	-	0.1/20
Phlox alyssifolia	-	T	T	-	T	0.3/60
Phlox hoodii	T	3	-	T	-	0.8/60
Phlox muscoides	-	-	3	3	-	1.2/40
Potentilla pensylvanica	-	-	T	-	-	0.1/20

Table B2. (Continued)

	TRANSECT NUMBER								
	PSEUDOTSUGA MENZIESII/ FESTUCA IDAHOENSIS	PSEUDOTSUGA MENZIESII/ FESTUCA SCABRELLA	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS						PSEUDOTSUGA MENZIESII/ CAREX GEYERI
	18	8	15	22	24	25	27	Mean n=5	13
NATIVE ANNUAL/BIENNIAL FORBS (Continued)									
Collomia linearis	0.2/20	1.7/55	T/10	-	-	-	T/5	T/3	-
Epilobium paniculatum	0.2/10	-	-	-	-	-	-	-	-
Phacelia franklinii	-	0.2/5	-	-	-	-	-	-	-
Phacelia linearis	0.2/20	-	-	-	-	-	X	X	-
Polygonum douglasii	T/10	-	-	-	-	-	T/5	T/1	-
TOTAL NAF	0.7/65	5.9/60	0.6/20	0.1/25	-	-	1.6/50	0.5/19	-
INTRODUCED ANNUAL/BIENNIAL FORBS									
Arabis glabra	-	-	-	-	-	-	X	X	-
Draba nemorosa	-	-	-	0.2/25	-	-	-	T/5	-
Tragopogon dubius	T/5	-	-	-	-	-	-	-	-
TOTAL IAF	T/5	-	-	0.2/25	-	-	X	T/5	-
SUBSHRUBS									
Berberis repens	6.0/85	X	1.4/30	1.1/20	0.4/5	1.2/25	6.5/80	2.1/32	X
Chimaphila umbellata	-	-	-	-	-	T/5	-	T/1	-
TOTAL SUBSHRUBS	6.0/85	X	1.4/30	1.1/20	0.4/5	1.2/30	6.5/80	2.1/33	X
SHRUBS									
Amelanchier alnifolia	-	-	-	X	-	-	-	X	-
Artemisia tridentata	6.7/35	X	X	X	X	-	X	X	-
Clematis columbiana	-	-	-	-	-	-	-	-	0.3/10
Clematis occidentalis	-	-	-	-	-	0.2/5	-	T/1	-
Juniperus communis	0.2/5	3.8/10	13.4/30	18.0/35	38.7/75	26.7/65	7.0/35	20.8/48	X
Prunus virginiana	-	-	-	-	-	-	X	X	-
Ribes viscosissimum	X	-	-	-	-	-	-	-	-
Salix scouleriana	-	-	-	-	-	X	-	X	-

Table D3. Percent canopy cover/constancy by class and species for 5 ecodata plots sampled in the **ARTEMISIA NOVA/AGROPYRON SPICATUM** habitat type, Gold Fields Elkhorn study area, 1990.

	ECODATA PLOT NUMBER					
	ARTEMISIA NOVA/AGROPYRON SPICATUM					
	4	6	32	33	34	Mean n=5
GROUND COVER						
Bare soil	40	35	45	50	30	40.0/100
Gravel	20	40	30	20	40	30.0/100
Rock	T	T	3	T	10	2.9/100
Litter	25	10	10	10	10	13.0/100
Wood	3	3	T	10	3	3.9/100
Moss	T	T	-	-	-	0.2/40
Lichens	3	3	T	3	T	2.0/100
Basal vegetation	5	5	5	3	3	4.2/100
VEGETATION STRUCTURE (nonstratified)						
Total tree cover	T	T	-	-	3	0.8/60
Total shrub cover	40	40	40	30	30	36.0/100
Total graminoid cover	20	30	40	40	30	32.0/100
Total forb cover	3	10	10	10	10	8.6/100
CLASS\SPECIES						
NATIVE PERENNIAL GRAMINOIDS						
Agropyron smithii	T	-	-	10	-	2.1/40
Agropyron spicatum	3	10	3	3	12	6.2/100
Aristida longiseta	-	T	-	-	T	0.2/40
Bouteloua gracilis	10	3	10	3	-	5.2/80
Carex rossii	-	-	-	-	T	0.1/20
Carex stenophylla	T	-	3	T	-	0.8/60
Koeleria cristata	3	10	10	10	3	7.2/100
Oryzopsis hymenoides	T	3	-	T	3	1.4/80
Poa sandbergii	10	3	3	3	3	4.4/100
Stipa comata	3	3	20	10	3	7.8/100
Stipa viridula	-	-	T	-	-	0.1/20
TOTAL NPG	30.5	32.5	49.5	40.0	25.0	35.5/100

Table B2. (Continued)

	TRANSECT NUMBER								
	PSEUDOTSUGA MENZIESII/ FESTUCA IDAHOENSIS	PSEUDOTSUGA MENZIESII/ FESTUCA SCABRELLA	PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS						PSEUDOTSUGA MENZIESII/ CAREX GEYERI
	18	8	15	22	24	25	27	Mean n=5	13
SHRUBS (Continued)									
Shepherdia canadensis	-	-	-	-	-	X	-	X	-
Spiraea betulifolia	-	X	X	-	-	3.2/65	X	0.6/13	-
Symphoricarpos albus	-	-	-	-	-	-	X	X	-
Vaccinium scoparium	-	-	-	-	-	X	-	X	-
TOTAL SHRUBS	6.9/35	3.8/10	13.4/30	18.0/35	38.7/75	29.9/90	7.0/35	21.4/53	0.3/10
TREES									
Juniperus scopulorum	X	12.5/20	8.9/30	5.7/10	1.0/10	X	18.6/35	6.8/17	X
Picea engelmannii	-	-	-	-	-	X	-	X	-
Pinus contorta	-	-	-	-	-	61.5/90	X	12.3/18	17.0/30
Pinus flexilis	3.8/5	1.0/5	X	-	10.0/15	-	X	2.0/3	-
Pinus ponderosa	-	-	-	-	X	-	X	X	-
Populus tremuloides	-	-	-	-	-	X	-	X	-
Pseudotsuga menziesii	30.6/35	37.2/60	62.5/85	20.4/30	49.0/70	12.5/20	55.3/80	39.9/57	73.9/90
TOTAL TREES	34.3/40	50.6/70	71.4/85	26.1/35	60.0/80	74.0/90	73.9/80	61.1/74	90.9/95
TOTAL VEGETATION (Stratified)	79.6/100	100.7/100	95.3/100	66.0/100	100.8/100	111.6/100	102.7/100	95.3/100	135.5/100

Nomenclature follows USDA Forest Service (1987)

Footnotes are presented on cover page B-1.

Table D2. (Continued)

	ECODATA PLOT NUMBER							
	AGROPYRON SPICATUM/BOUTELOUA GRACILIS						FESTUCA IDAHOENSIS/ AGROPYRON SPICATUM	FESTUCA SCABRELLA/ AGROPYRON SPICATUM
	1	3	7	12	19	Mean n=5	23	28
SUBSHRUBS								
Artemisia frigida	12	18	3	3	8	8.8/100	3	T
Gutierrezia sarothrae	8	3	20	20	3	10.8/100	T	T
TOTAL SUBSHRUBS	20.0	21.0	23.0	23.0	11.0	19.6/100	3.5	1.0
SHRUBS								
Amelanchier alnifolia	-	-	-	-	-	-	-	T
Artemisia nova	-	-	-	T	-	0.1/20	-	-
Artemisia tridentata	-	T	-	-	-	0.1/20	-	3
Ceratoides lanata	-	-	-	T	-	0.1/20	-	-
Chrysothamnus nauseosus	T	T	T	-	-	0.3/60	T	T
Chrysothamnus viscidiflorus	-	-	-	-	-	-	T	T
Rhus aromatica	-	-	-	T	-	0.1/20	-	-
Ribes cereum	-	-	-	-	-	-	T	T
Rosa woodsii	-	-	-	-	-	-	3	-
Tetradymia canescens	T	-	-	T	-	0.2/40	T	T
TOTAL SHRUBS	1.0	1.0	0.5	2.0	-	0.9/80	5.0	5.5
TREES								
Juniperus scopulorum	-	3	-	-	-	0.6/20	-	-
TOTAL VEGETATION (Stratified)	123.5	98.5	99.5	86.5	113.5	104.3/100	110.5	113.0

Nomenclature follows USDA Forest Service (1987)

Footnotes are presented on cover page D-1.

Table B3a. Mean percent canopy cover/frequency by class and species for 13 transects sampled in the **PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS** habitat type and 2 transects in the **PICEA ENGELMANNII** series, Gold Fields Elkhorn study area, 1989.

	TRANSECT NUMBER								
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS								
	1	3	4	5	6	7	9	10	12
GROUND COVER									
Bare soil	3.2/35	T/5	T/5	0.2/25	0.1/10	0.2/15	0.3/10	-	0.9/25
Rock	11.5/100	0.2/5	1.2/30	4.0/75	-	0.3/5	9.1/65	26.0/85	1.1/25
Litter	55.6/100	91.8/100	86.4/100	62.6/100	96.3/100	93.4/100	54.5/100	61.3/100	93.6/100
Moss	19.5/95	3.6/60	6.9/55	23.5/100	1.1/10	0.2/10	24.1/90	7.0/80	1.2/10
Lichens	7.1/100	1.3/50	0.5/25	7.0/100	T/10	0.1/15	9.6/80	1.0/60	0.3/25
Basal vegetation	3.1/95	3.0/100	5.0/100	2.7/100	2.4/95	5.8/100	2.4/100	4.7/100	2.9/85
TOTAL VEG. (non-stratified)	67.8/100	81.9/100	77.7/100	68.9/100	82.9/100	86.7/100	70.6/100	75.3/100	84.7/100
TOTAL UNDERSTORY VEG.	26.4/95	38.1/100	58.0/100	40.5/100	36.9/95	63.2/100	30.1/100	54.3/100	38.6/95
CLASS\SPECIES									
NATIVE PERENNIAL GRAMINOIDS									
Agropyron caninum	-	-	-	-	X	2.9/20	-	-	-
Agropyron spicatum	-	-	-	-	-	-	-	-	2.2/15
Bromus anomalus	-	-	-	-	-	0.9/20	-	-	-
Bromus carinatus	-	-	-	-	T/5	-	-	-	X
Calamagrostis rubescens	9.4/70	28.3/100	38.8/100	20.7/90	9.3/70	21.9/50	3.4/55	24.9/95	9.9/50
Carex concinnoides	-	0.2/5	0.8/10	-	0.2/5	-	-	-	-
Carex disperma	-	-	-	-	-	-	-	-	-
Carex geyeri	-	X	1.7/20	-	19.4/70	4.1/25	-	X	17.5/55
Carex hoodii	-	-	-	-	-	X	-	-	-
Carex microptera	-	-	-	-	-	-	-	-	-
Carex petasata	-	-	-	-	-	1.4/20	-	-	-
Carex rossii	-	-	-	X	-	-	-	-	-
Cinna latifolia	-	-	-	-	-	-	-	-	-
Danthonia intermedia	-	-	-	-	-	0.8/30	-	-	-
Elymus glaucus	-	-	-	-	-	-	-	-	-
Festuca idahoensis	-	-	-	-	0.1/5	7.3/40	-	-	T/5
Festuca scabrella	-	-	-	-	-	0.7/5	-	-	-

Table D2. (Continued)

	ECODATA PLOT NUMBER							
	AGROPYRON SPICATUM/BOUTELOUA GRACILIS						FESTUCA IDAHOENSIS/ AGROPYRON SPICATUM	FESTUCA SCABRELLA/ AGROPYRON SPICATUM
	1	3	7	12	19	Mean n=5	23	28
NATIVE PERENNIAL FORBS (Continued)								
Solidago missouriensis	-	T	T	-	T	0.3/60	T	-
Sphaeralcea coccinea	T	T	T	-	T	0.4/80	T	-
Townsendia hookeri	-	-	-	T	T	0.2/40	-	-
TOTAL NPF	16.5	10.5	10.5	12.5	18.5	13.7/100	16.0	21.0
INTRODUCED PERENNIAL FORBS								
Linaria dalmatica	-	T	-	-	-	0.1/20	-	-
Taraxacum officinale	-	-	-	-	T	0.1/20	T	T
TOTAL IPF	-	0.5	-	-	0.5	0.2/40	0.5	0.5
FERNS AND ALLIES								
Selaginella densa	3	T	20	-	20	8.7/80	30	10
NATIVE ANNUAL/BIENNIAL FORBS								
Arabis holboellii	-	T	-	T	T	0.3/60	-	-
Cryptantha celosioides	-	-	-	T	-	0.1/20	-	-
Descurainia pinnata	-	-	-	-	T	0.1/20	-	-
Lappula redowskii	-	-	-	T	-	0.1/20	-	-
Lepidium densiflorum	-	T	T	-	T	0.3/60	-	-
Linum rigidum	-	-	-	T	-	0.1/20	-	-
Plantago patagonica	-	T	-	-	-	0.1/20	-	-
TOTAL NAF	-	1.5	0.5	2.0	1.5	1.1/80	-	-
INTRODUCED ANNUAL/BIENNIAL FORBS								
Tragopogon dubius	T	T	-	-	-	0.2/40	T	T

Table B3a. (Continued)

	TRANSECT NUMBER								
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS								
	1	3	4	5	6	7	9	10	12
NATIVE PERENNIAL GRAMINOIDS (Continued)									
Glyceria striata	-	-	-	-	-	-	-	-	-
Koeleria cristata	-	-	-	-	-	0.3/10	-	-	-
Melica spectabilis	-	-	-	-	-	X	-	-	-
Poa juncifolia	-	-	-	-	-	X	-	-	X
Poa nervosa	-	-	-	-	-	-	-	-	-
Sitanion hystrix	-	-	-	X	-	-	-	-	-
Stipa occidentalis	-	-	-	-	X	7.3/35	-	-	0.5/25
Stipa richardsonii	-	-	-	-	-	1.4/30	-	-	-
Trisetum spicatum	-	-	-	X	-	-	-	-	-
TOTAL NPG	9.4/70	28.5/100	41.2/100	20.7/90	29.0/90	48.5/90	3.4/55	24.9/95	30.1/90
INTRODUCED PERENNIAL GRAMINOIDS									
Agrostis stolonifera	-	-	-	-	-	-	-	-	-
Poa pratensis	-	-	-	-	-	2.7/35	-	-	-
TOTAL IPG	-	-	-	-	-	2.7/35	-	-	-
NATIVE PERENNIAL FORBS									
Achillea millefolium	-	-	-	X	0.2/5	1.0/30	-	-	0.4/5
Actaea rubra	-	-	-	-	-	-	-	-	-
Agoseris glauca	-	-	-	X	-	1.0/20	-	-	-
Allium cernuum	-	-	-	X	0.3/5	0.4/10	-	X	0.3/5
Anemone multifida	-	-	-	X	-	-	-	-	-
Angelica arguta	-	-	-	-	-	-	-	-	-
Antennaria microphylla	-	-	0.5/15	T/5	-	X	-	-	0.4/5
Antennaria parvifolia	-	-	-	-	-	X	-	-	-
Antennaria racemosa	4.6/70	4.0/40	-	2.6/40	0.2/5	0.1/10	1.6/40	4.3/50	-
Arabis drummondii	-	-	-	-	-	-	-	-	X
Arenaria congesta	-	-	-	-	-	X	-	-	-

Table D2. (Continued)

	ECODATA PLOT NUMBER							
	AGROPYRON SPICATUM/BOUTELOUA GRACILIS						FESTUCA IDAHOENSIS/ AGROPYRON SPICATUM	FESTUCA SCABRELLA/ AGROPYRON SPICATUM
	1	3	7	12	19	Mean n=5	23	28
NATIVE PERENNIAL FORBS (Continued)								
Coryphantha missouriensis	T	T	-	T	T	0.4/80	-	-
Crepis modocensis	T	-	T	-	-	0.2/40	-	-
Erigeron caespitosus	-	-	-	-	-	-	T	T
Erigeron compositus	-	-	T	T	-	0.2/40	T	-
Erigeron pumilus	T	-	T	-	T	0.3/60	-	-
Eriogonum ovalifolium	-	-	-	-	T	0.1/20	-	-
Eriogonum umbellatum	-	-	-	-	-	-	-	T
Gaura coccinea	-	T	-	T	T	0.3/60	T	T
Geum triflorum	-	-	-	-	-	-	T	T
Haplopappus acaulis	-	-	-	-	-	-	T	3
Heuchera parvifolia	-	-	-	-	-	-	T	T
Hymenopappus filifolius	-	-	-	T	-	0.1/20	-	-
Liatris punctata	T	T	-	T	3	0.9/80	-	-
Lithospermum incisum	-	-	-	T	-	0.1/20	-	-
Lupinus sericeus	-	-	-	-	-	-	T	T
Lygodesmia juncea	-	-	-	T	-	0.1/20	-	-
Musineon divaricatum	-	-	-	-	-	-	-	T
Opuntia polyacantha	3	3	T	T	T	1.5/100	-	-
Orobanche fasciculata	T	-	-	-	-	0.1/20	-	-
Oxytropis sericea	-	-	T	-	T	0.2/40	-	-
Paronychia sessiliflora	-	-	-	3	T	0.7/40	-	-
Penstemon eriantherus	-	-	-	-	T	0.1/20	-	-
Phlox alyssifolia	-	-	T	T	-	0.2/40	T	T
Phlox hoodii	-	-	-	-	T	0.1/20	-	-
Phlox muscoides	T	-	3	T	T	0.9/80	-	-
Potentilla hippiana	-	T	-	-	-	0.1/20	T	-
Sedum lanceolatum	-	-	-	-	-	-	-	T
Senecio canus	-	-	-	T	-	0.1/20	-	-

Table B3a. (Continued)

	TRANSECT NUMBER								
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS								
	1	3	4	5	6	7	9	10	12
NATIVE PERENNIAL FORBS (Continued)									
Arnica cordifolia	1.8/45	0.9/25	3.8/80	T/5	2.4/50	0.4/5	0.7/20	2.3/50	X
Arnica sororia	-	-	-	-	-	X	-	-	-
Aster conspicuus	-	0.3/10	0.5/15	0.7/10	-	T/5	-	2.6/45	-
Aster foliaceus	-	-	-	-	-	-	-	-	-
Astragalus miser	-	-	11.3/90	-	-	-	-	11.3/60	-
Campanula rotundifolia	T/5	X	-	0.4/15	X	T/5	-	0.1/5	-
Castilleja miniata	-	-	-	X	-	-	-	X	-
Cerastium arvense	-	-	-	-	-	0.5/10	-	-	0.2/10
Cirsium scariosum	-	-	-	-	-	-	-	-	-
Disporum trachycarpum	-	-	-	-	X	-	-	0.3/5	-
Epilobium angustifolium	X	X	-	-	-	-	-	0.9/5	-
Epilobium ciliatum	-	-	-	-	-	-	-	-	-
Erigeron speciosus	-	-	-	-	-	X	-	-	-
Eriogonum umbellatum	-	-	-	-	-	2.2/20	-	-	X
Fragaria vesca	X	-	-	-	0.9/20	0.1/5	-	2.9/35	-
Fragaria virginiana	T/5	0.1/5	0.8/20	0.3/20	2.1/35	0.4/15	0.1/5	0.2/5	1.1/15
Galium boreale	-	-	-	-	-	X	-	-	-
Galium triflorum	-	-	-	-	-	-	-	-	-
Geranium richardsonii	-	-	-	-	-	-	-	-	-
Geranium viscosissimum	-	-	-	-	-	T/5	-	-	X
Geum macrophyllum	-	-	-	-	-	-	-	-	-
Geum triflorum	-	-	-	-	-	X	-	-	-
Goodyera oblongifolia	-	X	-	-	-	-	-	-	-
Heracleum lanatum	-	-	-	-	-	-	-	-	-
Heuchera cylindrica	X	-	-	-	-	-	-	X	-
Hieracium albiflorum	0.1/5	-	-	-	-	-	-	-	-
Hieracium cynoglossoides	-	-	-	X	-	-	-	-	-
Hypopitys monotropa	-	X	-	-	-	-	-	-	-
Lithospermum ruderale	-	-	-	-	X	X	-	-	4.2/15

Table D2. (Continued)

	ECODATA PLOT NUMBER							
	AGROPYRON SPICATUM/BOUTELOUA GRACILIS						FESTUCA IDAHOENSIS/ AGROPYRON SPICATUM	FESTUCA SCABRELLA/ AGROPYRON SPICATUM
	1	3	7	12	19	Mean n=5	23	28
NATIVE PERENNIAL GRAMINOIDS (Continued)								
Stipa comata	10	T	T	20	3	6.8/100	T	-
TOTAL NPG	82.5	60.0	45.0	47.0	62.0	59.3/100	54.5	71.5
INTRODUCED PERENNIAL GRAMINOIDS								
Poa pratensis	-	-	-	-	-	-	T	3
NATIVE PERENNIAL FORBS								
Achillea millefolium	-	T	-	-	-	0.1/20	T	3
Allium cernuum	T	-	-	T	-	0.2/40	-	-
Antennaria microphylla	T	-	-	-	T	0.2/40	3	3
Antennaria parvifolia	T	T	3	-	3	1.4/80	T	T
Arenaria congesta	-	-	-	-	-	-	3	3
Artemisia dracunculus	3	T	-	-	3	1.3/60	T	-
Artemisia ludoviciana	-	-	-	-	-	-	T	-
Aster falcatus	T	T	T	T	T	0.5/100	T	-
Astragalus adsurgens	3	-	-	-	-	0.6/20	T	-
Astragalus atropubescens	-	T	-	-	-	0.1/20	-	-
Astragalus crassicarpus	-	-	-	T	-	0.1/20	-	-
Astragalus drummondii	T	T	-	-	-	0.2/40	T	T
Astragalus flexuosus	-	-	-	-	T	0.1/20	-	T
Astragalus gilviflorus	T	-	-	T	T	0.3/60	-	-
Astragalus purshii	-	T	-	-	-	0.1/20	-	-
Besseya wyomingensis	-	-	-	-	-	-	T	-
Chaenactis douglasii	-	-	-	T	-	0.1/20	-	-
Chrysopsis villosa	T	T	-	T	T	0.4/80	T	-
Cirsium undulatum	T	T	-	T	T	0.4/80	-	-
Comandra umbellata	-	-	-	-	-	-	-	3

Table B3a. (Continued)

	TRANSECT NUMBER								
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS								
	1	3	4	5	6	7	9	10	12
NATIVE PERENNIAL FORBS (Continued)									
Lupinus sericeus	-	-	-	X	-	4.9/30	-	-	2.1/20
Mertensia ciliata	-	-	-	-	-	-	-	-	-
Mimulus guttatus	-	-	-	-	-	-	-	-	-
Mitella pentandra	-	-	-	-	-	-	-	-	-
Osmorhiza chilensis	-	-	-	-	-	-	-	-	-
Pedicularis contorta	-	-	-	X	-	-	-	-	-
Penstemon procerus	-	X	-	X	0.1/5	1.1/15	-	-	-
Perideridia gairdneri	-	-	-	-	-	X	-	-	-
Phacelia hastata	-	-	-	-	-	-	-	-	T/5
Potentilla glandulosa	-	-	-	-	T/5	X	-	-	X
Potentilla gracilis	-	-	-	-	-	X	-	-	-
Prunella vulgaris	-	-	-	-	-	-	-	-	-
Pyrola chlorantha	X	X	-	-	-	-	X	-	-
Pyrola secunda	-	0.2/10	-	-	-	-	X	-	-
Ranunculus macounii	-	-	-	-	-	-	-	-	-
Ranunculus uncinatus	-	-	-	-	-	-	-	-	-
Saxifraga arguta	-	-	-	-	-	-	-	-	-
Sedum lanceolatum	-	-	-	X	-	-	T/5	-	-
Senecio serra	-	-	-	-	-	-	-	-	-
Senecio streptanthifolius	X	X	-	0.5/25	-	-	-	-	-
Senecio triangularis	-	-	-	-	-	-	-	-	-
Smilacina stellata	-	-	-	-	-	X	-	-	-
Solidago missouriensis	-	-	-	-	-	0.8/10	-	-	1.5/30
Streptopus amplexifolius	-	-	-	-	-	-	-	-	-
Thalictrum dasycarpum	-	-	-	-	-	-	-	-	-
Thalictrum occidentale	-	-	-	-	-	0.3/10	-	1.3/10	-
Urtica dioica	-	-	-	-	-	-	-	-	-
Valeriana dioica	T/5	-	-	-	-	X	-	-	-
TOTAL NPF	6.6/70	5.4/65	16.8/100	4.5/70	6.0/85	13.0/75	2.4/50	25.9/95	9.9/55

Table D2. Percent canopy cover/constancy by class and species for 7 ecodata plots sampled in the **AGROPYRON SPICATUM/BOUTELOUA GRACILIS, FESTUCA IDAHOENSIS/AGROPYRON SPICATUM** and **FESTUCA SCABRELLA/AGROPYRON SPICATUM** habitat types, Gold Fields Elkhorn study area, 1990.

