

Annual Status Report:

**2000 Plant Community Monitoring for
Agate Fossil Beds National Monument**



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Prairie Cluster Long-term Ecological Monitoring Program

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Plant Communities Monitored

The locations of plant community sampling sites were determined using a stratified random approach based on plant communities defined The USGS-NPS Vegetation Mapping Program. The following plant communities were sampled in 1999.

Northern Great Plains little bluestem prairie. The community occurs on uplands throughout the monument typically on shoulders of flat-topped hills and on eroding sandstone slopes of the sides of hills. Soils are poorly developed or absent. The community is sparsely vegetated (25%-50% average herbaceous cover), and dominated by dwarf caespitose, perennial forbs. The community possesses several noteworthy species that are disjunct from populations further south in the state including *Lesquerella alpina*, *Paronychia sessiliflora*, *Phlox hoodii* ssp. *muscoides*, and *Stenotus amerioides*. Two sample sites (20 plots) are located in the Northern Great Plains little bluestem community.

Needle & thread- Blue grama mixedgrass prairie. The community is found away from the floodplain throughout the monument, primarily on upper slopes and flat summits of hills. Soils are fine sands and fine loamy sands and often shallow. The community is dominated by graminoids less than 1m tall (*Carex filifolia*, *Stipa comata*). Two sample sites (20 plots) are located in the Needle & thread – Blue grama community.

Prairie Sandreed – Sand bluestem prairie. The community occurs throughout the monument, primarily on lower slopes and valley bottoms. Soils are mostly fine sand and loamy fine sands. The community is dominated by mid and tall grasses (*Calamovilfa longifolia*, *Stipa comata*) and forb diversity and abundance is typically low. Four sample sites (40 plots) are located in the Prairie Sandreed – Sandbluestem community.

Prairie Sandreed – Sand bluestem prairie, upland disturbance. Areas adjacent to the main road were briefly in cultivation and future plans include restoration of the area. Two sample sites (20 plots) are located in the disturbed areas of this community.

Western wheatgrass mixedgrass prairie. The community occurs on higher terraces throughout the monument on fairly level ground on either side of the river. Soils are fine sands and loamy fine sands. A relatively dense layer of graminoids (*Pascopyrum smithii*, *Poa pratense*) dominates the community, with *Equisetum laevigatum* being a diagnostic species. One sample site (10 plots) is located in the Western wheatgrass community.

Eleven sample sites (110 10 m² plots) were sampled in June and again in August 2000. Sampling procedures follow Buck et al., 1999. Data collection, processing and summary by John Boetsch, Mike DeBacker, Jennifer Haack, Karola Mlekush and Lisa Thomas.

Buck, C., S. Jenkins, G. Willson, M. DeBacker, L. Thomas. 1999. Protocol Design for Plant Community Monitoring. Draft.

**2000 Plant Community Monitoring Results: Northern Great Plains Bluestem Prairie,
Agate Fossil Beds NM**

Table 1a. Plant Community Composition: Species Richness and Shannon Diversity.

All Species:

Species Richness:	83	Total Shannon Evenness:	0.66
Total Shannon Diversity:	2.90	Mean Evenness (st dev):	0.64 (0.07)
Mean Diversity (st dev):	2.64 (0.40)		

Native Species Only:

Native Species Richness:	79	Total Shannon Evenness:	0.66
Total Shannon Diversity:	2.89	Mean Evenness (st dev):	0.65 (0.07)
Mean Diversity (st dev):	2.63 (0.39)		

Table 1b. Plant Community Summary: Relative Frequency and Cover of Exotic Species.

Number of Exotic Species: **4**
 Number of Native Species: **79**
 Exotic Ratio: **0.048**

	<u>Relative Frequency</u>	<u>Relative Cover</u>
Exotic	0.90%	0.19%
Native	99.10%	99.81%

Table 2a. Plant Community Structure: Ground Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Bare Soil	47.63%
Bare Rock	18.00%
Grass Litter	20.35%
Woody Debris	0.15%
Leaf Litter	0.27%
Unvegetated Surface	66.88%

Table 2b. Plant Community Structure: Vegetation Type Cover.

<u>Vegetation Type</u>	<u>Mean Percent Cover</u>
Grasses/Grass-Like	43.20%
Herbs	12.65%
Shrubs	15.35%

Table 3a. Plant Community Composition: Herbaceous and Shrub Species.