	ECODATA PLOT NUMBER							
	AGROPYRON SPICATUM/BOUTELOUA GRACILIS						FESTUCA IDAHOENSIS/ AGROPYRON SPICATUM	FESTUCA SCABRELLA/ AGROPYRON SPICATUM
	1	3	7	12	19	Mean n=5	23	28
GROUND COVER								
Bare soil	20	20	20	20	20	20.0/100	10	20
Gravel	20	20	20	40	30	26.0/100	10	20
Rock	10	20	20	T	10	12.1/100	20	3
Litter	35	25	25	35	35	31.0/100	45	45
Wood	T	-	-	T	-	0.2/40	T	T
Moss	T	T	T	T	-	0.4/80	-	T
Lichens	3	10	10	3	T	5.3/100	3	3
Basal vegetation	5	5	5	5	5	5.0/100	5	5
VEGETATION STRUCTURE (nonstratified)								
Total tree cover	-	3	-	-	-	0.6/20	-	-
Total shrub cover	2	20	20	20	10	14.4/100	10	10
Total graminoid cover	62	58	42	40	50	50.4/100	50	60
Total forb cover	18	8	28	10	40	20.8/100	40	30
CLASS\SPECIES								
NATIVE PERENNIAL GRAMINOIDS								
Agropyron smithii	-	10	T	-	3	2.7/60	-	-
Agropyron spicatum	3	20	10	3	10	9.2/100	20	20
Aristida longiseta	T	3	T	T	3	1.5/100	-	-
Bouteloua gracilis	28	20	10	3	20	16.2/100	-	-
Carex rossii	-	-	-	-	-	-	-	T
Carex stenophylla	3	3	3	T	3	2.5/100	T	T
Festuca idahoensis	-	-	-	-	-	-	30	30
Festuca scabrella	-	-	-	-	-	-	-	10
Koeleria cristata	20	3	20	10	10	12.6/100	3	10
Poa sandbergii	18	T	T	10	10	7.8/100	T	T

Table B3a. (Continued)

	TRANSECT NUMBER								
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS								
	1	3	4	5	6	7	9	10	12
INTRODUCED PERENNIAL FORBS									
Taraxacum officinale	-	-	-	-	-	0.2/5	-	-	0.2/10
Trifolium repens	-	-	-	-	-	-	-	-	-
TOTAL IPF	-	-	-	-	-	0.2/5	-	-	0.2/10
FERNS AND ALLIES									
Equisetum arvense	-	-	-	-	-	-	-	-	-
Equisetum hyemale	-	-	-	-	-	-	-	-	-
TOTAL F&A	-	-	-	-	-	-	-	-	-
NATIVE ANNUAL/BIENNIAL FORBS									
Androsace occidentalis	-	-	-	-	-	-	-	-	T/5
Arabis divaricarpa	-	-	-	-	-	X	-	-	-
Arabis holboellii	-	-	-	X	-	-	-	-	-
Collinsia parviflora	-	-	-	-	-	0.7/20	-	-	-
Collomia linearis	-	-	-	-	-	0.5/20	-	-	-
Epilobium paniculatum	-	-	-	-	-	X	-	-	-
Linanthus septentrionalis	-	-	-	-	-	X	-	-	-
Polygonum douglasii	-	-	-	-	-	0.4/5	-	-	-
TOTAL NAF	-	-	-	X	-	1.5/35	-	-	T/5
INTRODUCED ANNUAL/BIENNIAL FORBS									
Chenopodium album	-	-	-	-	-	T/5	-	-	-
Draba nemorosa	-	-	-	-	-	X	-	-	-
Tragopogon dubius	-	-	-	-	-	0.1/5	-	-	-
Verbascum thapsus	-	-	-	-	-	-	-	-	-
TOTAL IAF	-	-	-	-	-	0.1/10	-	-	-

Table D1. (Continued)

	ECODATA PLOT NUMBER					
	STIPA COMATA/BOUTELOUA GRACILIS			AGROPYRON SPICATUM/POA SANDBERGII		
	5	14	Mean n=2	15	26	Mean n=2
TREES						
Juniperus scopulorum	-	-	-	-	T	0.2/50
Pinus flexilis	-	-	-	-	T	0.2/50
TOTAL TREES	-	-	-	-	1.0	0.5/50
TOTAL VEGETATION (Stratified)	88.0	78.0	83.0/100	132.5	73.5	103.0/100

Nomenclature follows USDA Forest Service (1987)

Footnotes are presented on cover page D-1.

Table B3a. (Continued)

	TRANSECT NUMBER								
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS								
	1	3	4	5	6	7	9	10	12
SUBSHRUBS									
Arctostaphylos uva-ursi	-	X	-	-	-	-	-	-	-
Berberis repens	-	3.1/35	4.5/70	1.4/50	1.4/10	2.0/35	-	1.2/20	0.3/10
Chimaphila umbellata	X	X	-	-	-	-	X	-	-
TOTAL SUBSHRUBS	X	3.1/35	4.5/70	1.4/50	1.4/10	2.0/35	X	1.2/20	0.3/10
SHRUBS									
Alnus incana	-	-	-	-	-	-	-	-	-
Amelanchier alnifolia	-	-	-	X	-	-	-	-	-
Artemisia tridentata	-	-	-	-	-	1.3/10	-	-	-
Clematis occidentalis	X	-	-	-	0.2/5	-	-	1.4/10	-
Juniperus communis	6.0/15	1.0/5	X	13.5/45	2.3/5	X	0.2/5	7.2/15	X
Lonicera utahensis	0.6/5	X	-	-	-	-	0.1/5	-	-
Ribes lacustre	-	-	-	-	-	-	-	-	-
Ribes setosum	-	-	-	-	-	-	-	X	0.8/5
Ribes viscosissimum	-	-	-	-	-	-	-	-	-
Rosa acicularis	X	X	-	T/10	-	T/5	X	4.7/55	-
Rubus idaeus	-	-	-	-	-	-	-	-	-
Salix scouleriana	X	-	-	-	-	-	-	-	-
Shepherdia canadensis	X	-	-	X	-	-	X	X	-
Spiraea betulifolia	1.1/25	1.5/35	2.2/30	3.7/45	-	X	1.0/30	1.2/25	-
Symphoricarpos albus	-	-	-	-	-	-	-	-	-
Vaccinium globulare	-	-	-	-	-	-	0.4/5	-	-
Vaccinium scoparium	4.1/5	0.4/5	-	-	-	-	23.8/70	-	-
TOTAL SHRUBS	11.8/50	2.8/45	2.2/30	17.2/75	2.5/10	1.3/15	25.5/85	14.5/80	0.8/5

Table D1. (Continued)

	ECODATA PLOT NUMBER					
	STIPA COMATA/BOUTELOUA GRACILIS			AGROPYRON SPICATUM/POA SANDBERGII		
	5	14	Mean n=2	15	26	Mean n=2
NATIVE PERENNIAL FORBS						
Phlox hoodii	-	T	0.2/50	-	-	-
Phlox muscoides	T	3	1.8/100	T	-	0.2/50
Sedum lanceolatum	-	-	-	T	-	0.2/50
Senecio canus	-	T	0.2/50	T	T	0.5/100
Sphaeralcea coccinea	T	T	0.5/100	T	-	0.2/50
TOTAL NPF	8.0	8.5	8.2/100	16.0	14.5	15.2/100
INTRODUCED PERENNIAL FORBS						
Taraxacum officinale	-	-	-	-	T	0.2/50
FERNS AND ALLIES						
Selaginella densa	T	-	0.2/50	32	-	16.0/50
NATIVE ANNUAL/BIENNIAL FORBS						
Cryptantha celosioides	-	T	0.2/50	-	T	0.2/50
Descurainia pinnata	-	-	-	-	T	0.2/50
Linum rigidum	-	T	0.2/50	-	T	0.2/50
TOTAL NAF	-	1.0	0.5/50	-	1.5	0.8/50
SUBSHRUBS						
Artemisia frigida	10	3	6.5/100	10	3	6.5/100
Gutierrezia sarothrae	10	10	10.0/100	10	10	10.0/100
TOTAL SUBSHRUBS	20.0	13.0	16.5/100	20.0	13.0	16.5/100
SHRUBS						
Artemisia nova	-	-	-	-	3	1.5/50
Ceratoides lanata	-	T	0.2/50	-	T	0.2/50
Chrysothamnus nauseosus	T	-	0.2/50	T	-	0.2/50
TOTAL SHRUBS	0.5	0.5	0.5/100	0.5	3.5	2.0/100

Table B3a. (Continued)

	TRANSECT NUMBER								
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS								
	1	3	4	5	6	7	9	10	12
TREES									
Juniperus scopulorum	-	-	-	X	-	3.0/5	X	X	X
Picea engelmannii	X	-	-	-	-	-	X	-	-
Pinus contorta	41.0/60	69.5/100	37.7/60	36.5/60	7.7/10	28.0/45	45.2/65	19.1/25	X
Pinus flexilis	0.2/5	-	-	-	-	-	X	X	-
Pseudotsuga menziesii	18.0/40	X	X	13.6/40	63.8/80	23.9/25	14.8/35	22.1/30	63.6/80
TOTAL TREES	59.1/70	69.5/100	37.7/60	50.1/85	71.5/85	54.9/70	60.0/85	41.2/55	63.6/80
TOTAL VEGETATION (Stratified)	86.9/100	109.2/100	102.3/100	93.9/100	110.3/100	124.1/100	91.2/100	107.6/100	104.9/100

Nomenclature follows USDA Forest Service (1987)

Footnotes are presented on cover page B-1.

Table D1. (Continued)

	ECODATA PLOT NUMBER					
	STIPA COMATA/BOUTELOUA GRACILIS			AGROPYRON SPICATUM/POA SANDBERGII		
	5	14	Mean n=2	15	26	Mean n=2
NATIVE PERENNIAL FORBS						
Allium cernuum	-	-	-	-	3	1.5/50
Antennaria microphylla	T	-	0.2/50	3	-	1.5/50
Antennaria parvifolia	T	-	0.2/50	T	-	0.2/50
Artemisia dracunculus	T	-	0.2/50	T	-	0.2/50
Aster falcatus	T	-	0.2/50	-	-	-
Astragalus adsurgens	-	-	-	3	-	1.5/50
Astragalus agrestis	-	-	-	T	-	0.2/50
Astragalus gilviflorus	T	T	0.5/100	-	-	-
Chaenactis douglasii	-	-	-	-	T	0.2/50
Cirsium undulatum	T	T	0.5/100	-	-	-
Comandra umbellata	-	T	0.2/50	-	T	0.2/50
Coryphantha missouriensis	T	-	0.2/50	-	-	-
Crepis modocensis	-	-	-	T	-	0.2/50
Draba oligosperma	-	-	-	-	T	0.2/50
Erigeron caespitosus	-	T	0.2/50	T	T	0.5/100
Erigeron compositus	-	-	-	3	-	1.5/50
Eriogonum flavum	-	-	-	-	T	0.2/50
Eriogonum ovalifolium	T	-	0.2/50	-	-	-
Erysimum inconspicuum	-	-	-	T	T	0.5/100
Gaura coccinea	-	T	0.2/50	-	-	-
Haplopappus acaulis	-	-	-	-	T	0.2/50
Hymenopappus filifolius	-	-	-	-	T	0.2/50
Lesquerella alpina	-	T	0.2/50	-	T	0.2/50
Liatris punctata	T	T	0.5/100	-	-	-
Linum lewisii	-	-	-	-	3	1.5/50
Opuntia polyacantha	2	-	1.0/50	T	-	0.2/50
Oxytropis sericea	-	-	-	T	-	0.2/50
Paronychia sessiliflora	T	T	0.5/100	T	T	0.5/100
Penstemon eriantherus	-	-	-	T	-	0.2/50
Phlox alyssifolia	-	-	-	-	3	1.5/50

Table B3b. (Continued)

	TRANSECT NUMBER							
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS					PIC ENG/ SMI STE	PIC ENG/ GAL TRI	PIC ENG SERIES
	14	17	19	20	Mean n=13	21	23	Mean n=2
GROUND COVER								
Bare soil	-	-	-	T/5	0.4/10	-	0.5/15	0.2/8
Rock	0.7/10	0.7/20	23.6/95	T/10	6.0/40	-	2.6/40	1.3/20
Litter	94.4/100	74.5/100	69.7/100	90.5/100	78.8/100	96.1/100	64.3/100	80.2/100
Moss	0.6/5	18.2/90	1.6/45	6.8/35	8.8/53	1.1/35	27.3/75	14.2/55
Lichens	-	5.0/90	4.5/100	-	2.8/50	0.3/35	1.6/60	1.0/48
Basal vegetation	4.3/100	1.6/100	0.6/75	2.6/70	3.2/94	2.5/95	3.7/90	3.1/92
TOTAL VEG. (non-stratified)	89.6/100	77.9/100	63.5/100	86.5/100	78.0/100	74.5/100	75.5/100	75.0/100
TOTAL UNDERSTORY VEG.	44.8/100	25.9/100	8.6/85	35.8/70	38.6/95	29.8/90	26.0/85	27.9/88
CLASS\SPECIES								
NATIVE PERENNIAL GRAMINOIDS								
Agropyron caninum	-	-	-	-	0.2/2	X	-	X
Agropyron spicatum	-	-	-	-	0.2/1	-	-	-
Bromus anomalus	-	-	-	-	T/2	-	X	X
Bromus carinatus	-	-	-	-	T/T	-	-	-
Calamagrostis rubescens	21.9/85	9.7/55	5.0/65	9.7/55	16.4/72	17.9/60	1.1/10	9.5/35
Carex concinnoides	-	1.2/25	X	-	0.2/3	0.2/10	-	0.1/5
Carex disperma	-	-	-	-	-	-	1.2/15	0.6/8
Carex geyeri	6.3/40	0.6/15	-	8.9/40	4.5/20	-	0.2/5	0.1/2
Carex hoodii	-	-	-	-	X	-	-	-
Carex microptera	-	-	-	-	-	-	X	X
Carex petasata	-	-	-	-	0.1/2	-	-	-
Carex rossii	-	-	-	-	X	-	-	-
Cinna latifolia	-	-	-	-	-	-	X	X
Danthonia intermedia	-	-	-	-	T/2	-	-	-
Elymus glaucus	-	-	-	-	-	X	X	X
Festuca idahoensis	X	-	-	-	0.6/4	-	-	-
Festuca scabrella	-	-	-	0.7/10	0.1/1	-	-	-

Table D1. Percent canopy cover/constancy by class and species for 4 ecodata plots sampled in the **STIPA COMATA/BOUTELOUA GRACILIS** and **AGROPYRON SPICATUM/POA SANDBERGII** habitat types, Gold Fields Elkhorn study area, 1990.

	ECODATA PLOT NUMBER					
	STIPA COMATA/BOUTELOUA GRACILIS			AGROPYRON SPICATUM/POA SANDBERGII		
	5	14	Mean n=2	15	26	Mean n=2
GROUND COVER						
Bare soil	30	45	37.5/100	15	10	12.5/100
Gravel	30	30	30.0/100	20	50	35.0/100
Rock	3	T	1.8/100	20	20	20.0/100
Litter	25	20	22.5/100	35	10	22.5/100
Wood	T	-	0.2/50	-	T	0.2/50
Moss	-	T	0.2/50	T	T	0.5/100
Lichens	3	T	1.8/100	3	3	3.0/100
Basal vegetation	5	5	5.0/100	5	3	4.0/100
VEGETATION STRUCTURE (nonstratified)						
Total tree cover	-	-	-	-	T	0.2/50
Total shrub cover	20	10	15.0/100	20	20	20.0/100
Total graminoid cover	50	50	50.0/100	60	30	45.0/100
Total forb cover	5	10	7.5/100	40	10	25.0/100
CLASS\SPECIES						
NATIVE PERENNIAL GRAMINOIDS						
Agropyron dasystachyum	T	-	0.2/50	-	-	-
Agropyron smithii	-	T	0.2/50	-	-	-
Agropyron spicatum	T	T	0.5/100	20	20	20.0/100
Aristida longiseta	12	T	6.2/100	T	-	0.2/50
Bouteloua gracilis	20	20	20.0/100	T	-	0.2/50
Carex rossii	-	-	-	-	T	0.2/50
Carex stenophylla	3	3	3.0/100	-	-	-
Koeleria cristata	12	10	11.0/100	20	3	11.5/100
Oryzopsis hymenoides	-	T	0.2/50	-	3	1.5/50
Poa sandbergii	3	10	6.5/100	20	10	15.0/100
Stipa comata	8	10	9.0/100	3	3	3.0/100
TOTAL NPG	59.0	55.0	57.0/100	64.0	39.5	51.8/100

Table B3b. (Continued)

	TRANSECT NUMBER							
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS					PIC ENG/ SMI STE	PIC ENG/ GAL TRI	PIC ENG SERIES
	14	17	19	20	Mean n=13	21	23	Mean n=2
NATIVE PERENNIAL GRAMINOIDS (Continued)								
Glyceria striata	-	-	-	-	-	-	0.4/10	0.2/5
Koeleria cristata	-	-	-	-	T/1	-	-	-
Melica spectabilis	-	-	-	-	X	-	-	-
Poa juncifolia	0.7/10	-	-	-	T/1	-	-	-
Poa nervosa	2.3/20	T/5	-	1.4/25	0.3/4	0.4/15	X	0.2/8
Sitanion hystrix	-	-	-	-	X	-	-	-
Stipa occidentalis	-	-	-	-	0.6/5	X	-	X
Stipa richardsonii	-	-	-	-	0.1/2	-	-	-
Trisetum spicatum	-	X	X	X	X	T/5	X	T/2
TOTAL NPG	31.2/100	11.6/80	5.0/65	20.7/65	23.4/84	18.6/75	2.8/30	10.7/52
INTRODUCED PERENNIAL GRAMINOIDS								
Agrostis stolonifera	-	-	-	-	-	-	0.2/5	0.1/2
Poa pratensis	-	-	-	-	0.2/3	-	-	-
TOTAL IPG	-	-	-	-	0.2/3	-	0.2/5	0.1/2
NATIVE PERENNIAL FORBS								
Achillea millefolium	T/5	-	-	0.1/5	0.1/4	X	-	X
Actaea rubra	-	-	-	-	-	X	X	X
Agoseris glauca	-	-	-	-	0.1/2	X	-	X
Allium cernuum	-	-	-	X	0.1/2	X	-	X
Anemone multifida	-	-	-	-	X	X	-	X
Angelica arguta	-	-	-	-	-	X	-	X
Antennaria microphylla	1.5/5	-	-	T/5	0.2/3	0.2/5	-	0.1/2
Antennaria parvifolia	-	-	-	-	X	-	-	-
Antennaria racemosa	-	6.8/75	0.3/5	-	1.9/26	1.2/5	0.4/10	0.8/8
Arabis drummondii	-	-	-	-	X	-	-	-
Arenaria congesta	-	-	-	-	X	-	-	-

Table B3b. (Continued)

	TRANSECT NUMBER							
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS					PIC ENG/ SMI STE	PIC ENG/ GAL TRI	PIC ENG SERIES
	14	17	19	20	Mean n=13	21	23	Mean n=2
NATIVE PERENNIAL FORBS (Continued)								
Arnica cordifolia	0.2/5	0.5/25	0.1/5	X	1.0/24	1.9/35	2.0/30	2.0/32
Arnica sororia	-	-	-	-	X	-	-	-
Aster conspicuus	0.4/5	-	0.3/10	0.2/5	0.4/8	X	-	X
Aster foliaceus	-	-	-	-	-	2.1/30	X	1.0/15
Astragalus miser	-	-	-	X	1.7/12	-	-	-
Campanula rotundifolia	T/10	-	-	-	T/3	X	X	X
Castilleja miniata	-	-	-	-	X	-	-	-
Cerastium arvense	0.2/5	-	-	-	T/2	-	-	-
Cirsium scariosum	-	-	-	-	-	X	X	X
Disporum trachycarpum	-	-	-	-	T/T	-	0.2/5	0.1/2
Epilobium angustifolium	0.2/5	X	-	-	0.1/1	X	T/5	T/2
Epilobium ciliatum	-	-	-	-	-	-	X	X
Erigeron speciosus	-	-	-	-	X	-	-	-
Eriogonum umbellatum	-	-	-	-	0.2/2	-	-	-
Fragaria vesca	-	0.2/5	-	-	0.3/5	-	0.5/15	0.2/8
Fragaria virginiana	3.0/45	-	T/5	0.1/5	0.6/14	0.6/20	0.4/15	0.5/18
Galium boreale	T/5	-	-	-	T/T	-	-	-
Galium triflorum	-	-	-	-	-	-	0.6/10	0.3/5
Geranium richardsonii	-	-	-	-	-	X	0.6/10	0.3/5
Geranium viscosissimum	-	-	-	X	T/T	-	0.2/5	0.1/2
Geum macrophyllum	-	-	-	-	-	-	X	X
Geum triflorum	-	-	-	-	X	-	-	-
Goodyera oblongifolia	-	X	-	-	X	-	-	-
Heracleum lanatum	-	-	-	-	-	-	X	X
Heuchera cylindrica	-	-	-	-	X	-	-	-
Hieracium albiflorum	1.4/15	0.2/5	-	-	0.1/2	-	-	-
Hieracium cynoglossoides	-	-	-	-	X	-	-	-
Hypopitys monotropa	-	-	-	-	X	-	-	-
Lithospermum ruderale	-	-	-	-	0.3/1	-	-	-

APPENDIX D

Percent canopy cover by ecodata plot for 27 vegetation types sampled in the Elkhorn study area, 1990.

Table	Vegetation Types	Page
	Grassland	
D1	*Stipa comata/Bouteloua gracilis*	D-2
D1	*Agropyron spicatum/Poa sandbergii*	D-2
D2	*Agropyron spicatum/Bouteloua gracilis*	D-6
D2	*Festuca idahoensis/Agropyron spicatum*	D-6
D2	*Festuca scabrella/Agropyron spicatum*	D-6
	Shrub/Grassland	
D3	*Artemisia nova/Agropyron spicatum*	D-11
D4	*Artemisia tridentata/Agropyron spicatum*	D-15
D4	*Artemisia tridentata/Festuca idahoensis*	D-15
D4	*Artemisia tridentata/Festuca scabrella*	D-15
D4	*Artemisia tridentata/Poa pratensis* c.t.	D-15
D4	*Chrysothamnus nauseosus/Poa pratensis* c.t.	D-15
D4	*Cercocarpus ledifolius/Agropyron spicatum*	D-15
	Forest/Savannah	
D5	*Juniperus scopulorum/Agropyron spicatum*	D-21
D5	*Pinus flexilis/Agropyron spicatum*	D-21
D5	*Pinus flexilis/Agropyron smithii* bottom	D-21
D6	*Pseudotsuga menziesii/Juniperus scopulorum* bottom	D-26
D6	*Pseudotsuga menziesii/Festuca idahoensis*	D-26
D6	*Pseudotsuga menziesii/Festuca scabrella*	D-26
D6	*Pseudotsuga menziesii/Calamagrostis rubescens*	D-26
D7	*Abies lasiocarpa-Pinus albicaulis*/scree	D-31
D7	*Abies lasiocarpa/Vaccinium scoparium*	D-31
	Bottomland	
D8	*Poa pratensis/Carex praegracilis*	D-33
D8	*Potentilla fruticosa/Deschampsia cespitosa*	D-33
D8	*Salix geyeriana*	D-33
	Miscellaneous	
D9	Tame Pasture	D-37
D9	Placer Mining	D-37
D9	Reclamation	D-37

Footnotes for the tables in Appendix D:

Canopy cover values follow the cover class system in U.S. Forest Service (1987); ecodata plots are 0.1-acre, circular.

T (Trace) is a cover value accorded 0.5 percent within an ecodata plot.

Table B3b. (Continued)

	TRANSECT NUMBER							
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS					PIC ENG/ SMI STE	PIC ENG/ GAL TRI	PIC ENG SERIES
	14	17	19	20	Mean n=13	21	23	Mean n=2
NATIVE PERENNIAL FORBS (Continued)								
Lupinus sericeus	-	-	-	X	0.5/4	-	-	-
Mertensia ciliata	-	-	-	-	-	-	1.8/25	0.9/12
Mimulus guttatus	-	-	-	-	-	-	X	X
Mitella pentandra	-	-	-	-	-	-	3.7/15	1.8/8
Osmorhiza chilensis	0.6/15	-	-	-	T/1	0.5/10	1.6/20	1.0/15
Pedicularis contorta	-	-	-	-	X	-	-	-
Penstemon procerus	0.4/10	-	-	-	0.1/2	X	-	X
Perideridia gairdneri	-	-	-	-	X	-	-	-
Phacelia hastata	-	-	-	-	T/T	-	-	-
Potentilla glandulosa	-	-	-	-	T/T	-	-	-
Potentilla gracilis	X	-	-	-	X	0.2/10	-	0.1/5
Prunella vulgaris	-	-	-	-	-	-	X	X
Pyrola chlorantha	-	-	0.2/10	-	T/1	0.1/5	T/5	T/5
Pyrola secunda	2.6/30	-	0.1/5	-	0.2/3	1.4/20	0.5/20	1.0/20
Ranunculus macounii	-	-	-	-	-	-	X	X
Ranunculus uncinatus	-	-	-	-	-	-	0.3/5	0.2/2
Saxifraga arguta	-	-	-	-	-	-	3.2/15	1.6/8
Sedum lanceolatum	-	X	-	-	T/T	-	-	-
Senecio serra	-	-	-	-	-	X	-	X
Senecio streptanthifolius	-	0.9/25	-	-	0.1/4	-	-	-
Senecio triangularis	-	-	-	-	-	-	1.3/15	0.6/8
Smilacina stellata	0.2/5	-	-	-	T/T	0.1/5	-	T/2
Solidago missouriensis	-	-	-	0.7/25	0.2/5	-	-	-
Streptopus amplexifolius	-	-	-	-	-	-	X	X
Thalictrum dasycarpum	-	-	-	-	-	0.2/10	0.7/5	0.4/8
Thalictrum occidentale	1.3/10	-	-	X	0.2/2	1.1/15	1.8/30	1.4/22
Urtica dioica	-	-	-	-	-	-	X	X
Valeriana dioica	0.1/5	0.6/15	-	-	T/2	-	-	-
TOTAL NPF	12.1/85	9.1/75	1.0/30	1.1/30	8.8/68	9.4/75	19.3/75	14.4/75

Table B3b. (Continued)

	TRANSECT NUMBER							
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS					PIC ENG/ SMI STE	PIC ENG/ GAL TRI	PIC ENG SERIES
	14	17	19	20	Mean n=13	21	23	Mean n=2
INTRODUCED PERENNIAL FORBS								
Taraxacum officinale	0.2/5	-	-	0.2/5	T/2	0.2/5	0.6/15	0.4/10
Trifolium repens	-	-	-	-	-	X	0.2/5	0.1/2
TOTAL IPF	0.2/5	-	-	0.2/5	T/2	0.2/5	0.8/15	0.5/10
FERNS AND ALLIES								
Equisetum arvense	-	-	-	-	-	-	T/5	T/2
Equisetum hyemale	-	-	-	-	-	X	-	X
TOTAL F&A	-	-	-	-	-	X	T/5	T/2
NATIVE ANNUAL/BIENNIAL FORBS								
Androsace occidentalis	-	-	-	-	T/T	-	-	-
Arabis divaricarpa	-	-	-	-	X	-	-	-
Arabis holboellii	-	-	-	-	X	-	-	-
Collinsia parviflora	-	0.3/5	-	-	0.1/2	-	-	-
Collomia linearis	-	-	-	-	T/2	-	-	-
Epilobium paniculatum	-	-	-	-	X	-	-	-
Linanthus septentrionalis	-	-	-	-	X	-	-	-
Polygonum douglasii	-	-	-	-	T/T	-	-	-
TOTAL NAF	-	0.3/5	-	-	0.1/3	-	-	-
INTRODUCED ANNUAL/BIENNIAL FORBS								
Chenopodium album	-	-	-	-	T/T	-	-	-
Draba nemorosa	-	-	-	-	X	-	-	-
Tragopogon dubius	-	-	-	-	T/T	-	-	-
Verbascum thapsus	-	-	-	X	X	-	-	-
TOTAL IAF	-	-	-	X	T/1	-	-	-

Transect 23 (Continued)

SPECIES	CANOPY COVERAGE PLOT NUMBERS (1-20) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
NATIVE PERENNIAL FORBS (Continued)																						
Geranium richardsonii	-	-	-	-	-	-	-	-	-	6	-	5	-	-	-	-	-	-	-	-	0.6	10
Geranium viscosissimum	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	0.2	5
Geum macrophyllum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Heracleum lanatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Mertensia ciliata	-	-	-	-	4	-	-	-	-	2	4	-	10	-	-	-	-	-	15	-	1.8	25
Mimulus guttatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Mitella pentandra	-	-	-	-	-	-	-	-	-	7	58	8	-	-	-	-	-	-	-	-	3.7	15
Osmorhiza chilensis	-	-	-	-	3	-	-	6	-	4	-	-	-	-	-	-	18	-	-	-	1.6	20
Prunella vulgaris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pyrola chlorantha	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Pyrola secunda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	1	2	-	0.5	20
Ranunculus macounii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Ranunculus uncinatus	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	0.3	5
Saxifraga arguta	-	-	-	-	-	-	-	-	38	22	4	-	-	-	-	-	-	-	-	-	3.2	15
Senecio triangularis	-	-	-	-	-	-	-	-	5	10	10	-	-	-	-	-	-	-	-	-	1.3	15
Streptopus amplexifolius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Thalictrum dasycarpum	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-	-	-	-	-	0.7	5
Thalictrum occidentale	-	4	-	-	5	-	-	-	-	-	-	15	8	-	2	-	-	2	-	-	1.8	30
Urtica dioica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPF	5	10	-	-	24	-	-	20	43	68	85	48	35	-	2	2	22	3	17	3	19.3	75
INTRODUCED PERENNIAL FORBS																						
Taraxacum officinale	-	-	-	-	-	-	-	-	-	-	6	3	3	-	-	-	-	-	-	-	0.6	15
Trifolium repens	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	0.2	5
TOTAL IPF	-	-	-	-	-	-	-	-	-	-	9	3	3	-	-	-	-	-	-	-	0.8	15
SUBSHRUBS																						
Berberis repens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
SHRUBS																						
Alnus incana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Clematis occidentalis	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	10
Juniperus communis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Ribes lacustre	-	1	-	-	-	-	-	24	-	-	-	28	-	17	-	-	-	-	8	-	3.9	25
Rubus idaeus	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	16	3	-	1.8	15
Spiraea betulifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL SHRUBS	-	4	-	1	-	-	-	24	-	-	-	28	16	17	-	-	-	16	11	-	5.9	40
TREES																						
Picea engelmannii	80	30	99	98	-	99	99	95	-	-	-	-	98	99	95	90	95	60	-	-	56.9	65
Pinus contorta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pseudotsuga menziesii	-	-	20	-	-	-	-	-	-	-	-	45	35	-	-	-	-	3	-	-	5.2	20
TOTAL TREES	80	30	119	98	-	99	99	95	-	-	-	45	133	99	95	90	95	63	-	-	62.0	70
TOTAL VEG. (stratified)	98	45	119	99	24	99	99	139	43	82	109	126	187	116	97	92	117	91	31	6	90.9	100

Table B3b. (Continued)

	TRANSECT NUMBER							
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS					PIC ENG/ SMI STE	PIC ENG/ GAL TRI	PIC ENG SERIES
	14	17	19	20	Mean n=13	21	23	Mean n=2
SUBSHRUBS								
Arctostaphylos uva-ursi	-	-	-	-	X	-	-	-
Berberis repens	0.1/5	0.2/15	-	1.7/25	1.2/21	X	X	X
Chimaphila umbellata	-	-	-	-	X	X	-	X
TOTAL SUBSHRUBS	0.1/5	0.2/15	-	1.7/25	1.2/21	X	X	X
SHRUBS								
Alnus incana	-	-	-	-	-	-	X	X
Amelanchier alnifolia	-	-	X	-	X	-	-	-
Artemisia tridentata	-	-	-	-	0.1/1	-	-	-
Clematis occidentalis	-	-	-	-	0.1/1	X	0.2/10	0.1/5
Juniperus communis	X	4.1/10	X	14.0/25	3.7/10	X	X	X
Lonicera utahensis	X	-	0.7/15	-	0.1/2	1.6/5	X	0.8/2
Ribes lacustre	-	-	-	-	-	X	3.9/25	2.0/12
Ribes setosum	X	-	-	X	T/T	-	-	-
Ribes viscosissimum	-	-	X	-	X	-	-	-
Rosa acicularis	-	-	T/5	-	0.4/6	X	-	X
Rubus idaeus	X	-	-	-	X	-	1.8/15	0.9/8
Salix scouleriana	-	-	-	-	X	-	-	-
Shepherdia canadensis	-	X	0.3/5	-	T/T	-	-	-
Spiraea betulifolia	-	2.6/55	1.3/35	-	1.1/22	0.9/15	X	0.4/8
Symphoricarpos albus	X	-	-	-	X	-	-	-
Vaccinium globulare	-	-	X	-	T/T	-	-	-
Vaccinium scoparium	2.2/5	-	0.9/20	-	2.4/8	2.8/30	-	1.4/15
TOTAL SHRUBS	2.2/5	6.7/55	3.2/65	14.0/25	8.1/42	5.3/45	5.9/40	5.6/42

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	8
TRANSECT:	23	ASPECT:	220
DATE:	08/17/89	ELEVATION:	6625
WORKER(S):	KS & ED	TOPOGRAPHY:	TOE SLOPE & BOTTOM
PHOTO:	37	CONFIGURATION:	UNDULATING

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	4	-	-	-	-	-	-	-	-	5	T	-	-	-	-	-	-	-	-	-	0.5	15
ROCK	2	-	-	-	-	-	-	-	-	20	-	3	4	3	-	-	5	4	-	10	2.6	40
LITTER	74	70	99	98	96	97	50	65	51	5	10	8	95	93	98	72	79	14	40	71	64.3	100
LICHENS	T	1	-	-	-	1	-	-	-	2	T	-	-	3	1	5	T	12	2	3	1.6	60
BRYOPHYTE	18	28	-	2	3	2	-	35	38	66	87	88	-	-	-	22	15	69	57	15	27.3	75
TOTAL VEG. (non-stratified)	84	34	99	98	24	99	99	95	40	72	95	88	99	99	95	90	95	70	29	6	75.5	100
TOTAL UNDERSTORY VEG.	18	13	-	1	24	-	-	40	40	72	95	70	42	17	2	2	22	26	29	6	26.0	85
NATIVE PERENNIAL GRAMINOIDS																						
Bromus anomalus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Calamagrostis rubescens	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	-	-	1.1	10
Carex disperma	-	-	-	-	-	-	-	-	-	9	12	2	-	-	-	-	-	-	-	-	1.2	15
Carex geyeri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	0.2	5
Carex microptera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Cinna latifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Elymus glaucus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Glyceria striata	-	-	-	-	-	-	-	-	-	5	3	-	-	-	-	-	-	-	-	-	0.4	10
Poa nervosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Trisetum spicatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPG	13	-	-	-	-	-	-	-	-	14	15	2	-	-	-	-	-	9	-	3	2.8	30
INTRODUCED PERENNIAL GRAMINOIDS																						
Agrostis stolonifera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	0.2	5
NATIVE PERENNIAL FORBS																						
Actaea rubra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Antennaria racemosa	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	10
Arnica cordifolia	1	-	-	-	12	-	-	9	-	7	3	8	-	-	-	-	-	-	-	-	2.0	30
Aster foliaceus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Campanula rotundifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Cirsium scariosum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Disporum trachycarpum	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	0.2	5
Epilobium angustifolium	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	-	-	-	T	5
Epilobium ciliatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Equisetum arvense	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	T	5
Fragaria vesca	-	3	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	3	0.5	15
Fragaria virginiana	-	-	-	-	-	-	-	2	-	3	-	3	-	-	-	-	-	-	-	-	0.4	15
Galium triflorum	-	-	-	-	-	-	-	-	-	-	-	9	3	-	-	-	-	-	-	-	0.6	10

Table B3b. (Continued)

	TRANSECT NUMBER							
	PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS					PIC ENG/ SMI STE	PIC ENG/ GAL TRI	PIC ENG SERIES
	14	17	19	20	Mean n=13	21	23	Mean n=2
TREES								
Juniperus scopulorum	-	-	-	X	0.2/T	-	-	-
Picea engelmannii	X	-	-	-	X	41.2/60	56.9/65	49.0/62
Pinus contorta	54.5/65	18.0/35	60.3/90	-	32.1/47	26.4/40	X	13.2/20
Pinus flexilis	1.4/5	-	-	-	0.1/1	X	-	X
Pseudotsuga menziesii	22.6/40	56.5/80	3.5/5	75.7/85	29.1/42	4.1/10	5.2/20	4.6/15
TOTAL TREES	78.4/85	74.5/100	63.8/90	75.7/85	61.5/81	71.7/85	62.0/70	66.8/78
TOTAL VEGETATION (Stratified)	124.3/100	102.2/100	72.9/100	113.3/100	103.3/100	105.1/100	90.9/100	98.0/100

Nomenclature follows USDA Forest Service (1987)

Footnotes are presented on cover page B-1.

Transect 21 (Continued)

SPECIES	CANOPY COVERAGE PLOT NUMBERS (1-20) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
NATIVE PERENNIAL FORBS (Continued)																						
Penstemon procerus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Potentilla gracilis	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.2	10
Pyrola chlorantha	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	0.1	5
Pyrola secunda	-	-	-	2	8	-	-	-	-	1	-	16	-	-	-	-	-	-	-	-	1.4	20
Senecio serra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Smilacina stellata	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
Thalictrum dasycarpum	-	-	-	-	-	-	1	-	-	-	3	-	-	-	-	-	-	-	-	-	0.2	10
Thalictrum occidentale	-	-	8	8	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	15
TOTAL NPF	10	-	15	18	19	9	41	2	-	1	5	20	T	-	-	3	-	4	7	34	9.4	75
INTRODUCED PERENNIAL FORBS																						
Taraxacum officinale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	0.2	5
Trifolium repens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL IPF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	0.2	5
FERNS AND ALLIES																						
Equisetum hyemale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
SUBSHRUBS																						
Berberis repens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Chimaphila umbellata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL SUBSHRUBS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
SHRUBS																						
Clematis occidentalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Juniperus communis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lonicera utahensis	-	-	-	-	-	-	-	-	-	-	-	-	-	32	-	-	-	-	-	-	1.6	5
Ribes lacustre	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Rosa acicularis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Spiraea betulifolia	-	-	-	-	-	2	-	-	-	-	10	6	-	-	-	-	-	-	-	-	0.9	15
Vaccinium scoparium	-	-	-	3	-	1	-	-	-	-	-	-	-	-	4	-	-	9	5	34	2.8	30
TOTAL SHRUBS	-	-	-	3	-	3	-	-	-	-	10	6	-	32	4	-	-	9	5	34	5.3	45
TREES																						
Picea engelmannii	-	20	95	80	-	98	99	98	95	90	-	-	-	60	65	20	-	-	-	4	41.2	60
Pinus contorta	95	35	-	-	-	-	-	-	-	-	-	40	65	98	25	-	-	90	80	-	26.4	40
Pinus flexilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pseudotsuga menziesii	-	-	-	-	-	-	-	-	-	80	-	-	-	-	-	-	-	-	-	1	4.1	10
TOTAL TREES	95	55	95	80	-	98	99	98	95	170	-	40	65	158	90	20	-	90	80	5	71.7	85
TOTAL VEG. (stratified)	146	55	110	102	55	127	218	115	95	171	18	78	66	190	103	51	3	153	167	79	105.1	100

APPENDIX C

Field Form Printouts, 27 Transects, 1989.

Vegetation Types	1989 Transects	Page
GRASSLAND *Festuca scabrella/Festuca idahoensis*	16,26	C-2
SHRUB/GRASSLAND *Artemisia tridentata/Festuca idahoensis*	2,11	C-7
FOREST/SAVANNAH *Pseudotsuga menziesii/Festuca idahoensis*	18	C-11
Pseudotsuga menziesii/Festuca scabrella	8	C-13
Pseudotsuga menziesii/Juniperus communis	15,22,24,25,27	C-15
Pseudotsuga menziesii/Carex geyeri	13	C-25
Pseudotsuga menziesii/Calamagrostis rubescens	1,3,4,5,6,7,9,10,12, 14,17,19,20	C-27
Picea engelmannii/Smilacina stellata	21	C-53
Picea engelmannii/Galium triflorum	23	C-55

Footnotes for the printouts in Appendix C:

T (Trace) is a cover value less than 1 percent in a quadrat or less than 0.1 percent mean cover for a transect

X = Incidental species recorded on a transect site, but not within the 0.2 x 0.5m cover quadrats

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	6
TRANSECT:	21	ASPECT:	188
DATE:	08/17/89	ELEVATION:	6665
WORKER(S):	KS & ED	TOPOGRAPHY:	BENCH
PHOTO:	36	CONFIGURATION:	STRAIGHT

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	
ROCK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	
LITTER	98	99	96	99	97	99	96	98	99	99	98	98	98	80	97	92	96	98	95	89	96.1	100
LICHENS	-	-	-	-	-	-	-	1	-	-	1	1	1	-	T	1	-	-	-	1	0.3	35
BRYOPHYTE	-	-	3	-	T	-	-	-	-	T	-	-	-	-	1	6	3	-	-	7	1.1	35
TOTAL VEG. (non-stratified)	96	55	95	84	52	98	99	98	95	98	16	55	65	99	80	45	3	95	94	67	74.5	100
TOTAL UNDERSTORY VEG.	48	-	15	20	52	27	86	16	-	1	16	35	1	32	12	30	3	56	78	67	29.8	90
NATIVE PERENNIAL GRAMINOIDS																						
Agropyron caninum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Calamagrostis rubescens	38	-	-	1	36	17	78	15	-	-	3	8	-	-	9	28	-	50	75	-	17.9	60
Carex concinnoides	-	-	-	-	-	-	-	-	-	-	-	4	T	-	-	-	-	-	-	-	0.2	10
Elymus glaucus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Poa nervosa	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	1	0.4	15
Stipa occidentalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Trisetum spicatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	T	5
TOTAL NPG	41	-	-	1	36	17	78	15	-	-	3	12	T	-	9	28	3	50	75	2	18.6	75
NATIVE PERENNIAL FORBS																						
Achillea millefolium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Actaea rubra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Agoseris glauca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Allium cernuum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Anemone multifida	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Angelica arguta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Antennaria microphylla	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	0.2	5
Antennaria racemosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24	1.2	5
Arnica cordifolia	-	-	-	6	-	3	14	-	-	-	-	-	T	-	-	3	-	4	7	-	1.9	35
Aster conspicuus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Aster foliaceus	8	-	7	-	6	2	18	1	-	-	-	-	-	-	-	-	-	-	-	-	2.1	30
Campanula rotundifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Cirsium scariosum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Epilobium angustifolium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Fragaria virginiana	-	-	-	-	-	-	2	1	-	-	-	4	-	-	-	-	-	-	-	5	0.6	20
Geranium richardsonii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Osmorhiza chilensis	-	-	-	-	-	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	10

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	36
TRANSECT:	16	ASPECT:	289
DATE:	08/16/89	ELEVATION:	6955
WORKER(S):	DC & LL	TOPOGRAPHY:	UPPER SLOPE/RIDGE
PHOTO:	23	CONFIGURATION:	CONVEX

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-	T	T	10
ROCK	3	8	-	-	T	3	12	16	10	3	1	10	-	2	1	3	T	10	-	-	4.2	75
LITTER	87	82	79	93	89	87	67	61	69	90	86	41	77	83	82	72	81	67	67	88	77.4	100
LICHENS	4	5	15	3	2	T	15	18	15	-	6	45	14	5	8	14	6	12	20	2	10.5	95
BRYOPHYTE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	
TOTAL VEG. (non-stratified)	58	40	60	48	85	87	68	55	57	75	65	44	84	80	71	75	80	65	77	62	66.8	100
NATIVE PERENNIAL GRAMINOIDS																						
Agropyron spicatum	-	T	-	12	12	30	4	-	-	-	2	-	-	12	-	-	-	-	-	-	3.6	35
Festuca idahoensis	12	4	15	7	10	11	10	5	3	18	6	T	-	12	15	6	15	6	8	8	8.6	95
Festuca scabrella	11	17	16	10	35	18	25	35	40	45	28	12	40	25	30	55	17	39	40	40	28.9	100
Koeleria cristata	2	-	9	8	5	12	3	4	2	-	-	1	3	5	-	4	9	3	4	-	3.7	75
Poa scabrella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	T	0.2	10
TOTAL NPG	25	22	40	37	62	71	42	44	45	63	36	14	43	54	45	65	44	48	52	49	45.0	100
NATIVE PERENNIAL FORBS																						
Achillea millefolium	-	-	5	-	3	3	-	2	3	-	T	-	-	-	-	-	-	-	-	-	0.8	30
Agoseris glauca	-	-	-	-	-	-	-	-	T	-	-	-	2	-	-	-	-	-	-	-	0.1	10
Allium cernuum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	1	-	-	0.2	15
Antennaria microphylla	-	-	-	-	-	1	-	-	-	-	T	1	-	-	-	7	-	-	-	-	0.5	20
Arenaria congesta	18	6	9	11	15	-	5	7	5	10	13	3	7	10	4	2	3	-	5	2	6.8	90
Astragalus adsurgens	6	-	-	-	-	-	1	9	T	-	-	-	-	-	-	-	-	-	-	-	0.8	20
Astragalus miser	4	-	-	-	-	6	-	-	-	2	-	-	-	-	-	-	-	-	-	-	0.6	15
Besseya wyomingensis	1	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	-	-	-	0.2	15
Campanula rotundifolia	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Cerastium arvense	-	-	-	-	6	2	2	-	-	-	-	-	2	-	-	-	-	-	2	-	0.7	25
Comandra umbellata	1	-	1	-	-	-	-	-	-	-	2	-	-	1	-	-	-	-	-	-	0.3	20
Delphinium bicolor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	0.1	5
Pseudotsuga menziesii	-	5	-	-	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-	-	0.5	15
Erigeron caespitosus	-	2	-	3	2	10	11	-	2	7	8	4	6	-	7	1	-	1	-	3	3.4	70
Erigeron compositus	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	2	-	-	0.8	15
Eriogonum umbellatum	-	-	-	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Geum triflorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Linum lewisii	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	0.1	5
Lupinus sericeus	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
Phlox alyssifolia	2	2	-	-	7	1	T	-	-	-	T	-	-	-	-	T	-	3	3	-	1.0	45

Transect 20 (Continued)

SPECIES	CANOPY COVERAGE PLOT NUMBERS (1-20) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
SUBSHRUBS																						
Berberis repens	-	-	-	-	19	-	-	-	9	-	-	1	-	-	1	-	-	4	-	-	1.7	25
SHRUBS																						
Juniperus communis	22	-	-	-	-	-	-	-	-	-	-	60	85	25	88	-	-	-	-	-	14.0	25
Ribes setosum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL SHRUBS	22	-	-	-	-	-	-	-	-	-	-	60	85	25	88	-	-	-	-	-	14.0	25
TREES																						
Juniperus scopulorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pseudotsuga menziesii	-	99	99	90	99	99	70	99	90	-	-	40	35	99	99	99	99	99	99	99	75.7	85
TOTAL TREES	-	99	99	90	99	99	70	99	90	-	-	40	35	99	99	99	99	99	99	99	75.7	85
TOTAL VEG. (stratified)	24	163	165	153	177	135	70	99	138	51	28	123	125	127	188	99	99	105	99	99	113.3	100

Transect 16 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
NATIVE PERENNIAL FORBS (Continued)																						
Sedum lanceolatum	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.1	10
Zigadenus venenosus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPF	35	15	15	15	33	25	24	19	9	21	27	10	17	11	12	15	15	7	10	6	17.0	100
INTRODUCED PERENNIAL FORBS																						
Linaria dalmatica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
FERNS AND ALLIES																						
Selaginella densa	10	11	10	T	-	4	10	1	6	12	8	27	28	15	20	3	30	22	30	15	13.1	95
NATIVE ANNUAL/BIENNIAL FORBS																						
Collomia linearis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
SHRUBS																						
Artemisia tridentata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TREES																						
Pinus ponderosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pseudotsuga menziesii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL TREES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL VEG. (stratified)	70	48	65	52	95	100	76	64	62	96	71	51	88	80	77	83	89	77	92	70	75.1	100

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	13
TRANSECT:	20	ASPECT:	134
DATE:	08/17/89	ELEVATION:	6685
WORKER(S):	LL & DC	TOPOGRAPHY:	UPPER SLOPE/RIDGE
PHOTO:	31	CONFIGURATION:	CONVEX

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
ROCK	T	-	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	T	10
LITTER	99	91	95	63	93	97	99	99	97	82	43	66	99	97	94	99	99	99	99	99	90.5	100
LICHENS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	
BRYOPHYTE	-	3	-	30	T	-	-	-	-	13	55	32	-	3	-	-	-	-	-	-	6.8	35
TOTAL VEG. (non-stratified)	24	99	99	95	99	99	70	99	95	47	25	87	99	99	99	99	99	99	99	99	86.5	100
TOTAL UNDERSTORY VEG.	24	61	64	60	74	36	-	-	44	47	25	75	88	25	88	-	-	6	-	-	35.8	70
NATIVE PERENNIAL GRAMINOIDS																						
Calamagrostis rubescens	-	24	21	36	55	-	-	-	1	11	19	17	5	3	-	-	-	2	-	-	9.7	55
Carex geyeri	2	38	45	15	-	36	-	-	13	26	3	-	-	-	-	-	-	-	-	-	8.9	40
Festuca scabrella	-	-	-	-	-	-	-	-	8	6	-	-	-	-	-	-	-	-	-	-	0.7	10
Poa nervosa	-	-	-	8	3	-	-	-	7	3	6	-	-	-	-	-	-	-	-	-	1.4	25
Trisetum spicatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPG	2	62	66	59	58	36	-	-	29	46	28	17	5	3	-	-	-	2	-	-	20.7	65
NATIVE PERENNIAL FORBS																						
Achillea millefolium	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	0.1	5
Allium cernuum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Antennaria microphylla	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	T	5
Arnica cordifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Aster conspicuus	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	0.2	5
Astragalus miser	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Fragaria virginiana	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	0.1	5
Geranium viscosissimum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lupinus sericeus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Solidago missouriensis	-	2	-	4	1	-	-	-	7	T	-	-	-	-	-	-	-	-	-	-	0.7	25
Thalictrum occidentale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPF	-	2	-	4	1	-	-	-	10	T	-	5	-	-	-	-	-	-	-	-	1.1	30
INTRODUCED PERENNIAL FORBS																						
Taraxacum officinale	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	0.2	5
INTRODUCED ANNUAL/BIENNIAL FORBS																						
Verbascum thapsus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	14
TRANSECT:	26	ASPECT:	240
DATE:	08/18/89	ELEVATION:	6915
WORKER(S):	DC & LL	TOPOGRAPHY:	RIDGE/UPPER SLOPE
PHOTO:	7 & 8	CONFIGURATION:	CONVEX

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	1	-	8	7	3	-	4	17	15	T	5	3	29	47	30	34	22	54	5	5	14.5	90
ROCK	12	T	2	-	14	5	15	6	4	1	3	3	2	1	2	3	5	5	T	15	5.0	95
LITTER	67	88	64	84	60	86	67	60	62	72	80	84	63	45	59	57	66	35	47	67	65.7	100
LICHENS	15	5	20	2	15	T	8	10	12	15	2	2	T	T	2	1	1	2	T	3	5.9	100
BRYOPHYTE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	40	2	2.2	15
TOTAL VEG. (non-stratified)	57	65	63	80	75	78	65	60	65	83	82	61	46	58	85	63	78	38	75	88	68.3	100
NATIVE PERENNIAL GRAMINOIDS																						
Agropyron caninum	-	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Agropyron spicatum	-	-	-	-	-	-	-	-	-	5	5	-	-	-	-	-	-	-	-	-	0.5	10
Calamagrostis rubescens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	0.2	5
Carex petasata	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	19	2	9	19	-	2.8	25
Carex rossii	-	8	1	-	7	8	-	9	-	-	-	-	-	-	-	-	-	-	-	-	1.7	25
Danthonia intermedia	-	-	-	-	-	5	-	4	6	14	5	3	4	7	8	2	8	2	2	3	3.7	70
Festuca idahoensis	-	-	5	8	10	35	12	5	12	12	9	10	8	3	6	2	-	-	-	-	6.9	70
Festuca scabrella	12	20	25	27	1	10	-	-	-	-	-	4	8	3	5	3	1	-	16	-	6.8	65
Koeleria cristata	5	1	7	10	10	-	4	8	12	4	24	14	T	2	3	1	-	-	-	-	5.3	75
Poa juncifolia	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	5
Poa scabrella	7	-	1	3	-	4	-	3	4	-	T	9	7	15	-	-	7	3	10	12	4.3	70
Stipa occidentalis	-	-	3	7	-	-	1	-	5	4	-	-	-	-	-	-	-	2	-	-	1.1	30
Stipa richardsonii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPG	29	29	42	55	28	63	17	29	39	39	44	47	28	30	22	27	18	16	50	15	33.3	100
INTRODUCED PERENNIAL GRAMINOIDS																						
Phleum pratense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	0.4	5
Poa pratensis	-	-	2	-	25	-	15	10	-	8	-	-	-	-	-	-	15	7	-	16	4.9	40
TOTAL IPG	-	-	2	-	25	-	15	10	-	8	-	-	-	-	-	-	15	7	-	24	5.3	40
NATIVE PERENNIAL FORBS																						
Achillea millefolium	-	-	-	T	4	-	-	-	-	1	2	1	-	-	-	-	-	-	-	-	0.4	25
Agoseris glauca	5	2	-	-	4	-	5	4	2	3	7	4	3	6	18	9	4	3	4	2	4.3	85
Allium cernuum	-	-	-	-	-	-	T	-	-	T	-	-	-	-	-	-	-	-	-	-	T	10
Anemone multifida	-	-	3	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	10
Antennaria microphylla	5	20	14	20	17	11	7	12	5	12	21	5	5	18	24	5	2	5	14	14	11.8	100
Arabis nuttallii	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Arenaria congesta	10	15	6	3	3	5	11	12	15	12	8	7	5	9	16	16	17	3	7	4	9.2	100
Aster campestris	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	3	-	-	-	0.2	10
Astragalus agrestis	-	-	-	2	1	1	2	-	-	-	4	-	-	-	2	-	-	-	-	-	0.6	30

Transect 19 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
TREES																						
Pinus contorta	75	80	85	90	65	85	50	40	-	85	80	70	35	20	80	80	35	-	60	90	60.3	90
Pseudotsuga menziesii	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	-	3.5	5
TOTAL TREES	75	80	85	90	65	85	50	40	-	155	80	70	35	20	80	80	35	-	60	90	63.8	90
TOTAL VEG. (stratified)	78	86	89	91	104	98	58	52	18	157	89	83	35	41	80	80	41	4	68	108	72.9	100

Transect 26 (Continued)

SPECIES	CANOPY COVERAGE PLOT NUMBERS (1-20) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
NATIVE PERENNIAL FORBS (Continued)																						
Astragalus miser	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30	1.5	5
Besseya wyomingensis	-	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Campanula rotundifolia	2	1	-	-	-	-	-	-	-	-	-	-	4	-	7	1	-	-	-	-	0.8	25
Cerastium arvense	-	T	3	5	1	1	-	-	1	5	2	-	1	2	-	-	-	-	-	-	1.1	50
Chrysopsis villosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Comandra umbellata	1	-	-	-	-	-	-	1	2	-	-	-	T	-	-	-	-	-	-	-	0.2	20
Erigeron caespitosus	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Eriogonum umbellatum	3	-	-	-	4	-	-	1	T	-	-	-	-	-	-	-	-	-	-	-	0.4	20
Fragaria virginiana	-	-	1	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	10
Gaillardia aristata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	0.2	5
Geranium viscosissimum	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	2	0.3	10
Geum triflorum	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Helianthella uniflora	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	3	3	-	-	0.6	15
Heuchera parvifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Hieracium cynoglossoides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	1	-	0.3	10
Iris missouriensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lithospermum ruderale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lupinus sericeus	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	5
Penstemon procerus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	T	5
Potentilla glandulosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Potentilla gracilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	2	-	-	-	0.3	10
Sedum lanceolatum	2	-	1	T	T	-	1	2	2	-	-	-	T	-	-	-	-	-	-	-	0.5	40
Solidago missouriensis	-	-	-	-	-	2	8	-	-	2	-	-	-	-	-	-	-	-	-	3	0.8	20
Zigadenus venenosus	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
TOTAL NPF	36	43	29	31	40	27	39	32	28	36	44	17	20	39	70	36	36	14	27	59	35.0	100
INTRODUCED PERENNIAL FORBS																						
Taraxacum officinale	-	1	-	6	T	1	3	1	11	10	2	2	2	-	2	-	-	1	-	6	2.4	70
NATIVE ANNUAL/BIENNIAL FORBS																						
Arabis divaricarpa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Collomia linearis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	4	2	2	0.7	25
Collinsia parviflora	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	T	T	0.2	20
Polygonum douglasii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NAF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5	4	2	2	0.9	45
INTRODUCED ANNUAL/BIENNIAL FORBS																						
Filago arvensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Tragopogon dubius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL IAF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
SUBSHRUBS																						
Berberis repens	1	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	9	-	-	-	0.6	15

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	55
TRANSECT:	19	ASPECT:	304
DATE:	08/17/89	ELEVATION:	6750
WORKER(S):	KS & ED	TOPOGRAPHY:	MID SLOPE/ROCK CHUTE
PHOTO:	35	CONFIGURATION:	UNDULATING

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	
ROCK	2	18	5	-	3	8	35	4	10	5	7	25	65	35	79	40	25	20	50	35	23.6	95
LITTER	95	79	93	99	94	85	54	94	80	91	91	71	30	60	10	49	71	61	35	51	69.7	100
LICHENS	2	2	1	1	T	2	10	1	3	T	1	2	5	5	10	10	3	15	10	5	4.5	100
BRYOPHYTE	-	-	-	-	-	4	-	-	6	3	-	T	-	-	1	1	-	4	4	8	1.6	45
TOTAL VEG. (non-stratified)	75	80	85	90	80	85	50	44	17	95	80	72	35	28	80	80	37	3	62	92	63.5	100
TOTAL UNDERSTORY VEG.	3	5	4	T	38	12	8	12	17	2	8	12	-	18	-	-	5	3	8	17	8.6	85
NATIVE PERENNIAL GRAMINOIDS																						
Calamagrostis rubescens	-	2	-	T	32	T	8	12	8	2	-	4	-	12	-	-	T	-	5	14	5.0	65
Carex concinnoides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Trisetum spicatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPG	-	2	-	T	32	T	8	12	8	2	-	4	-	12	-	-	T	-	5	14	5.0	65
NATIVE PERENNIAL FORBS																						
Antennaria racemosa	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	0.3	5
Arnica cordifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.1	5
Aster conspicuus	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	0.3	10
Fragaria virginiana	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	T	5
Pyrola chlorantha	-	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	0.2	10
Pyrola secunda	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	0.1	5
TOTAL NPF	-	-	2	-	3	-	-	-	8	-	-	-	-	2	-	-	-	3	-	2	1.0	30
SHRUBS																						
Amelanchier alnifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Juniperus communis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lonicera utahensis	-	-	-	-	-	-	-	-	-	-	-	2	-	7	-	-	5	-	-	-	0.7	15
Ribes viscosissimum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Rosa acicularis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	T	5
Shepherdia canadensis	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	0.3	5
Spiraea betulifolia	3	-	-	-	4	12	-	-	2	-	-	-	-	-	-	-	-	T	3	2	1.3	35
Vaccinium globulare	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Vaccinium scoparium	-	4	2	-	-	-	-	-	-	-	4	7	-	-	-	-	-	-	-	-	0.9	20
TOTAL SHRUBS	3	4	2	-	4	12	-	-	2	-	9	9	-	7	-	-	5	1	3	2	3.2	65

Transect 26 (Continued)

SPECIES	CANOPY COVERAGE PLOT NUMBERS (1-20) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
SHRUBS																						
Artemisia tridentata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Chrysothamnus nauseosus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Juniperus communis	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
Shepherdia canadensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Spiraea betulifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	5	-	0.4	10
TOTAL SHRUBS	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	2	5	-	0.5	15
TREES																						
Juniperus scopulorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pinus contorta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pinus flexilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pinus ponderosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pseudotsuga menziesii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL TREES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL VEG. (stratified)	66	73	73	92	94	90	76	72	78	93	90	66	50	71	94	67	83	44	85	107	78.0	100

Transect 17 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
SHRUBS																						
Juniperus communis	6	-	-	-	-	-	-	75	-	-	-	-	-	-	-	-	-	-	-	-	4.1	10
Shepherdia canadensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Spiraea betulifolia	3	9	5	4	15	3	-	2	3	-	-	-	-	-	-	-	-	1	6	1	2.6	55
TOTAL SHRUBS	9	9	5	4	15	3	-	77	3	-	-	-	-	-	-	-	-	1	6	1	6.7	55
TREES																						
Pinus contorta	30	-	-	-	25	75	-	-	-	35	-	-	-	80	-	-	-	-	75	40	18.0	35
Pseudotsuga menziesii	-	75	50	65	80	-	15	90	90	85	90	75	90	-	90	40	60	80	55	-	56.5	80
TOTAL TREES	30	75	50	65	105	75	15	90	90	120	90	75	90	80	90	40	60	80	130	40	74.5	100
TOTAL VEG. (stratified)	106	84	71	79	121	83	46	167	122	124	107	91	104	102	108	66	88	143	163	71	102.2	100

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	29
TRANSECT:	2	ASPECT:	140
DATE:	08/15/89	ELEVATION:	7150
WORKER(S):	LL & DC	TOPOGRAPHY:	UPPER SLOPE
PHOTO:	23-	CONFIGURATION:	CONVEX

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	3	-	-	-	10	40	-	-	2	2	20	10	6	-	5	2	T	T	5.0	60
ROCK	-	-	-	-	-	-	1	45	-	-	-	1	2	1	T	-	1	-	-	-	2.5	35
LITTER	91	90	90	88	94	91	82	10	88	85	93	83	73	79	86	93	88	92	92	91	83.9	100
LICHENS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	
BRYOPHYTE	-	-	-	-	-	-	4	2	-	-	2	2	T	-	2	-	-	-	-	-	0.6	30
TOTAL VEG. (non-stratified)	70	95	85	97	65	85	65	33	70	80	60	90	60	92	55	75	65	70	95	85	74.5	100
NATIVE PERENNIAL GRAMINOIDS																						
Agropyron caninum	-	-	4	4	-	-	-	-	-	-	-	-	-	-	-	-	3	-	25	3	1.9	25
Agropyron spicatum	-	-	-	-	-	4	-	-	3	20	10	-	9	50	5	-	12	-	-	-	5.6	40
Bromus carinatus	-	3	-	-	-	4	-	1	-	1	-	-	-	-	-	-	-	-	-	-	0.4	20
Calamagrostis rubescens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Carex hoodii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Carex petasata	-	-	18	-	11	-	-	-	8	-	-	-	-	-	-	-	15	-	-	-	2.6	20
Carex rossii	-	-	-	-	-	-	4	3	-	4	5	7	-	-	12	8	-	5	-	-	2.4	40
Danthonia intermedia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Festuca idahoensis	-	-	-	-	4	4	10	10	18	12	30	17	9	-	-	12	-	3	-	18	7.3	60
Koeleria cristata	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
Melica spectabilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Poa juncifolia	3	-	-	3	5	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	0.7	20
Poa scabrella	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	5
Sitanion hystrix	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Stipa occidentalis	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	12	-	-	-	-	0.7	15
Trisetum spicatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPG	5	3	22	7	20	12	22	15	29	37	46	24	18	50	17	32	30	12	25	21	22.4	100
INTRODUCED PERENNIAL GRAMINOIDS																						
Poa pratensis	35	40	50	15	35	37	20	1	-	-	-	-	20	10	15	20	30	45	10	40	21.1	80
NATIVE PERENNIAL FORBS																						
Achillea millefolium	4	3	-	3	-	-	1	-	2	2	-	2	-	-	-	-	-	-	-	-	0.8	35
Allium cernuum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Antennaria microphylla	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Arabis drummondii	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	0.1	10
Arabis nuttallii	-	-	-	-	-	-	T	1	-	1	-	-	-	-	-	-	-	-	-	-	0.1	15
Aster integrifolius	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	5
Astragalus miser	10	-	-	-	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6	10

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	38
TRANSECT:	17	ASPECT:	030
DATE:	08/16/89	ELEVATION:	6880
WORKER(S):	KS & ED	TOPOGRAPHY:	UPPER MID SLOPE
PHOTO:	34	CONFIGURATION:	CONVEX

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	
ROCK	-	-	-	2	6	-	4	-	-	-	-	-	1	-	-	-	-	-	-	-	0.7	20
LITTER	94	96	96	47	67	65	75	80	71	75	97	98	81	20	89	53	22	91	86	87	74.5	100
LICHENS	T	3	1	20	24	2	3	8	2	10	-	T	2	-	2	10	6	1	T	4	5.0	90
BRYOPHYTE	2	-	2	30	2	32	18	6	25	15	2	-	15	79	8	35	71	5	10	7	18.2	90
TOTAL VEG. (non-stratified)	85	77	60	68	85	75	40	95	92	90	90	75	90	85	92	48	68	90	92	60	77.9	100
TOTAL UNDERSTORY VEG.	70	9	18	13	16	8	28	76	28	4	15	14	14	20	17	24	27	58	29	30	25.9	100
NATIVE PERENNIAL GRAMINOIDS																						
Calamagrostis rubescens	52	-	16	-	1	5	-	-	24	-	T	-	-	-	2	6	-	54	16	18	9.7	55
Carex concinnoides	-	-	-	1	-	-	-	-	4	-	-	12	4	3	-	-	-	-	-	-	1.2	25
Carex geyeri	2	-	-	-	-	-	7	-	-	-	3	-	-	-	-	-	-	-	-	-	0.6	15
Poa nervosa	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Trisetum spicatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPG	55	-	16	1	1	5	7	-	28	-	4	12	4	3	2	6	-	54	16	18	11.6	80
NATIVE PERENNIAL FORBS																						
Antennaria racemosa	10	-	-	8	-	-	14	-	T	3	5	1	5	18	5	16	22	8	8	12	6.8	75
Arnica cordifolia	2	-	-	1	-	-	-	-	-	-	1	1	-	-	-	-	4	-	-	-	0.5	25
Epilobium angustifolium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Fragaria vesca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	0.2	5
Goodyera oblongifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Hieracium albiflorum	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Sedum lanceolatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Senecio streptanthifolius	-	-	-	-	-	-	-	-	-	-	7	2	5	T	-	-	-	-	3	-	0.9	25
Valeriana dioica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	3	2	-	-	-	0.6	15
TOTAL NPF	12	-	-	9	-	-	17	-	T	3	13	4	10	19	16	19	28	8	11	12	9.1	75
NATIVE ANNUAL/BIENNIAL FORBS																						
Collinsia parviflora	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	5
SUBSHRUBS																						
Berberis repens	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	1	-	-	-	-	0.2	15

Transect 2 (Continued)

SPECIES	CANOPY COVERAGE PLOT NUMBERS (1-20) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
NATIVE PERENNIAL FORBS (Continued)																						
Campanula rotundifolia	7	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	T	4	-	T	0.7	25
Cerastium arvense	4	5	14	-	5	10	3	3	15	4	10	2	3	-	14	30	4	7	-	12	7.2	85
Comandra umbellata	-	-	-	-	13	-	-	-	-	-	-	-	4	-	-	-	-	-	-	3	1.0	15
Dodecatheon conjugens	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	T	5
Eriogonum umbellatum	8	-	-	22	20	9	-	6	5	7	2	12	-	-	-	-	-	-	-	-	4.5	45
Fragaria virginiana	-	-	-	-	-	6	1	-	-	-	-	5	-	-	-	-	-	-	5	-	0.8	20
Gaillardia aristata	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
Geranium viscosissimum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Geum triflorum	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	T	5
Hackelia micrantha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Helianthella uniflora	5	-	-	30	-	-	2	-	10	13	7	4	15	15	20	7	9	7	10	25	8.9	75
Hieracium cynoglossoides	-	1	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	0.3	10
Lithospermum ruderale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	0.2	5
Lomatium triternatum	-	-	-	-	-	-	3	-	-	-	-	-	-	4	-	-	-	-	-	-	0.3	10
Lupinus sericeus	12	4	21	-	4	70	14	6	4	15	-	35	6	25	-	-	20	15	30	30	15.5	80
Penstemon procerus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Perideridia gairdneri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	0.2	5
Potentilla glandulosa	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Potentilla gracilis	-	2	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	3	1.0	15
Zigadenus venenosus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPF	50	25	37	55	67	95	25	17	52	42	26	61	28	44	34	42	34	33	49	74	44.4	100
INTRODUCED PERENNIAL FORBS																						
Taraxacum officinale	3	2	11	-	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	1.0	25
NATIVE ANNUAL/BIENNIAL FORBS																						
Androsace occidentalis	T	-	-	-	-	-	2	-	-	1	-	-	T	-	-	-	-	-	-	-	0.2	20
Collomia linearis	-	-	-	1	2	3	-	2	-	3	2	1	3	2	2	-	6	3	-	-	1.5	60
Collinsia parviflora	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Polygonum douglasii	-	-	-	-	-	-	T	-	-	1	-	-	1	-	-	-	-	-	-	-	0.1	15
TOTAL NAF	T	-	-	1	2	3	2	2	-	5	2	1	4	2	2	-	6	3	-	-	1.8	70
INTRODUCED ANNUAL/BIENNIAL FORBS																						
Tragopogon dubius	2	-	-	-	-	-	4	-	-	-	-	-	2	-	-	-	-	-	-	-	0.4	15
SHRUBS																						
Amelanchier alnifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Artemisia tridentata	10	75	-	75	5	-	30	-	60	50	-	70	-	30	-	T	-	-	65	-	23.5	55
Juniperus communis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL SHRUBS	10	75	-	75	5	-	30	-	60	50	-	70	-	30	-	T	-	-	65	-	23.5	55
TREES																						
Pseudotsuga menziesii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL VEG. (stratified)	106	158	120	155	133	153	104	42	156	140	84	158	79	140	72	95	112	99	149	138	119.5	100

Transect 14 (Continued)

SPECIES	CANOPY COVERAGE PLOT NUMBERS (1-20) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
INTRODUCED PERENNIAL FORBS																						
Taraxacum officinale	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
SUBSHRUB																						
Berberis repens	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
SHRUBS																						
Juniperus communis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lonicera utahensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Ribes setosum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Rubus idaeus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Symphoricarpos albus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Vaccinium scoparium	-	-	-	-	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	5
TOTAL SHRUBS	-	-	-	-	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	5
TREES																						
Picea engelmannii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pinus contorta	-	75	99	40	-	-	80	30	-	-	95	99	90	-	99	99	90	99	95	-	54.5	65
Pinus flexilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27	-	-	-	-	-	1.4	5
Pseudotsuga menziesii	-	15	-	40	99	75	-	40	99	65	-	-	-	-	-	-	18	-	-	-	22.6	40
TOTAL TREES	-	90	99	80	99	75	80	70	99	65	95	99	90	-	126	99	108	99	95	-	78.4	85
TOTAL VEG. (stratified)	56	136	119	117	166	121	145	116	172	92	123	137	125	55	167	129	124	134	162	90	124.3	100

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	17
TRANSECT:	11	ASPECT:	112
DATE:	08/16/89	ELEVATION:	6735
WORKER(S):	KS & ED	TOPOGRAPHY:	UPPER MID SLOPE
PHOTO:	31	CONFIGURATION:	CONCAVE

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	T	-	-	-	4	30	2	3	6	1	T	3	-	-	1	-	-	-	2.5	50
ROCK	-	-	T	-	-	-	T	T	-	-	-	-	-	-	-	-	-	-	-	-	T	15
LITTER	92	90	89	92	90	90	87	64	89	87	84	87	89	87	88	90	88	92	90	90	87.7	100
LICHENS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	
BRYOPHYTE	-	2	T	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	0.2	15
TOTAL VEG. (non-stratified)	90	85	90	85	95	98	88	78	90	92	90	92	98	90	98	86	95	80	90	96	90.3	100
NATIVE PERENNIAL GRAMINOIDS																						
Agropyron caninum	2	2	8	4	-	-	1	6	4	5	5	3	4	1	-	15	4	15	3	-	4.0	80
Agropyron spicatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Bromus anomalus	2	-	-	3	-	-	4	2	5	7	-	-	-	-	-	2	-	-	-	2	1.3	40
Bromus carinatus	-	-	-	-	-	7	7	10	2	-	14	5	9	4	6	8	18	1	7	15	5.6	70
Calamagrostis rubescens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42	72	5.6	10
Carex hoodii	-	-	-	-	-	12	-	2	-	-	-	-	-	6	-	8	26	1	-	7	3.1	35
Carex petasata	6	10	-	5	-	-	8	-	-	-	-	-	-	5	-	-	-	-	-	-	1.7	25
Carex raynoldsii	-	-	-	12	-	4	-	5	-	-	2	-	7	6	-	12	-	3	-	2	2.6	45
Carex rossii	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	5
Danthonia intermedia	-	4	7	8	14	4	-	-	17	-	-	-	-	6	-	-	-	3	-	-	3.1	40
Festuca idahoensis	27	10	-	3	-	-	-	-	-	22	3	-	-	13	-	-	-	-	-	-	3.9	30
Juncus balticus	-	-	-	-	-	-	-	4	2	-	-	-	-	-	-	-	-	-	-	-	0.3	10
Koeleria cristata	-	1	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	-	-	T	10
Melica spectabilis	-	-	-	-	-	-	-	3	-	-	-	-	-	2	-	-	2	3	-	-	0.5	20
Poa juncifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	2	-	-	-	0.3	10
Stipa occidentalis	14	-	6	-	38	14	-	3	10	2	5	8	-	4	-	4	1	2	-	2	5.6	70
TOTAL NPG	51	27	39	35	52	41	20	35	40	36	29	16	20	53	6	49	53	28	52	100	39.1	100
INTRODUCED PERENNIAL GRAMINOIDS																						
Phleum pratense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Poa pratensis	12	42	36	44	36	35	60	24	40	65	58	70	55	-	74	5	14	35	3	16	36.2	95
TOTAL IPG	12	42	36	44	36	35	60	24	40	65	58	70	55	-	74	5	14	35	3	16	36.2	95
NATIVE PERENNIAL FORBS																						
Achillea millefolium	13	6	2	7	18	10	5	2	6	5	1	4	4	7	5	5	4	2	7	15	6.4	100
Agoseris glauca	-	-	-	-	2	-	5	3	7	-	8	-	-	-	-	-	3	5	-	-	1.6	35
Antennaria microphylla	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Arabis drummondii	-	-	1	-	-	-	1	3	1	-	-	-	-	-	-	-	-	-	-	-	0.3	20
Arenaria lateriflora	-	-	-	T	-	-	-	-	T	-	-	T	-	2	-	-	7	-	-	2	0.6	30
Aster foliaceus	-	-	-	-	-	-	-	-	6	-	6	5	-	8	6	-	-	-	-	-	1.5	25
Besseya wyomingensis	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	0.1	5
Campanula rotundifolia	3	3	-	2	-	-	2	-	7	1	3	5	-	9	-	1	3	-	-	-	1.9	55

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	12
TRANSECT:	14	ASPECT:	128
DATE:	08/16/89	ELEVATION:	6760
WORKER(S):	LL & DC	TOPOGRAPHY:	UNDULATING
PHOTO:	21-22	CONFIGURATION:	LOWER SLOPE - BENCH

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	
ROCK	1	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	10
LITTER	83	74	98	97	94	96	95	96	94	98	98	97	98	95	96	98	99	97	94	92	94.4	100
LICHENS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	
BRYOPHYTE	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	5
TOTAL VEG. (non-stratified)	50	85	99	90	99	90	95	96	99	70	96	99	95	52	99	99	99	99	97	84	89.6	100
TOTAL UNDERSTORY VEG.	50	40	19	37	65	42	60	44	75	25	27	38	35	52	60	30	15	35	62	84	44.8	100
NATIVE PERENNIAL GRAMINOIDS																						
Calamagrostis rubescens	25	30	15	35	20	25	15	20	-	15	-	38	35	32	22	24	7	-	50	30	21.9	85
Carex geyeri	-	-	-	-	-	-	6	-	35	-	12	-	-	8	-	-	4	35	15	11	6.3	40
Festuca idahoensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Poa juncifolia	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	6	0.7	10
Poa nervosa	-	-	-	-	-	-	-	20	11	10	-	-	-	5	-	-	-	-	-	-	2.3	20
TOTAL NPG	25	30	15	35	20	25	29	40	46	25	12	38	35	45	22	24	11	35	65	47	31.2	100
NATIVE PERENNIAL FORBS																						
Achillea millefolium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	T	5
Antennaria microphylla	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30	1.5	5
Arnica cordifolia	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Aster conspicuus	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	0.4	5
Campanula rotundifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	T	T	10
Cerastium arvense	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Epilobium angustifolium	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Fragaria virginiana	6	8	-	1	2	17	6	-	-	-	-	-	-	5	3	-	-	-	-	12	3.0	45
Galium boreale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	T	5
Hieracium albiflorum	25	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	15
Osmorhiza chilensis	-	5	-	-	-	-	-	-	3	-	-	-	-	5	-	-	-	-	-	-	0.6	15
Penstemon procerus	-	-	-	-	-	4	-	3	-	-	-	-	-	-	-	-	-	-	-	-	0.4	10
Potentilla gracilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pyrola secunda	-	-	-	-	-	-	22	-	17	2	-	-	-	-	4	2	5	-	-	-	2.6	30
Smilacina stellata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	0.2	5
Thalictrum occidentale	-	-	-	-	-	-	-	-	-	-	16	-	-	-	10	-	-	-	-	-	1.3	10
Valeriana dioica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	0.1	5
TOTAL NPF	31	14	5	2	2	21	31	6	27	2	16	-	-	10	19	6	5	-	2	43	12.1	85

Transect 11 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
NATIVE PERENNIAL FORBS (Continued)																						
Cerastium arvense	16	10	21	-	-	-	4	9	-	-	5	2	-	3	-	-	-	-	-	-	3.5	40
Epilobium angustifolium	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	3	-	-	6	0.5	15
Erigeron speciosus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Eriogonum umbellatum	-	-	-	-	18	-	-	-	-	-	-	-	-	-	-	30	-	-	16	-	3.2	15
Fragaria vesca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Fragaria virginiana	3	-	T	2	5	4	-	-	6	-	T	-	-	12	-	-	4	2	8	2	2.4	60
Gaillardia aristata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Galium boreale	2	5	8	3	26	15	7	3	5	7	12	8	6	10	12	3	5	7	3	8	7.7	100
Geranium viscosissimum	-	-	-	-	-	8	-	-	-	-	-	-	-	2	-	1	-	-	-	-	0.5	15
Geum triflorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Hackelia micrantha	-	-	-	3	-	3	-	-	-	-	-	1	5	15	12	-	3	-	-	-	2.1	35
Helianthella uniflora	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lithospermum ruderale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Penstemon procerus	2	-	16	-	-	-	-	-	-	-	-	-	-	4	5	-	-	-	12	-	1.9	25
Perideridia gairdneri	3	-	-	8	5	-	2	-	4	-	6	-	-	-	4	3	2	-	-	-	1.8	45
Potentilla gracilis	-	-	-	-	12	-	-	-	4	-	1	-	2	-	-	1	-	-	-	-	1.0	25
Senecio serra	-	-	-	-	-	-	8	-	-	-	16	-	52	-	22	8	5	-	10	-	6.0	35
Smilacina stellata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Solidago canadensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Solidago missouriensis	-	-	-	-	-	-	1	-	2	2	-	-	-	-	-	-	-	-	-	-	0.2	15
TOTAL NPF	42	24	49	26	86	40	35	20	49	15	59	29	71	72	66	52	39	16	56	33	43.8	100
INTRODUCED PERENNIAL FORBS																						
Taraxacum officinale	-	-	-	-	-	-	-	3	4	-	-	-	-	-	-	-	-	-	-	-	0.3	10
NATIVE ANNUAL/BIENNIAL FORBS																						
Collomia linearis	1	-	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	10
Polygonum douglasii	-	-	-	-	-	-	2	22	-	-	-	-	-	-	-	-	-	-	-	-	1.2	10
TOTAL NAF	1	-	-	-	T	-	2	22	-	-	-	-	-	-	-	-	-	-	-	-	1.3	20
INTRODUCED ANNUAL/BIENNIAL FORBS																						
Chenopodium album	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Thlaspi arvense	-	-	-	-	-	-	-	4	-	-	1	-	-	-	-	-	T	-	-	-	0.2	15
Tragopogon dubius	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	5
TOTAL IAF	-	-	T	-	7	-	-	4	-	-	1	-	-	-	-	-	T	-	-	-	0.7	25
SHRUBS																						
Artemisia tridentata	-	5	-	-	-	38	-	-	-	-	-	-	48	-	44	-	15	-	-	-	7.5	25
Juniperus communis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL SHRUBS	-	5	-	-	-	38	-	-	-	-	-	-	48	-	44	-	15	-	-	-	7.5	25
TREES																						
Pseudotsuga menziesii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL VEG. (stratified)	106	98	124	105	182	154	117	108	133	116	147	115	194	125	190	106	122	79	111	149	128.9	100

Transect 12 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
NATIVE ANNUAL/BIENNIAL FORBS																						
Androsace occidentalis	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
SUBSHRUBS																						
Berberis repens	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	3	-	-	-	-	0.3	10
SHRUBS																						
Juniperus communis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Ribes setosum	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	0.8	5
TOTAL SHRUBS	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	0.8	5
TREES																						
Juniperus scopulorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pinus contorta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pseudotsuga menziesii	-	40	99	99	99	30	70	99	99	95	75	60	-	-	-	90	99	99	99	20	63.6	80
TOTAL TREES	-	40	99	99	99	30	70	99	99	95	75	60	-	-	-	90	99	99	99	20	63.6	80
TOTAL VEG. (stratified)	80	76	141	126	168	87	111	112	110	102	84	105	55	91	81	193	99	100	124	55	104.9	100

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	36
TRANSECT:	18	ASPECT:	140
DATE:	08/17/89	ELEVATION:	6760
WORKER(S):	DC & LL	TOPOGRAPHY:	LOWER SLOPE
PHOTO:	29	CONFIGURATION:	CONVEX

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	4	15	-	-	10	2	20	2	30	8	7	-	12	7	-	5	3	2	15	T	7.1	80
ROCK	1	8	5	1	15	2	15	2	25	35	78	T	13	5	15	1	9	25	15	6	13.8	100
LITTER	91	73	90	96	67	95	56	86	42	45	12	97	72	84	81	89	88	70	66	92	74.6	100
LICHENS	T	T	-	-	T	-	-	-	T	7	-	-	-	-	-	-	-	-	-	-	0.5	25
BRYOPHYTE	T	T	-	-	-	-	T	-	2	-	-	-	-	-	-	2	-	-	-	-	0.3	25
TOTAL VEG. (non-stratified)	85	45	95	99	66	17	35	63	30	45	45	90	28	99	55	95	99	40	40	90	63.1	100
TOTAL UNDERSTORY VEG.	43	45	55	45	66	17	35	63	30	45	45	42	28	40	55	53	T	40	40	25	40.6	100
NATIVE PERENNIAL GRAMINOIDS																						
Agropyron spicatum	7	-	17	10	17	12	T	-	10	17	8	6	2	1	T	2	-	14	14	4	7.1	85
Calamagrostis rubescens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	3	3	0.3	15
Carex geyeri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37	-	-	6	-	2.2	10
Carex rossii	-	-	-	-	-	-	-	-	-	4	-	-	-	-	6	-	-	-	-	-	0.5	10
Festuca idahoensis	13	7	20	14	18	-	12	6	11	-	10	10	6	3	7	3	-	13	8	11	8.6	85
Festuca scabrella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Koeleria cristata	-	-	-	-	-	-	-	-	-	-	-	-	-	14	-	-	-	-	1	-	0.8	10
Stipa viridula	-	5	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	0.4	15
TOTAL NPG	20	12	37	24	36	12	13	6	22	21	18	16	8	18	14	42	T	27	32	18	19.8	100
INTRODUCED PERENNIAL GRAMINOIDS																						
Phleum pratense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Poa pratensis	8	20	5	2	1	-	8	20	-	12	-	-	8	-	32	-	-	5	-	-	6.1	55
TOTAL IPG	8	20	5	2	1	-	8	20	-	12	-	-	8	-	32	-	-	5	-	-	6.1	55
NATIVE PERENNIAL FORBS																						
Achillea millefolium	-	-	2	-	-	-	-	T	1	-	3	-	-	-	3	-	-	-	4	-	0.7	30
Allium cernuum	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	4	0.4	10
Antennaria microphylla	-	-	-	-	-	-	-	-	-	-	2	-	-	-	1	-	-	-	-	-	0.2	10
Arabis drummondii	-	1	-	-	-	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-	T	10
Arnica cordifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.1	5
Astragalus adsurgens	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Astragalus miser	-	5	7	-	-	-	-	-	-	-	-	-	3	-	-	11	-	-	-	2	1.4	25
Campanula rotundifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	0.1	10
Cerastium arvense	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Comandra umbellata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Crepis acuminata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Erigeron caespitosus	-	-	-	-	-	-	-	-	-	-	-	3	9	-	-	-	-	-	-	-	0.6	10
Eriogonum umbellatum	-	-	-	-	-	-	-	-	-	6	7	-	-	-	-	-	-	-	-	-	0.7	10

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	45
TRANSECT:	12	ASPECT:	133
DATE:	08/16/89	ELEVATION:	6670
WORKER(S):	LL & DC	TOPOGRAPHY:	MIDSLOPE
PHOTO:	19	CONFIGURATION:	CONVEX

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	4	7	3	-	-	1	-	-	-	-	-	-	-	-	-	-	3	-	-	-	0.9	25
ROCK	11	3	-	-	-	2	-	-	-	-	1	5	-	-	-	-	-	-	-	-	1.1	25
LITTER	78	88	93	98	95	94	97	99	99	99	99	95	75	87	93	91	97	99	98	97	93.6	100
LICHENS	-	T	-	-	-	-	-	-	T	T	-	T	3	-	-	-	-	-	-	-	0.3	25
BRYOPHYTE	-	-	-	-	-	-	-	-	-	-	-	-	17	6	-	-	-	-	-	-	1.2	10
TOTAL VEG. (non-stratified)	75	60	99	99	99	70	85	99	99	96	78	80	55	80	75	99	99	99	99	48	84.7	100
TOTAL UNDERSTORY VEG.	75	33	41	26	65	50	35	13	11	7	9	45	55	80	75	94	-	T	25	33	38.6	95
NATIVE PERENNIAL GRAMINOIDS																						
Agropyron spicatum	-	-	-	17	-	11	16	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	15
Bromus carinatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Calamagrostis rubescens	28	20	-	-	-	9	8	13	8	7	-	-	-	40	45	-	-	-	-	20	9.9	50
Carex geyeri	17	6	40	-	-	-	-	-	-	-	9	45	55	25	25	88	-	-	25	15	17.5	55
Festuca idahoensis	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Poa juncifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Stipa occidentalis	4	1	-	-	2	2	T	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	25
TOTAL NPG	49	28	40	17	2	22	25	13	8	7	9	45	55	65	70	88	-	-	25	35	30.1	90
NATIVE PERENNIAL FORBS																						
Achillea millefolium	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	5
Allium cernuum	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	5
Antennaria microphylla	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	5
Arabis drummondii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Arnica cordifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Cerastium arvense	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	10
Eriogonum umbellatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Fragaria virginiana	6	-	-	-	-	-	-	-	-	-	-	-	-	8	7	-	-	-	-	-	1.1	15
Geranium viscosissimum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lithospermum ruderale	8	-	-	-	55	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.2	15
Lupinus sericeus	10	-	-	-	8	7	16	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	20
Phacelia hastata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	T	5
Potentilla glandulosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Solidago missouriensis	-	1	1	10	4	-	-	-	-	-	-	-	-	2	-	12	-	-	-	-	1.5	30
TOTAL NPF	31	8	2	10	67	35	16	-	-	-	-	-	-	10	7	12	-	T	-	-	9.9	55
INTRODUCED PERENNIAL FORBS																						
Taraxacum officinale	-	-	-	-	-	-	-	-	-	-	-	-	-	T	4	-	-	-	-	-	0.2	10

Transect 18 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
NATIVE PERENNIAL FORBS (Continued)																						
Geranium viscosissimum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Helianthella uniflora	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lithospermum ruderale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lupinus sericeus	-	-	-	1	-	-	-	-	-	1	-	-	-	-	8	-	-	-	-	-	0.5	15
Phacelia hastata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Sedum lanceolatum	-	-	-	-	-	-	-	-	T	-	3	-	-	-	-	-	-	-	-	-	0.2	10
Solidago missouriensis	-	-	2	5	-	-	-	-	-	-	-	-	-	4	-	-	T	-	4	-	0.8	25
TOTAL NPF	1	6	11	6	-	-	-	T	6	8	18	3	12	4	13	12	T	-	8	8	5.8	80
NATIVE ANNUAL/BIENNIAL FORBS																						
Androsace occidentalis	1	T	1	-	-	-	T	-	-	-	-	-	-	-	-	-	-	-	T	-	0.2	25
Collomia linearis	-	-	-	-	-	-	T	1	1	-	1	-	-	-	-	-	-	-	-	-	0.2	20
Epilobium paniculatum	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	10
Phacelia linearis	-	-	-	-	T	-	-	-	-	-	-	-	1	-	-	-	-	1	T	-	0.2	20
Polygonum douglasii	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	T	10
TOTAL NAF	2	1	1	2	T	-	1	1	1	-	1	-	1	-	-	-	-	1	1	1	0.7	65
INTRODUCED ANNUAL/BIENNIAL FORBS																						
Tragopogon dubius	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
SUBSHRUBS																						
Berberis repens	16	12	13	15	14	7	-	9	4	10	4	T	T	1	1	2	-	9	2	-	6.0	85
SHRUBS																						
Artemisia tridentata	-	-	-	-	15	-	15	35	-	-	8	36	-	20	5	-	-	-	-	-	6.7	35
Juniperus communis	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	0.2	5
Ribes viscosissimum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL SHRUBS	-	-	-	-	15	-	15	35	-	-	8	36	-	23	5	-	-	-	-	-	6.9	35
TREES																						
Juniperus scopulorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pinus flexilis	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.8	5
Pseudotsuga menziesii	-	-	80	99	-	-	-	-	-	-	-	70	-	99	-	90	99	-	-	75	30.6	35
TOTAL TREES	75	-	80	99	-	-	-	-	-	-	-	70	-	99	-	90	99	-	-	75	34.3	40
TOTAL VEG. (stratified)	122	51	147	148	68	19	37	72	33	51	49	126	30	145	65	146	100	42	43	102	79.6	100

Transect 10 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
SHRUBS																						
Clematis occidentalis	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	25	1.4	10
Juniperus communis	-	-	38	-	-	-	-	-	-	-	-	75	30	-	-	-	-	-	-	-	7.2	15
Rosa acicularis	-	4	-	-	-	-	-	-	3	-	7	14	17	2	5	9	4	19	10	-	4.7	55
Shepherdia canadensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Spiraea betulifolia	4	-	-	-	-	3	-	-	-	-	-	-	-	-	5	-	-	4	8	-	1.2	25
TOTAL SHRUBS	4	4	38	-	-	3	2	-	3	-	7	89	47	2	10	9	4	23	18	25	14.5	80
TREES																						
Juniperus scopulorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pinus contorta	10	99	-	-	-	99	-	-	-	99	75	-	-	-	-	-	-	-	-	-	19.1	25
Pinus flexilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pseudotsuga menziesii	-	-	20	-	-	-	99	99	-	-	-	-	-	-	-	-	-	75	99	50	22.1	30
TOTAL TREES	10	99	20	-	-	99	99	99	-	99	75	-	-	-	-	-	-	75	99	50	41.2	55
TOTAL VEG. (stratified)	75	118	75	43	106	145	147	171	59	150	86	104	121	3	18	88	95	212	174	163	107.6	100

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	40
TRANSECT:	8	ASPECT:	240
DATE:	08/16/89	ELEVATION:	6840
WORKER(S):	DC & LL	TOPOGRAPHY:	MIDSLOPE
PHOTO:	6 & 7	CONFIGURATION:	CONVEX

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	1	7	-	-	1	30	40	25	12	12	-	-	-	-	-	-	3	4	-	-	6.8	50
ROCK	-	1	-	-	10	4	6	8	2	2	3	-	-	-	-	-	15	9	1	-	3.1	55
LITTER	94	85	80	94	73	62	51	50	51	76	93	92	99	35	50	68	74	83	97	84	74.6	100
LICHENS	2	-	-	T	2	-	-	12	10	2	-	-	-	T	5	6	3	-	-	-	2.2	50
BRYOPHYTE	1	-	20	2	11	1	-	10	20	T	2	5	-	60	40	22	T	T	-	9	10.2	80
TOTAL VEG. (non-stratified)	36	80	99	77	60	45	39	60	55	65	90	99	99	65	75	90	57	70	99	98	72.9	100
TOTAL UNDERSTORY VEG.	36	53	2	42	37	45	39	54	55	65	32	32	52	50	60	62	57	40	27	20	43.0	100
NATIVE PERENNIAL GRAMINOIDS																						
Agropyron spicatum	-	-	-	8	-	-	7	13	-	-	-	3	-	-	10	-	-	-	-	-	2.1	25
Bromus carinatus	-	-	-	-	-	14	5	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	10
Calamagrostis rubescens	-	-	-	3	4	-	-	-	-	-	4	-	1	18	-	9	-	-	6	3	2.4	40
Carex geyeri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Carex rossii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	5	7	-	0.8	15
Festuca idahoensis	7	11	-	5	23	6	-	10	5	12	4	3	-	-	4	25	14	-	4	6	7.0	75
Festuca scabrella	20	30	-	6	-	-	-	4	12	25	5	2	-	-	-	-	6	-	T	-	5.5	50
Koeleria cristata	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	0.2	5
Poa juncifolia	-	-	-	2	-	-	-	-	-	9	4	-	-	-	-	-	21	9	-	-	2.2	25
Poa scabrella	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Stipa occidentalis	-	-	-	-	-	7	-	-	-	-	-	5	-	-	8	5	-	-	-	-	1.2	20
TOTAL NPG	27	41	-	24	27	27	12	27	21	46	20	13	1	18	22	42	41	14	17	9	22.5	95
INTRODUCED PERENNIAL GRAMINOIDS																						
Poa pratensis	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	2	-	-	-	0.4	10
NATIVE PERENNIAL FORBS																						
Achillea millefolium	-	-	-	1	-	-	2	-	20	5	1	-	-	-	-	8	-	-	-	-	1.8	30
Allium cernuum	-	-	1	7	3	-	1	-	-	6	-	2	-	-	-	-	-	3	-	12	1.8	40
Anemone multifida	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Antennaria microphylla	-	-	-	2	-	-	-	7	2	-	-	-	-	-	-	-	-	-	-	-	0.6	15
Arenaria congesta	-	14	-	-	-	-	-	5	10	14	5	-	-	-	10	12	-	-	-	-	3.5	35
Arnica cordifolia	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	0.1	5
Astragalus miser	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	T	5
Campanula rotundifolia	-	-	-	-	-	-	-	4	-	-	-	-	4	1	3	-	-	-	-	-	0.6	20
Cerastium arvense	-	-	-	-	-	-	-	3	-	-	-	4	-	4	-	-	-	6	-	-	0.8	20
Dodecatheon conjugens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Eriogonum umbellatum	-	-	-	-	5	-	-	7	-	-	8	-	-	-	10	-	-	-	3	-	1.6	25
Fragaria virginiana	3	-	-	4	8	-	-	-	-	-	-	7	3	7	8	-	-	-	-	-	2.0	35

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	47
TRANSECT:	10	ASPECT:	292
DATE:	08/16/89	ELEVATION:	6635
WORKER(S):	LL & DC	TOPOGRAPHY:	MID SLOPE
PHOTO:	17	CONFIGURATION:	CONVEX

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	
ROCK	-	50	30	55	-	16	-	35	10	12	45	45	6	94	37	15	30	9	10	20	26.0	85
LITTER	96	50	59	36	78	77	84	59	73	82	50	47	74	5	44	66	33	83	74	55	61.3	100
LICHENS	T	-	2	4	-	T	6	2	1	T	-	T	-	-	-	T	-	-	T	2	1.0	60
BRYOPHYTE	1	-	7	2	15	4	7	T	12	2	4	3	15	-	-	12	30	-	10	15	7.0	80
TOTAL VEG. (non-stratified)	60	99	60	40	80	99	99	99	55	99	80	85	80	2	18	69	84	99	99	99	75.3	100
TOTAL UNDERSTORY VEG.	55	16	50	40	80	43	45	67	55	48	11	85	80	2	18	69	84	90	62	85	54.3	100
NATIVE PERENNIAL GRAMINOIDS																						
Calamagrostis rubescens	37	7	10	8	45	18	17	33	42	30	-	9	65	T	2	15	30	75	10	45	24.9	95
Carex geyeri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPG	37	7	10	8	45	18	17	33	42	30	-	9	65	T	2	15	30	75	10	45	24.9	95
NATIVE PERENNIAL FORBS																						
Allium cernuum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Antennaria racemosa	6	2	1	3	9	-	4	-	11	-	-	-	-	-	-	17	30	-	-	2	4.3	50
Arnica cordifolia	-	6	-	-	7	2	-	7	-	1	2	-	-	-	-	-	3	7	5	5	2.3	50
Aster conspicuus	-	-	-	-	-	-	-	4	-	17	2	1	5	-	5	6	6	-	-	6	2.6	45
Astragalus miser	18	-	-	2	37	22	23	21	3	3	-	-	-	-	-	35	17	32	-	13	11.3	60
Campanula rotundifolia	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
Castilleja miniata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Disporum trachycarpum	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	0.3	5
Epilobium angustifolium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	0.9	5
Fragaria vesca	-	-	3	30	-	-	-	2	-	-	-	-	-	-	1	6	5	-	10	-	2.9	35
Fragaria virginiana	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	0.2	5
Heuchera cylindrica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Thalictrum occidentale	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	20	-	1.3	10
TOTAL NPF	24	8	4	35	53	24	29	39	14	21	4	6	9	-	6	64	61	39	35	43	25.9	95
SUBSHRUBS																						
Berberis repens	-	-	3	-	8	T	-	-	-	-	-	-	-	-	-	-	-	-	12	-	1.2	20

Transect 8 (Continued)

SPECIES	CANOPY COVERAGE PLOT NUMBERS (1-20) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
NATIVE PERENNIAL FORBS (Continued)																						
Hieracium albiflorum	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
Lithospermum ruderale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lomatium triternatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lupinus sericeus	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	T	5
Phacelia hastata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Potentilla gracilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	0.1	5
Sedum lanceolatum	1	-	T	-	-	2	-	-	-	-	-	1	-	-	-	1	-	-	-	-	0.3	25
Solidago missouriensis	-	T	T	8	-	5	7	5	-	-	-	-	-	1	13	12	4	15	9	-	4.0	60
TOTAL NPF	6	14	2	22	16	7	10	31	33	27	14	14	7	13	44	35	4	24	12	12	17.4	100
INTRODUCED PERENNIAL FORBS																						
Taraxacum officinale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	0.1	5
NATIVE ANNUAL/BIENNIAL FORBS																						
Androsace occidentalis	3	4	-	-	T	20	-	3	2	4	2	-	-	-	-	-	24	T	-	-	3.2	50
Arabis divaricarpa	-	-	-	-	-	4	6	-	1	2	-	-	-	-	-	-	-	5	-	-	0.9	25
Collomia linearis	1	1	-	1	1	-	10	8	5	1	T	-	-	-	-	-	5	1	-	-	1.7	55
Phacelia franklinii	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
TOTAL NAF	4	5	-	1	1	24	20	11	8	7	2	-	-	-	-	-	29	6	-	-	5.9	60
SUBSHRUBS																						
Berberis repens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
SHRUBS																						
Artemisia tridentata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Juniperus communis	-	-	-	-	-	-	-	-	-	-	-	-	50	25	-	-	-	-	-	-	3.8	10
Spiraea betulifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL SHRUBS	-	-	-	-	-	-	-	-	-	-	-	-	50	25	-	-	-	-	-	-	3.8	10
TREES																						
Juniperus scopulorum	-	-	75	-	-	-	-	-	-	-	-	35	-	-	-	-	-	50	90	-	12.5	20
Pinus flexilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	-	1.0	5
Pseudotsuga menziesii	-	25	90	70	40	-	-	25	-	-	80	99	99	25	25	70	-	-	-	95	37.2	60
TOTAL TREES	-	25	165	70	40	-	-	25	-	-	80	134	99	25	25	70	-	50	110	95	50.6	70
TOTAL VEG. (stratified)	37	85	167	117	84	58	42	94	62	80	116	168	157	81	91	149	76	94	139	116	100.7	100

Transect 9 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
TREES																						
Juniperus scopulorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Picea engelmannii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pinus contorta	95	85	-	90	75	20	-	-	-	20	98	75	-	40	-	-	80	55	80	90	45.2	65
Pinus flexilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pseudotsuga menziesii	-	-	-	-	-	-	25	-	80	20	-	65	95	-	-	10	-	1	-	-	14.8	35
TOTAL TREES	95	85	-	90	75	20	25	-	80	40	98	140	95	40	-	10	80	56	80	90	60.0	85
TOTAL VEG. (stratified)	101	167	94	160	142	22	67	80	148	64	103	147	104	50	16	15	100	64	88	95	91.2	100

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	44
TRANSECT:	15	ASPECT:	146
DATE:	08/16/89	ELEVATION:	6650
WORKER(S):	KS & ED	TOPOGRAPHY:	UPPER SLOPE
PHOTO:	33	CONFIGURATION:	CONCAVE

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	55	30	-	-	-	-	-	2	-	-	-	10	-	-	-	-	-	-	4.9	20
ROCK	3	5	4	5	15	4	-	T	15	-	-	3	22	35	25	7	4	8	2	-	7.9	80
LITTER	91	93	38	59	78	94	99	98	78	98	99	91	72	51	72	87	94	40	94	99	81.3	100
LICHENS	T	1	T	T	2	1	-	-	3	-	-	2	5	4	2	3	1	2	T	-	1.4	75
BRYOPHYTE	4	-	-	4	-	-	-	-	-	-	1	3	-	-	1	-	-	49	2	-	3.2	35
TOTAL VEG. (non-stratified)	95	95	30	18	85	80	95	67	80	95	90	85	30	95	95	88	95	85	40	94	76.9	100
TOTAL UNDERSTORY VEG.	8	3	30	18	85	52	8	12	42	T	15	13	12	53	20	85	2	55	24	70	30.4	100
NATIVE PERENNIAL GRAMINOIDS																						
Agropyron spicatum	-	-	9	2	1	-	-	3	25	-	-	-	1	3	-	-	-	-	-	3	2.4	40
Carex hoodii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Carex rossii	-	-	-	2	-	T	-	-	7	-	-	-	3	-	-	-	-	-	-	-	0.6	20
Festuca idahoensis	-	T	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	15
Festuca scabrella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Poa scabrella	-	-	-	-	-	-	-	-	-	-	-	4	2	-	-	-	-	-	6	-	0.6	15
Sitanion hystrix	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Stipa occidentalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	0.1	5
Trisetum spicatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPG	-	T	14	5	1	T	-	3	32	-	-	4	6	3	-	-	2	-	6	3	4.0	65
NATIVE PERENNIAL FORBS																						
Achillea millefolium	-	-	12	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	0.8	10
Allium cernuum	-	3	-	-	-	T	-	-	4	-	-	-	-	-	-	-	-	3	-	-	0.5	20
Antennaria microphylla	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Aster conspicuus	-	-	-	3	4	-	2	-	3	T	-	-	1	-	-	-	-	1	-	-	0.7	35
Lithospermum ruderale	-	-	1	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	10
Lupinus sericeus	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	5
Penstemon attenuatus	-	T	5	8	-	-	-	5	3	-	-	T	5	-	-	-	-	T	-	-	1.4	40
Sedum lanceolatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Solidago missouriensis	-	-	-	-	-	7	2	-	1	-	-	-	-	-	-	2	-	-	2	-	0.7	25
TOTAL NPF	-	4	18	11	8	13	4	5	11	T	-	5	6	-	-	2	-	5	2	-	4.6	70
NATIVE ANNUAL/BIENNIAL FORBS																						
Arabis holboellii	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Collomia linearis	-	-	T	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	10
Collinsia parviflora	-	-	1	3	-	-	-	-	-	-	-	6	T	-	-	-	-	-	-	-	0.5	20
TOTAL NAF	-	-	2	4	-	-	-	-	-	-	-	6	T	-	-	-	-	-	-	-	0.6	20

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	48
TRANSECT:	9	ASPECT:	022
DATE:	08/15/89	ELEVATION:	6820
WORKER(S):	KS & ED	TOPOGRAPHY:	UPPER SLOPE
PHOTO:	30	CONFIGURATION:	CONCAVE

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	2	-	0.3	10
ROCK	-	-	-	-	3	-	18	-	5	8	-	16	4	15	30	46	10	10	16	1	9.1	65
LITTER	99	25	16	63	44	90	35	38	83	56	98	64	85	15	25	22	45	59	32	96	54.5	100
LICHENS	-	-	-	-	2	7	15	18	2	22	1	2	4	15	29	20	25	20	10	1	9.6	80
BRYOPHYTE	-	70	78	32	45	2	28	40	2	12	-	14	6	55	15	12	20	10	39	1	24.1	90
TOTAL VEG. (non-stratified)	95	95	94	95	90	21	55	76	82	50	98	80	95	45	14	15	83	56	82	90	70.6	100
TOTAL UNDERSTORY VEG.	6	80	94	65	65	1	38	76	68	22	5	6	9	10	14	5	18	8	7	5	30.1	100
NATIVE PERENNIAL GRAMINOIDS																						
Calamagrostis rubescens	-	-	-	2	T	1	26	-	-	8	-	T	-	9	2	-	15	1	-	2	3.4	55
NATIVE PERENNIAL FORBS																						
Antennaria racemosa	-	-	-	-	1	-	2	-	-	9	-	-	-	1	8	-	1	-	7	3	1.6	40
Arnica cordifolia	-	-	-	-	-	-	6	-	-	-	2	-	-	-	-	-	2	4	-	-	0.7	20
Fragaria virginiana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	0.1	5
Pyrola chlorantha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pyrola secunda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Sedum lanceolatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	T	5
TOTAL NPF	-	-	-	-	1	-	8	-	-	9	2	-	-	1	8	-	3	6	8	3	2.4	50
SUBSHRUBS																						
Chimaphila umbellata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
SHRUBS																						
Juniperus communis	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Lonicera utahensis	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
Rosa acicularis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Shepherdia canadensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Spiraea betulifolia	-	-	-	8	-	-	-	-	-	1	3	2	-	-	6	-	-	T	-	-	1.0	30
Vaccinium globulare	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	0.4	5
Vaccinium scoparium	6	80	94	60	65	T	8	72	65	6	-	4	9	-	-	5	2	-	-	-	23.8	70
TOTAL SHRUBS	6	82	94	68	65	T	8	80	68	7	3	6	9	-	6	5	2	T	-	-	25.5	85

Transect 15 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
SUBSHRUBS																						
Berberis repens	8	-	-	-	7	1	4	5	2	-	-	-	-	-	-	-	-	-	-	-	1.4	30
SHRUBS																						
Artemisia tridentata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Juniperus communis	-	-	-	-	82	38	-	-	-	-	-	-	-	52	-	85	-	5	5	-	13.4	30
Spiraea betulifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL SHRUBS	-	-	-	-	82	38	-	-	-	-	-	-	-	52	-	85	-	5	5	-	13.4	30
TREES																						
Juniperus scopulorum	-	-	-	-	-	10	-	-	-	-	15	-	-	-	20	-	-	50	12	70	8.9	30
Pinus flexilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pseudotsuga menziesii	95	95	-	-	-	40	95	65	55	95	90	85	20	95	95	45	95	75	20	90	62.5	85
TOTAL TREES	95	95	-	-	-	50	95	65	55	95	105	85	20	95	115	45	95	125	32	160	71.4	85
TOTAL VEG. (stratified)	103	99	34	20	98	102	103	78	100	96	105	100	33	150	115	132	97	135	45	163	95.3	100

Transect 7 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
SHRUBS																						
Artemisia tridentata	-	-	-	-	-	-	12	14	-	-	-	-	-	-	-	-	-	-	-	-	1.3	10
Juniperus communis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Rosa acicularis	-	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Spiraea betulifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL SHRUBS	-	-	-	T	-	-	12	14	-	-	-	-	-	-	-	-	-	-	-	-	1.3	15
TREES																						
Juniperus scopulorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60	3.0	5
Pinus contorta	-	-	85	50	20	-	-	70	30	95	95	55	60	-	-	-	-	-	-	-	28.0	45
Pseudotsuga menziesii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	95	95	95	95	98	23.9	25
TOTAL TREES	-	-	85	50	20	-	-	70	30	95	95	55	60	-	-	95	95	95	95	158	54.9	70
TOTAL VEG. (stratified)	102	102	188	141	73	127	92	132	86	161	187	174	120	76	63	166	133	104	99	158	124.1	100

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	50
TRANSECT:	22	ASPECT:	158
DATE:	08/17/89	ELEVATION:	6770
WORKER(S):	DC & LL	TOPOGRAPHY:	UPPER SLOPE
PHOTO:	-	CONFIGURATION:	CONCAVE

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	40	45	40	-	60	-	-	T	25	40	14	-	30	-	35	10	2	5	15	-	18.1	70
ROCK	11	25	22	-	14	12	-	20	35	25	40	1	15	5	27	30	1	2	1	1	14.4	90
LITTER	46	28	35	99	24	85	93	78	24	31	42	97	53	95	35	56	95	90	84	99	64.5	100
LICHENS	-	-	T	-	-	-	-	-	14	1	-	-	-	-	-	T	-	-	-	-	0.8	20
BRYOPHYTE	-	1	1	-	-	6	T	-	-	-	3	-	-	-	-	T	-	-	-	-	0.6	30
TOTAL VEG. (non-stratified)	37	16	98	90	21	98	94	93	33	42	43	70	40	90	20	52	26	16	4	99	54.1	100
TOTAL UNDERSTORY VEG.	37	16	30	55	21	70	81	93	33	42	43	35	40	90	20	52	26	16	4	-	40.2	95
NATIVE PERENNIAL GRAMINOIDS																						
Agropyron spicatum	T	3	2	-	-	1	-	-	16	-	12	-	T	-	-	2	-	-	-	-	1.9	40
Calamagrostis rubescens	-	-	-	-	4	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	0.5	10
Carex geyeri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	0.2	5
Carex rossii	6	-	3	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	0.7	15
Festuca idahoensis	14	10	6	3	-	4	-	-	2	17	9	-	T	-	3	-	8	-	-	-	3.8	55
Festuca scabrella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Koeleria cristata	3	1	3	-	3	-	-	-	1	-	3	-	-	-	-	-	5	12	-	-	1.6	40
Stipa viridula	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	T	5
TOTAL NPG	24	14	14	3	7	5	-	-	19	17	25	-	7	-	3	7	13	16	-	-	8.7	70
INTRODUCED PERENNIAL GRAMINOIDS																						
Poa pratensis	-	-	-	-	-	-	-	-	-	-	-	-	9	1	2	26	6	-	-	-	2.2	25
NATIVE PERENNIAL FORBS																						
Achillea millefolium	3	-	-	-	-	-	-	-	4	-	-	-	-	-	3	-	-	-	-	-	0.5	15
Allium cernuum	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	0.1	10
Anemone multifida	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Antennaria microphylla	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Arabis nuttallii	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	0.1	10
Astragalus miser	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	5
Campanula rotundifolia	4	-	7	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	15
Erigeron caespitosus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Galium boreale	-	-	6	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	0.4	10
Helianthella uniflora	-	-	-	-	-	-	-	8	-	-	8	-	-	-	-	-	T	-	-	-	0.8	15
Linum lewisii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lithospermum ruderale	-	-	-	-	-	8	-	-	-	-	3	-	-	-	-	14	-	-	-	-	1.3	15
Penstemon procerus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-	0.6	5
Phlox alyssifolia	T	-	-	-	-	-	-	-	1	2	4	-	-	-	-	7	-	-	-	-	0.7	25
Sedum lanceolatum	T	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-	-	-	0.2	15

Transect 7 (Continued)

SPECIES	CANOPY COVERAGE PLOT NUMBERS (1-20) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
NATIVE PERENNIAL FORBS (Continued)																						
Aster conspicuus	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	T	5
Campanula rotundifolia	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Cerastium arvense	-	-	-	8	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	10
Erigeron speciosus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Eriogonum umbellatum	-	14	-	2	-	22	5	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	20
Fragaria vesca	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
Fragaria virginiana	-	-	-	-	-	-	-	-	-	-	3	3	1	-	-	-	-	-	-	-	0.4	15
Galium boreale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Geranium viscosissimum	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Geum triflorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lithospermum ruderale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lupinus sericeus	27	20	4	16	8	-	-	-	-	-	-	22	-	-	-	-	-	-	-	-	4.9	30
Penstemon procerus	-	-	4	-	-	16	-	-	-	-	2	-	-	-	-	-	-	-	-	-	1.1	15
Perideridia gairdneri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Potentilla glandulosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Potentilla gracilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Smilacina stellata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Solidago missouriensis	-	-	-	-	-	-	-	-	-	-	-	12	4	-	-	-	-	-	-	-	0.8	10
Thalictrum occidentale	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-	-	-	0.3	10
Valeriana dioica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPF	33	36	10	28	20	48	9	7	-	2	8	41	5	-	5	2	-	7	-	-	13.0	75
INTRODUCED PERENNIAL FORBS																						
Taraxacum officinale	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
NATIVE ANNUAL/BIENNIAL FORBS																						
Arabis divaricarpa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Collomia linearis	5	1	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	20
Collinsia parviflora	5	-	-	-	-	-	-	3	1	-	-	-	-	4	-	-	-	-	-	-	0.7	20
Epilobium paniculatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Linanthus septentrionalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Polygonum douglasii	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	5
TOTAL NAF	10	8	-	-	-	1	2	3	1	-	-	-	-	4	-	-	-	-	-	-	1.5	35
INTRODUCED ANNUAL/BIENNIAL FORBS																						
Chenopodium album	-	-	-	-	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-	-	T	5
Draba nemorosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Tragopogon dubius	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
TOTAL IAF	2	-	-	-	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-	-	0.1	10
SUBSHRUBS																						
Berberis repens	-	-	-	-	10	3	10	4	8	2	-	-	-	2	-	-	-	-	-	-	2.0	35

Transect 22 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
NATIVE PERENNIAL FORBS (Continued)																						
Solidago missouriensis	5	1	-	-	12	-	-	1	11	21	6	4	T	3	-	6	-	-	4	-	3.7	60
Zigadenus venenosus	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	0.1	5
TOTAL NPF	13	1	13	6	14	8	3	9	17	26	24	4	3	3	15	27	T	-	5	-	9.5	90
INTRODUCED PERENNIAL FORBS																						
Taraxacum officinale	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
NATIVE ANNUAL/BIENNIAL FORBS																						
Androsace occidentalis	T	T	T	-	-	-	-	-	-	-	-	-	-	-	T	T	-	-	-	-	0.1	25
INTRODUCED ANNUAL/BIENNIAL FORBS																						
Draba nemorosa	T	T	T	-	-	-	-	-	-	-	1	-	T	-	-	-	-	-	-	-	0.2	25
SUBSHRUBS																						
Berberis repens	-	-	2	10	1	-	-	-	-	-	-	-	-	-	-	-	9	-	-	-	1.1	20
SHRUBS																						
Amelanchier alnifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Artemisia tridentata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Juniperus communis	-	-	-	45	-	60	80	90	-	-	-	35	30	20	-	-	-	-	-	-	18.0	35
TOTAL SHRUBS	-	-	-	45	-	60	80	90	-	-	-	35	30	20	-	-	-	-	-	-	18.0	35
TREES																						
Juniperus scopulorum	-	-	-	45	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	5.7	10
Pseudotsuga menziesii	-	-	95	25	-	90	50	-	-	-	-	50	-	-	-	-	-	-	-	99	20.4	30
TOTAL TREES	-	-	95	70	-	90	50	-	-	-	-	50	-	70	-	-	-	-	-	99	26.1	35
TOTAL VEG. (stratified)	38	16	126	134	22	163	133	99	36	43	50	89	49	94	21	61	29	16	5	99	66.0	100

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	30
TRANSECT:	7	ASPECT:	156
DATE:	08/15/89	ELEVATION:	6780
WORKER(S):	KS & ED	TOPOGRAPHY:	MID SLOPE
PHOTO:	29	CONFIGURATION:	STRAIGHT

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	T	-	-	-	-	2	-	-	-	-	-	-	2	-	-	-	-	-	-	0.2	15
ROCK	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	5
LITTER	92	89	93	92	95	86	89	92	94	94	94	92	93	91	94	94	96	99	99	99	93.4	100
LICHENS	-	-	-	-	-	1	T	-	-	-	-	-	-	-	-	T	-	-	-	-	0.1	15
BRYOPHYTE	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-	0.2	10
TOTAL VEG. (non-stratified)	85	84	96	95	60	90	86	85	65	96	98	96	85	71	60	97	97	95	95	98	86.7	100
TOTAL UNDERSTORY VEG.	85	84	82	80	50	90	86	55	50	62	84	92	55	71	60	67	37	9	4	60	63.2	100
NATIVE PERENNIAL GRAMINOIDS																						
Agropyron caninum	-	-	-	-	-	-	1	-	-	48	-	-	-	-	-	5	3	-	-	-	2.9	20
Bromus anomalus	-	7	5	4	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	20
Calamagrostis rubescens	-	-	4	17	-	-	-	-	-	-	54	78	55	70	58	64	35	2	-	-	21.9	50
Carex geyeri	-	-	-	-	18	17	-	2	22	-	22	-	-	-	-	-	-	-	-	-	4.1	25
Carex hoodii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Carex petasata	14	4	-	-	-	2	7	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	20
Danthonia intermedia	1	2	6	2	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	0.8	30
Festuca idahoensis	2	15	22	17	-	38	30	16	-	-	5	-	-	-	-	-	-	-	-	-	7.3	40
Festuca scabrella	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	5
Koeleria cristata	-	-	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	10
Melica spectabilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Poa juncifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Stipa occidentalis	22	30	40	16	-	12	14	-	12	-	-	-	-	-	-	-	-	-	-	-	7.3	35
Stipa richardsonii	3	-	12	2	5	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	30
TOTAL NPG	55	58	93	59	23	75	55	19	34	48	81	78	55	70	58	69	38	2	-	-	48.5	90
INTRODUCED PERENNIAL GRAMINOIDS																						
Poa pratensis	2	-	-	-	-	-	4	15	12	14	3	-	-	-	-	-	-	-	4	-	2.7	35
NATIVE PERENNIAL FORBS																						
Achillea millefolium	4	-	-	1	-	8	-	-	-	-	1	-	-	-	5	1	-	-	-	-	1.0	30
Agoseris glauca	-	2	-	1	12	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	20
Allium cernuum	-	-	-	-	-	-	-	7	-	1	-	-	-	-	-	-	-	-	-	-	0.4	10
Antennaria microphylla	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Antennaria parvifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Antennaria racemosa	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	0.1	10
Arenaria congesta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Arnica cordifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	0.4	5
Arnica sororia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	50
TRANSECT:	24	ASPECT:	233
DATE:	08/17/89	ELEVATION:	6560
WORKER(S):	LL & DC	TOPOGRAPHY:	MIDSLOPE
PHOTO:	33	CONFIGURATION:	CONVEX

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	T	-	3	-	-	-	-	-	T	3	-	-	32	T	-	-	-	-	-	-	2.0	30
ROCK	-	T	50	-	-	-	18	T	2	T	-	-	7	T	-	-	-	-	-	-	4.0	40
LITTER	98	95	45	99	99	99	82	99	96	96	99	97	60	35	99	99	98	99	99	96	89.5	100
LICHENS	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	T	10
BRYOPHYTE	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	4	0.4	15
TOTAL VEG. (non-stratified)	97	70	15	99	99	90	60	99	90	85	90	99	99	99	55	95	65	99	99	55	83.0	100
TOTAL UNDERSTORY VEG.	63	70	15	29	55	70	55	17	75	17	90	90	10	10	-	T	3	-	85	55	40.5	90
NATIVE PERENNIAL GRAMINOIDS																						
Agropyron spicatum	-	-	7	-	-	-	-	-	-	4	-	-	6	-	-	-	-	-	-	-	0.9	15
Carex geyeri	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	T	5
Festuca idahoensis	2	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	0.2	10
Poa scabrella	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	-	-	-	T	5
TOTAL NPG	2	-	7	-	-	-	-	-	-	7	-	-	7	-	-	-	-	-	-	-	1.1	20
INTRODUCED PERENNIAL GRAMINOIDS																						
Phleum pratense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
NATIVE PERENNIAL FORBS																						
Achillea millefolium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Allium cernuum	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	T	10
Anemone multifida	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
Antennaria microphylla	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Astragalus miser	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Epilobium angustifolium	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Erigeron compositus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Helianthella uniflora	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	T	5
Linum lewisii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lithospermum ruderale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Penstemon procerus	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	0.2	5
Solidago missouriensis	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	T	5
TOTAL NPF	5	-	-	-	-	-	2	-	1	1	-	-	4	-	-	T	-	-	-	-	0.7	30
SUBSHRUBS																						
Berberis repens	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	5

Transect 6 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
SHRUBS																						
Clematis occidentalis	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Juniperus communis	-	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	5
TOTAL SHRUBS	-	46	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	10
TREES																						
Pinus contorta	-	-	-	-	-	-	-	-	99	55	-	-	-	-	-	-	-	-	-	-	7.7	10
Pseudotsuga menziesii	-	30	95	99	99	-	90	65	-	20	90	99	75	90	99	99	60	75	90	-	63.8	80
TOTAL TREES	-	30	95	99	99	-	90	65	99	75	90	99	75	90	99	99	60	75	90	-	71.5	85
TOTAL VEG. (stratified)	49	84	127	113	108	1	115	122	153	117	132	147	75	151	133	105	119	146	146	63	110.3	100

Transect 24 (Continued)

SPECIES	CANOPY COVERAGE PLOT NUMBERS (1-20) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
SHRUBS																						
Artemisia tridentata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Juniperus communis	60	70	-	29	55	70	55	17	75	9	90	90	-	10	-	-	3	-	85	55	38.7	75
TOTAL SHRUBS	60	70	-	29	55	70	55	17	75	9	90	90	-	10	-	-	3	-	85	55	38.7	75
TREES																						
Juniperus scopulorum	-	-	-	10	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	1.0	10
Pinus flexilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	95	65	-	-	-	10.0	15
Pinus ponderosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pseudotsuga menziesii	85	-	-	99	95	35	10	99	20	80	-	50	99	99	20	-	-	99	90	-	49.0	70
TOTAL TREES	85	-	-	109	95	35	10	99	20	80	-	50	109	99	60	95	65	99	90	-	60.0	80
TOTAL VEG. (stratified)	152	70	15	138	150	105	67	116	96	97	90	140	120	109	60	96	68	99	175	55	100.8	100

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	38
TRANSECT:	6	ASPECT:	135
DATE:	08/15/89	ELEVATION:	6840
WORKER(S):	LL & DC	TOPOGRAPHY:	MIDSLOPE
PHOTO:	4-5	CONFIGURATION:	UNDULATING

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	T	-	-	-	0.1	10
ROCK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	
LITTER	90	99	98	99	99	99	99	95	96	97	97	96	99	97	98	97	97	96	82	96	96.3	100
LICHENS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	T	T	10
BRYOPHYTE	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	1.1	10
TOTAL VEG. (non-stratified)	44	65	98	99	99	1	90	90	99	85	95	99	75	95	99	99	75	96	97	57	82.9	100
TOTAL UNDERSTORY VEG.	44	52	30	14	9	1	25	55	54	41	42	47	-	57	32	6	52	67	53	57	36.9	95
NATIVE PERENNIAL GRAMINOIDS																						
Agropyron caninum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Bromus carinatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	T	5
Calamagrostis rubescens	6	T	4	4	-	-	-	45	-	6	8	35	-	30	20	4	12	10	-	2	9.3	70
Carex concinnoides	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	0.2	5
Carex geyeri	15	-	20	-	2	-	25	12	50	35	32	6	-	-	6	-	40	50	40	55	19.4	70
Festuca idahoensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.1	5
Stipa occidentalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPG	21	T	24	4	2	-	25	57	50	41	40	44	-	30	26	4	52	60	40	60	29.0	90
NATIVE PERENNIAL FORBS																						
Achillea millefolium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	0.2	5
Allium cernuum	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	5
Antennaria racemosa	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	0.2	5
Arnica cordifolia	-	3	3	2	2	1	-	-	-	-	-	-	-	12	8	-	3	9	5	-	2.4	50
Campanula rotundifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Disporum trachycarpum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Fragaria vesca	4	-	-	8	-	-	-	-	4	1	-	-	-	-	-	-	-	-	-	-	0.9	20
Fragaria virginiana	-	-	-	-	-	-	-	-	-	-	2	4	-	16	-	2	4	2	11	-	2.1	35
Lithospermum ruderale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Penstemon procerus	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
Potentilla glandulosa	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
TOTAL NPF	5	3	5	10	7	1	-	-	4	1	2	4	-	31	8	2	7	11	16	3	6.0	85
SUBSHRUBS																						
Berberis repens	23	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	10

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	25
TRANSECT:	25	ASPECT:	046
DATE:	08/17/89	ELEVATION:	6490
WORKER(S):	ED & KS	TOPOGRAPHY:	LOWER SLOPE
PHOTO:	20	CONFIGURATION:	STRAIGHT

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	2	-	-	-	1	-	-	-	T	-	-	-	-	-	-	-	-	-	-	0.2	15
ROCK	-	-	-	5	1	37	-	-	-	3	15	-	-	20	-	-	-	-	-	-	4.1	30
LITTER	96	97	83	61	62	43	97	96	90	88	67	89	99	76	99	99	99	99	91	99	86.5	100
LICHENS	1	-	1	T	T	2	-	-	3	4	10	2	-	1	-	-	-	-	-	T	1.3	55
BRYOPHYTE	-	-	12	30	35	16	-	-	5	4	7	1	-	2	-	T	-	-	8	1	6.1	60
TOTAL VEG. (non-stratified)	99	88	94	42	84	37	98	95	85	75	92	92	48	85	95	40	95	95	96	85	81.0	100
TOTAL UNDERSTORY VEG.	26	15	80	42	47	37	85	76	24	65	30	18	9	65	16	5	7	8	41	46	37.1	100
NATIVE PERENNIAL GRAMINOIDS																						
Calamagrostis rubescens	-	-	1	-	-	-	-	-	18	-	-	18	-	-	-	T	T	-	-	-	1.9	25
Carex concinnoides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Carex geyeri	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Sitanion hystrix	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPG	4	-	1	-	-	-	-	-	18	-	-	18	-	-	-	T	T	-	-	-	2.1	30
NATIVE PERENNIAL FORBS																						
Antennaria racemosa	-	-	-	-	-	-	-	-	8	4	-	-	-	-	-	-	-	-	-	-	0.6	10
Arnica cordifolia	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	0.2	5
Aster conspicuus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Epilobium angustifolium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Fragaria virginiana	-	-	-	1	9	1	2	-	T	4	3	-	9	7	-	1	1	8	3	-	2.5	65
Hieracium albiflorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	0.2	5
Potentilla glandulosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pyrola chlorantha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pyrola secunda	5	-	-	T	-	6	-	3	-	-	2	-	-	-	-	-	-	-	-	-	0.8	25
Solidago missouriensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPF	5	-	-	2	9	7	2	3	9	8	9	-	9	7	-	1	4	8	3	-	4.2	75
SUBSHRUBS																						
Berberis repens	-	9	T	-	-	7	-	-	-	-	5	-	-	-	-	-	-	-	-	2	1.2	25
Chimaphila umbellata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	T	5
TOTAL SUBSHRUBS	-	9	T	-	-	7	-	-	-	-	5	-	-	-	-	-	-	-	1	2	1.2	30
SHRUBS																						
Clematis occidentalis	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Juniperus communis	18	6	80	42	40	16	82	75	-	20	25	-	-	62	-	-	-	-	32	36	26.7	65
Salix scouleriana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Shepherdia canadensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	

Transect 5 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
SUBSHRUBS																						
Berberis repens	-	-	2	-	-	-	-	T	1	4	1	T	-	6	6	-	-	7	T	-	1.4	50
SHRUBS																						
Amelanchier alnifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Juniperus communis	62	28	18	80	-	-	-	-	22	24	2	-	-	26	-	-	-	-	-	7	13.5	45
Rosa acicularis	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	T	10
Shepherdia canadensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Spiraea betulifolia	9	8	10	24	5	1	12	4	-	-	-	1	-	-	-	-	-	-	-	-	3.7	45
TOTAL SHRUBS	71	36	28	104	6	1	12	4	22	24	2	1	-	26	-	-	-	-	1	7	17.2	75
TREES																						
Juniperus scopulorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pinus contorta	-	40	-	-	-	-	10	85	-	40	85	90	85	40	-	-	50	90	60	55	36.5	60
Pseudotsuga menziesii	60	-	-	10	80	-	-	-	5	-	-	1	-	-	-	65	-	50	-	1	13.6	40
TOTAL TREES	60	40	-	10	80	-	10	85	5	40	85	91	85	40	-	65	50	140	60	56	50.1	85
TOTAL VEG. (stratified)	132	90	45	138	126	34	31	153	60	75	88	112	86	74	48	123	92	206	96	73	93.9	100

Transect 25 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
SHRUBS (Continued)																						
Spiraea betulifolia	-	-	1	-	-	10	6	T	2	4	-	-	-	3	16	4	3	T	12	2	3.2	65
Vaccinium scoparium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL SHRUBS	18	6	81	42	40	26	88	76	2	24	25	-	-	65	16	4	3	T	44	38	29.9	90
TREES																						
Juniperus scopulorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Picea engelmannii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pinus contorta	99	85	80	-	55	-	95	90	75	55	85	90	45	65	95	20	10	20	90	75	61.5	90
Populus tremuloides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pseudotsuga menziesii	-	-	-	-	-	-	-	-	-	35	-	-	-	-	-	25	95	95	-	-	12.5	20
TOTAL TREES	99	85	80	-	55	-	95	90	75	90	85	90	45	65	95	45	105	115	90	75	74.0	90
TOTAL VEG. (stratified)	126	100	163	44	104	40	185	172	104	122	124	108	54	137	111	51	113	124	138	115	111.6	100

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	40
TRANSECT:	5	ASPECT:	291
DATE:	08/15/89	ELEVATION:	6875
WORKER(S):	KS & ED	TOPOGRAPHY:	UPPER MID SLOPE
PHOTO:	28	CONFIGURATION:	CONVEX

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	1	-	-	-	-	-	-	-	1	1	T	1	-	-	-	-	-	-	0.2	25
ROCK	-	-	3	-	-	4	15	-	1	3	4	12	3	20	3	1	T	4	T	5	4.0	75
LITTER	86	77	58	57	55	32	64	93	59	15	91	76	86	52	24	49	86	87	69	35	62.6	100
LICHENS	2	5	12	2	T	3	5	T	7	20	T	7	4	15	35	8	2	3	4	5	7.0	100
BRYOPHYTE	7	15	23	36	40	58	15	2	30	61	3	3	6	10	35	38	8	2	24	54	23.5	100
TOTAL VEG. (non-stratified)	84	70	43	85	86	33	28	95	50	55	85	91	85	55	45	87	75	95	70	60	68.9	100
TOTAL UNDERSTORY VEG.	65	46	43	85	44	33	21	66	50	32	3	19	1	30	45	55	40	84	33	15	40.5	100
NATIVE PERENNIAL GRAMINOIDS																						
Calamagrostis rubescens	-	14	15	16	26	32	9	52	29	T	-	3	1	2	35	54	38	56	26	6	20.7	90
Carex rossii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Sitanion hystrix	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Trisetum spicatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPG	-	14	15	16	26	32	9	52	29	T	-	3	1	2	35	54	38	56	26	6	20.7	90
NATIVE PERENNIAL FORBS																						
Achillea millefolium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Agoseris glauca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Allium cernuum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Anemone multifida	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Antennaria microphylla	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-	T	5
Antennaria racemosa	1	-	-	5	14	-	-	-	3	6	-	16	-	-	-	-	-	-	3	3	2.6	40
Arnica cordifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	T	5
Aster conspicuus	-	-	-	3	-	-	-	11	-	-	-	-	-	-	-	-	-	-	-	-	0.7	10
Campanula rotundifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2	4	-	0.4	15
Castilleja miniata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Fragaria virginiana	-	-	-	-	-	T	-	-	-	-	-	-	-	-	-	3	1	-	-	T	0.3	20
Hieracium cynoglossoides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lupinus sericeus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pedicularis contorta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Penstemon procerus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Sedum lanceolatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Senecio streptanthifolius	-	-	-	-	-	-	-	-	-	-	-	T	-	-	5	1	2	1	-	-	0.5	25
TOTAL NPF	1	-	-	8	14	T	-	11	3	6	-	17	-	-	7	4	4	3	8	4	4.5	70
NATIVE ANNUAL/BIENNIAL FORBS																						
Arabis holboellii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	54
TRANSECT:	27	ASPECT:	160
DATE:	08/18/89	ELEVATION:	6350
WORKER(S):	KS & ED	TOPOGRAPHY:	LOWER MID SLOPE
PHOTO:	21	CONFIGURATION:	UNDULATING

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	4	T	-	-	-	-	-	-	-	10	-	-	1	30	35	5	-	-	5	4.5	40
ROCK	2	5	4	-	-	-	13	22	56	10	15	1	3	30	35	3	20	-	-	10	11.5	75
LITTER	97	90	94	99	99	98	81	33	38	78	66	93	66	65	34	60	73	99	97	83	77.2	100
LICHENS	T	T	1	-	-	-	2	3	5	8	5	3	T	1	T	-	T	-	-	T	1.6	70
BRYOPHYTE	-	-	-	-	-	-	2	42	1	4	4	T	30	1	-	T	-	-	-	-	4.3	45
TOTAL VEG. (non-stratified)	95	95	55	65	98	90	94	28	80	58	47	70	95	72	20	46	47	97	99	88	72.0	100
TOTAL UNDERSTORY VEG.	11	6	25	15	36	76	70	28	48	58	47	70	90	19	20	46	31	88	94	30	45.4	100
NATIVE PERENNIAL GRAMINOIDS																						
Agropyron spicatum	1	-	-	-	2	-	2	-	4	12	2	-	-	3	8	26	8	-	-	-	3.4	50
Agrostis scabra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Carex geyeri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Carex petasata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	0.3	5
Carex rossii	-	-	-	-	-	4	-	5	2	8	8	4	2	10	-	2	-	-	-	17	3.1	50
Festuca idahoensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Festuca scabrella	T	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	-	-	-	-	T	10
Koeleria cristata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Stipa occidentalis	2	-	-	1	T	-	-	T	4	4	4	7	4	1	-	-	-	-	-	-	1.4	50
TOTAL NPG	4	-	-	1	3	4	2	6	10	24	14	12	6	14	8	28	13	-	-	17	8.2	80
INTRODUCED PERENNIAL GRAMINOIDS																						
Phleum pratense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Poa pratensis	-	-	-	-	-	-	8	-	5	3	6	1	1	3	6	7	-	-	-	-	2.0	45
TOTAL IPG	-	-	-	-	-	-	8	-	5	3	6	1	1	3	6	7	-	-	-	-	2.0	45
NATIVE PERENNIAL FORBS																						
Achillea millefolium	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	0.1	5
Allium cernuum	3	-	-	2	1	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	0.4	20
Antennaria microphylla	-	-	-	-	5	-	-	-	-	-	-	14	-	-	-	-	-	-	-	-	1.0	10
Aster conspicuus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Campanula rotundifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Cerastium arvense	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Eriogonum umbellatum	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	0.1	5
Erysimum inconspicuum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Fritillaria atropurpurea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Geranium viscosissimum	-	-	-	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-	0.2	10
Lithospermum ruderale	-	-	-	-	1	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	0.4	10
Lomatium triternatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	35
TRANSECT:	4	ASPECT:	260
DATE:	08/15/89	ELEVATION:	6970
WORKER(S):	LL & DC	TOPOGRAPHY:	LOWER SLOPE
PHOTO:	2-3	CONFIGURATION:	CONCAVE-UNDULATING

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	-	T	5
ROCK	2	1	-	-	-	-	4	-	-	-	-	2	12	3	-	-	-	-	-	-	1.2	30
LITTER	35	83	97	97	91	79	92	95	97	96	95	81	80	75	70	92	93	94	94	91	86.4	100
LICHENS	-	-	-	-	-	3	-	-	-	-	-	3	1	2	-	-	-	-	-	T	0.5	25
BRYOPHYTE	62	14	-	-	5	15	-	-	-	-	-	10	3	15	-	4	4	-	T	5	6.9	55
TOTAL VEG. (non-stratified)	44	60	95	97	57	54	95	96	80	60	90	41	90	80	99	95	95	85	85	55	77.7	100
TOTAL UNDERSTORY VEG.	44	50	43	44	57	54	65	76	42	60	83	41	78	63	7	70	58	85	85	55	58.0	100
NATIVE PERENNIAL GRAMINOIDS																						
Calamagrostis rubescens	33	35	30	33	22	40	60	35	35	55	65	35	30	37	5	45	35	60	55	30	38.8	100
Carex concinnoides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	12	-	0.8	10
Carex geyeri	-	-	-	-	9	-	-	-	-	-	-	-	4	10	-	-	-	10	-	-	1.7	20
TOTAL NPG	33	35	30	33	31	40	60	35	35	55	65	35	34	47	5	49	35	70	67	30	41.2	100
NATIVE PERENNIAL FORBS																						
Antennaria microphylla	3	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	5	-	0.5	15
Arnica cordifolia	2	7	3	7	-	2	10	-	2	-	9	4	6	5	-	5	8	T	4	T	3.8	80
Aster conspicuus	-	2	-	-	-	-	-	-	-	-	-	-	3	-	-	-	4	-	-	-	0.5	15
Astragalus miser	3	6	12	-	25	16	3	45	-	4	11	2	27	9	3	28	9	5	3	15	11.3	90
Fragaria virginiana	7	-	-	-	-	-	-	-	-	-	-	3	2	4	-	-	-	-	-	-	0.8	20
TOTAL NPF	15	15	15	7	25	19	13	45	2	4	20	9	38	18	3	33	21	6	12	16	16.8	100
SUBSHRUBS																						
Berberis repens	-	5	-	6	6	-	12	1	8	8	10	-	10	2	-	2	-	5	6	8	4.5	70
SHRUBS																						
Juniperus communis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Spiraea betulifolia	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	20	10	6	2.2	30
TOTAL SHRUBS	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	20	10	6	2.2	30
TREES																						
Pinus contorta	-	40	90	95	-	-	40	85	60	-	25	-	20	30	99	80	90	-	-	-	37.7	60
Pseudotsuga menziesii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL TREES	-	40	90	95	-	-	40	85	60	-	25	-	20	30	99	80	90	-	-	-	37.7	60
TOTAL VEG. (stratified)	50	99	135	141	62	59	125	166	105	67	120	44	102	97	107	164	148	101	95	60	102.3	100

Transect 27 (Continued)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
NATIVE PERENNIAL FORBS (Continued)																						
Lupinus sericeus	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Lychnis drummondii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Penstemon attenuatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Phacelia hastata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Solidago missouriensis	-	-	4	5	-	3	-	-	2	-	-	6	3	-	-	-	-	-	-	-	1.2	30
TOTAL NPF	3	-	4	7	7	3	-	4	2	2	8	22	7	-	-	-	-	-	-	-	3.5	55
FERNS AND ALLIES																						
Cystopteris fragilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
NATIVE ANNUAL/BIENNIAL FORBS																						
Arabis holboellii	-	1	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	0.3	10
Collomia linearis	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	-	-	-	-	T	5
Collinsia parviflora	-	-	-	-	-	-	-	-	T	1	5	-	-	2	5	2	10	-	-	1	1.3	40
Phacelia linearis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Polygonum douglasii	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	-	-	-	-	T	5
TOTAL NAF	-	1	-	-	-	-	-	-	5	1	5	1	-	2	5	2	10	-	-	1	1.6	50
INTRODUCED ANNUAL/BIENNIAL FORBS																						
Arabis glabra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
SUBSHRUBS																						
Berberis repens	6	5	2	4	6	11	T	5	20	15	16	4	-	-	2	12	10	12	-	-	6.5	80
SHRUBS																						
Artemisia tridentata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Juniperus communis	-	-	23	-	9	6	60	16	-	8	-	18	-	-	-	-	-	-	-	-	7.0	35
Prunus virginiana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Spiraea betulifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Symphoricarpos albus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL SHRUBS	-	-	23	-	9	6	60	16	-	8	-	18	-	-	-	-	-	-	-	-	7.0	35
TREES																						
Juniperus scopulorum	-	-	-	5	15	65	-	-	-	-	-	-	90	-	-	-	-	88	94	15	18.6	35
Pinus contorta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pinus flexilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pinus ponderosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pseudotsuga menziesii	95	95	35	60	98	80	85	-	75	15	-	20	80	65	-	-	25	95	98	85	55.3	80
TOTAL TREES	95	95	35	65	113	145	85	-	75	15	-	20	170	65	-	-	25	183	192	100	73.9	80
TOTAL VEG. (stratified)	108	101	64	77	138	169	156	31	117	68	49	78	184	84	21	49	58	195	192	118	102.7	100

Transect 3 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
SHRUBS																						
Juniperus communis	-	-	-	-	-	-	-	-	-	-	-	-	-	20	-	-	-	-	-	-	1.0	5
Lonicera utahensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Rosa acicularis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Spiraea betulifolia	-	T	-	7	-	14	3	T	-	-	-	-	-	-	-	-	-	-	T	4	1.5	35
Vaccinium scoparium	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	5
TOTAL SHRUBS	-	T	-	7	7	14	3	T	-	-	-	-	-	20	-	-	-	-	T	4	2.8	45
TREES																						
Pinus contorta	80	80	60	10	85	95	85	95	60	75	85	65	55	70	25	65	90	70	85	55	69.5	100
Pseudotsuga menziesii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL TREES	80	80	60	10	85	95	85	95	60	75	85	65	55	70	25	65	90	70	85	55	69.5	100
TOTAL VEG. (stratified)	147	141	129	95	148	139	107	98	69	78	88	97	100	156	60	77	167	84	123	84	109.2	100

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	18
TRANSECT:	13	ASPECT:	090
DATE:	08/16/89	ELEVATION:	6670
WORKER(S):	KS & ED	TOPOGRAPHY:	MIDSLOPE
PHOTO:	32	CONFIGURATION:	STRAIGHT

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	T	-	-	-	-	T	-	T	15	-	-	-	-	-	-	5	-	1	1.1	30
ROCK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	
LITTER	88	92	98	96	84	92	99	96	96	91	85	94	92	87	63	71	77	74	98	98	88.6	100
LICHENS	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	T	1	-	0.1	15
BRYOPHYTE	5	6	-	3	12	2	-	-	-	3	-	1	-	5	30	25	16	-	1	-	5.5	60
TOTAL VEG. (non-stratified)	98	99	98	82	85	98	97	96	50	97	97	80	90	80	98	98	97	95	85	68	89.4	100
TOTAL UNDERSTORY VEG.	83	28	5	14	37	73	11	37	31	68	31	54	75	80	92	50	65	-	1	15	42.5	95
NATIVE PERENNIAL GRAMINOIDS																						
Calamagrostis rubescens	22	-	T	2	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	1.4	20
Carex geyeri	-	-	-	-	-	-	-	32	-	7	24	-	-	-	56	18	42	-	1	10	9.5	40
Carex raynoldsii	-	1	T	1	-	-	-	-	-	-	-	32	2	T	-	-	-	-	-	-	1.9	30
Carex rossii	-	16	-	T	34	72	7	-	26	35	8	18	70	38	12	4	20	-	-	-	18.0	70
Danthonia intermedia	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	1	-	-	-	-	0.4	10
Festuca scabrella	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Poa nervosa	64	-	-	2	1	-	-	-	-	5	1	-	-	-	-	5	3	-	-	-	4.1	35
Stipa occidentalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPG	86	17	1	6	35	72	10	32	26	47	33	50	72	49	68	28	65	-	1	10	35.4	95
NATIVE PERENNIAL FORBS																						
Achillea millefolium	T	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	0.1	15
Allium cernuum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Antennaria anaphaloides	-	-	-	-	-	-	-	-	-	-	-	-	2	3	2	-	-	-	-	-	0.4	15
Antennaria microphylla	-	-	-	-	-	1	-	-	-	-	-	-	-	24	9	-	-	-	-	-	1.7	15
Arabis drummondii	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	0.1	10
Arnica cordifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	0.4	5
Aster conspicuus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	T	5
Campanula rotundifolia	-	-	-	-	2	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	0.4	15
Dodecatheon conjugens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Fragaria virginiana	3	3	2	8	T	2	2	3	3	3	-	2	-	9	6	5	-	-	-	-	2.6	70
Galium boreale	-	9	3	-	2	-	-	5	4	13	-	-	-	-	-	-	-	-	-	-	1.8	30
Geum triflorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Hackelia micrantha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Lithospermum ruderale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Penstemon procerus	-	-	-	-	-	-	-	-	-	6	-	-	T	-	-	5	-	-	-	-	0.6	15
Potentilla glandulosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	9
TRANSECT:	3	ASPECT:	250
DATE:	08/14/89	ELEVATION:	6880
WORKER(S):	KS & ED	TOPOGRAPHY:	UPPER SADDLE
PHOTO:	27	CONFIGURATION:	UNDULATING

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	T	5
ROCK	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	0.2	5
LITTER	97	88	94	92	89	95	98	87	95	96	98	94	89	89	97	86	94	97	94	67	91.8	100
LICHENS	-	-	-	-	-	T	-	T	4	-	1	-	-	2	-	6	2	T	T	8	1.3	50
BRYOPHYTE	-	8	2	-	6	T	1	12	-	3	-	4	8	-	-	4	-	-	1	22	3.6	60
TOTAL VEG. (non-stratified)	90	87	85	85	92	96	87	95	61	75	85	72	88	88	54	69	93	70	88	78	81.9	100
TOTAL UNDERSTORY VEG.	64	55	68	80	58	41	19	2	9	3	2	31	43	84	33	12	72	14	36	26	38.1	100
NATIVE PERENNIAL GRAMINOIDS																						
Calamagrostis rubescens	38	32	67	75	40	22	16	2	8	3	T	3	36	62	17	8	65	14	35	23	28.3	100
Carex concinnoides	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Carex geyeri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPG	38	35	67	75	40	22	16	2	8	3	T	3	36	62	17	8	65	14	35	23	28.5	100
NATIVE PERENNIAL FORBS																						
Antennaria racemosa	20	21	1	T	-	-	-	-	-	-	-	16	3	-	6	-	12	-	-	-	4.0	40
Arnica cordifolia	9	-	-	-	-	-	3	-	1	-	2	-	-	-	-	-	-	-	-	2	0.9	25
Aster conspicuus	-	4	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	0.3	10
Campanula rotundifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Epilobium angustifolium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Fragaria virginiana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	0.1	5
Goodyera oblongifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Hypopitys monotropa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Penstemon procerus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pyrola chlorantha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pyrola secunda	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	10
Senecio streptanthifolius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL NPF	29	25	2	3	-	-	3	-	1	-	2	16	5	-	6	-	12	-	2	2	5.4	65
SUBSHRUBS																						
Arctostaphylos uva-ursi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Berberis repens	-	-	-	-	16	8	-	-	-	-	-	13	4	4	12	4	-	-	-	-	3.1	35
Chimaphila umbellata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL SUBSHRUBS	-	-	-	-	16	8	-	-	-	-	-	13	4	4	12	4	-	-	-	-	3.1	35

Transect 13 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
NATIVE PERENNIAL FORBS (Continued)																						
Potentilla gracilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	0.2	5
Pyrola secunda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	0.2	5
Senecio serra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Senecio streptanthifolius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Smilacina stellata	-	2	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	-	0.1	10
Thalictrum occidentale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Valeriana dioica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	3	-	-	-	0.5	10
Viola nuttallii	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
TOTAL NPF	5	14	5	8	5	3	2	8	7	24	1	2	3	38	18	24	6	-	-	8	9.0	90
INTRODUCED PERENNIAL FORBS																						
Taraxacum officinale	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
SUBSHRUBS																						
Berberis repens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
SHRUBS																						
Clematis columbiana	-	-	-	2	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	0.3	10
Juniperus communis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
TOTAL SHRUBS	-	-	-	2	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	0.3	10
TREES																						
Juniperus scopulorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pinus contorta	-	-	-	-	-	25	85	75	40	-	-	-	-	-	40	75	-	-	-	-	17.0	30
Pseudotsuga menziesii	95	99	98	80	75	85	75	80	-	90	95	60	80	-	45	80	95	95	85	65	73.9	90
TOTAL TREES	95	99	98	80	75	110	160	155	40	90	95	60	80	-	85	155	95	95	85	65	90.9	95
TOTAL VEG. (stratified)	188	130	104	96	115	185	172	195	73	161	129	112	159	87	171	207	166	95	86	83	135.5	100

Transect 1 (Continued)

	CANOPY COVERAGE PLOT NUMBERS (1-20)																					
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
TREES																						
Pinus contorta	90	-	-	-	-	96	-	-	25	65	-	95	55	20	88	80	75	50	-	80	41.0	60
Picea engelmannii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Pinus flexilis	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	0.2	5
Pseudotsuga menziesii	-	-	95	20	-	-	-	-	10	30	-	-	50	95	-	50	-	10	-	-	18.0	40
TOTAL TREES	90	-	95	20	-	96	-	-	38	95	-	95	105	115	88	130	75	60	-	80	59.1	70
TOTAL VEG. (stratified)	148	23	118	114	35	120	51	33	48	100	33	109	142	128	91	132	85	60	6	162	86.9	100

WESTERN TECHNOLOGY AND ENGINEERING, INC.
FIELD DATA SHEET
(20) 2 x 5 dM PLOTS

STUDY AREA:	GOLD FIELDS ELKHORN PROJECT	SLOPE (%):	58
TRANSECT:	1	ASPECT:	336
DATE:	08/14/89	ELEVATION:	6760
WORKER(S):	KS & ED	TOPOGRAPHY:	UPPER MID SLOPE
PHOTO:	26	CONFIGURATION:	STRAIGHT

CANOPY COVERAGE
PLOT NUMBERS (1-20)

SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MEAN	FREQ.
BARE GROUND	-	-	-	-	-	-	-	-	T	26	4	12	-	-	15	-	-	5	1	-	3.2	35
ROCK	2	8	1	3	3	16	2	15	8	23	4	6	8	5	40	41	16	18	8	3	11.5	100
LITTER	87	20	81	61	16	65	72	39	76	38	70	54	66	41	17	40	72	52	63	82	55.6	100
LICHENS	1	2	4	2	3	14	17	3	6	5	8	12	6	8	15	4	5	10	15	2	7.1	100
BRYOPHYTE	-	69	12	30	76	2	5	40	8	7	11	8	17	38	12	14	7	15	12	8	19.5	95
TOTAL VEG. (non-stratified)	98	21	96	85	33	96	47	31	44	85	30	95	88	95	88	95	75	55	6	92	67.8	100
TOTAL UNDERSTORY VEG.	58	21	21	82	33	24	47	31	13	5	30	14	34	12	3	1	10	-	6	82	26.4	95
NATIVE PERENNIAL GRAMINOIDS																						
Calamagrostis rubescens	-	3	15	14	17	24	32	22	-	-	16	2	30	2	2	1	7	-	-	-	9.4	70
NATIVE PERENNIAL FORBS																						
Antennaria racemosa	-	16	2	18	13	-	14	3	10	3	7	-	2	T	1	T	-	-	2	-	4.6	70
Arnica cordifolia	-	4	3	2	-	-	3	5	-	2	3	-	-	9	-	-	-	-	4	-	1.8	45
Campanula rotundifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	T	5
Epiloblum angustifolium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Fragaria vesca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Fragaria virginiana	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	5
Heuchera cylindrica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Hieracium albiflorum	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	5
Pyrola chlorantha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Senecio streptanthifolius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Valeriana dioica	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	T	5
TOTAL NPF	-	20	6	20	13	-	19	9	10	5	10	-	2	11	1	T	-	-	6	-	6.6	70
SUBSHRUBS																						
Chimaphila umbellata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
SHRUBS																						
Clematis occidentalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Juniperus communis	58	-	-	60	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	6.0	15
Lonicera utahensis	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-	0.6	5
Rosa acicularis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Salix scouleriana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Shepherdia canadensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
Spiraea betulifolia	-	-	2	-	5	-	-	-	-	-	7	-	5	-	-	-	3	-	-	-	1.1	25
Vaccinium scoparium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	82	4.1	5
TOTAL SHRUBS	58	-	2	60	5	-	-	2	-	-	7	12	5	-	-	-	3	-	-	82	11.8	50