Species	Frequency	Mean Cover	Importance Value
SCHIZACHYRIUM SCOPARIUM	100.00%	22.20%	0.1696
GUTIERREZIA SAROTHRAE	70.00%	10.18%	0.0682
STIPA COMATA	90.00%	6.75%	0.0578
BOUTELOUA GRACILIS	80.00%	5.06%	0.0431
YUCCA GLAUCA	80.00%	4.59%	0.0394
CAREX FILIFOLIA	50.00%	5.20%	0.0266
RHUS TRILOBATA	30.00%	8.58%	0.0254
BOUTELOUA CURTIPENDULA	35.00%	6.43%	0.0237
ARENARIA HOOKERI	65.00%	2.38%	0.0236
PHLOX ANDICOLA	80.00%	0.50%	0.0179
KOELERIA MACRANTHA	45.00%	2.94%	0.0177
ANDROPOGON HALLII	45.00%	2.94%	0.0175
CALAMOVILFA LONGIFOLIA	45.00%	2.94%	0.0174
LUPINUS PLATTENSIS	30.00%	5.75%	0.0171
ARISTIDA PURPUREA	65.00%	1.08%	0.0170
LITHOSPERMUM INCISUM	70.00%	0.50%	0.0159
ALLIUM TEXTILE	65.00%	0.50%	0.0148
TETRANEURIS ACAULIS	65.00%	0.50%	0.0144
MUHLENBERGIA PUNGENS	50.00%	1.25%	0.0139
GAURA COCCINEA	60.00%	0.50%	0.0137
ASTRAGALUS MISSOURIENSIS	55.00%	0.73%	0.0135
CALYLOPHUS SERRULATUS	50.00%	1.00%	0.0131
PARONYCHIA DEPRESSA	50.00%	1.00%	0.0129
LESQUERELLA LUDOVICIANA	55.00%	0.50%	0.0129
LIATRIS PUNCTATA	55.00%	0.50%	0.0127
ERYSIMUM ASPERUM	55.00%	0.50%	0.0127
ARTEMISIA FRIGIDA	40.00%	1.75%	0.0125
ELYMUS LANCEOLATUS ssp. LANCEOLATUS	50.00%	0.75%	0.0117
LEPIDIUM DENSIFLORUM	50.00%	0.50%	0.0116
ERIOGONUM FLAVUM	35.00%	1.57%	0.0104
THERMOPSIS RHOMBIFOLIA	35.00%	1.57%	0.0104
VIOLA NUTTALLII	40.00%	0.50%	0.0090
MACHAERANTHERA GRINDELIOIDES	15.00%	5.33%	0.0089
CYMOPTERUS ACAULIS	40.00%	0.50%	0.0088
LESQUERELLA ARENOSA	40.00%	0.50%	0.0086
ARABIS HOLBOELLII	35.00%	0.50%	0.0083
ERIOGONUM ANNUUM	35.00%	0.50%	0.0082
PSORALIDIUM TENUIFLORUM	35.00%	0.50%	0.0082
OPUNTIA FRAGILIS	35.00%	0.50%	0.0081
COMANDRA UMBELLATA	35.00%	0.50%	0.0076
PHACELIA HASTATA	30.00%	0.92%	0.0074
PSORALIDIUM LANCEOLATUM	30.00%	0.50%	0.0071
SILENE DRUMMONDII	25.00%	0.50%	0.0058
VULPIA OCTOFLORA	25.00%	0.50%	0.0058
ELYMUS ELYMOIDES	25.00%	0.50%	0.0056
OPUNTIA MACRORHIZA	25.00%	0.50%	0.0055
HETEROTHECA VILLOSA	20.00%	1.12%	0.0054
MIRABILIS HIRSUTA	20.00%	0.50%	0.0047

Species	Frequency	Mean Cover	Importance Value
LINUM RIGIDUM	20.00%	0.50%	0.0047
DALEA CANDIDA var. OLIGOPHYLLA	20.00%	0.50%	0.0046
PSORALEA ESCULENTA	20.00%	0.50%	0.0043
MUSINEON TENUIFOLIUM	20.00%	0.50%	0.0043
LINUM PUBERULUM	20.00%	0.50%	0.0043
CRYPTANTHA CELOSIODES	20.00%	0.50%	0.0043
PARONYCHIA SESSILIFLORA	20.00%	0.50%	0.0043
TRADESCANTIA OCCIDENTALIS	15.00%	0.50%	0.0036
LYGODESMIA JUNCEA	15.00%	0.50%	0.0036
EUPHORBIA ROBUSTA	15.00%	0.50%	0.0034
SENECIO RIDDELLII	15.00%	0.50%	0.0033
LATHYRUS POLYMORPHUS	15.00%	0.50%	0.0033
HEDEOMA DRUMMONDII	15.00%	0.50%	0.0032
ASTRAGALUS SPATULATUS	15.00%	0.50%	0.0032
ASTRAGALUS SERICOLEUCUS	10.00%	1.75%	0.0032
TRAGOPOGON DUBIUS	10.00%	0.50%	0.0023
SPOROBOLUS CRYPTANDRUS	10.00%	0.50%	0.0021
OENOTHERA CESPITOSA	10.00%	0.50%	0.0021
ASCLEPIAS VIRIDIFLORA	10.00%	0.50%	0.0021
OXYTROPIS SERICEA	10.00%	0.50%	0.0021
CASTILLEJA SESSILIFLORA	10.00%	0.50%	0.0021
CIRSIIUM FLODMANII	10.00%	0.50%	0.0021
SENECIO CANUS	5.00%	3.00%	0.0020
ASTRAGALUS CERAMICUS	5.00%	0.50%	0.0012
TOWNSENDIA GRANDIFLORA	5.00%	0.50%	0.0012
OENOTHERA ALBICAULIS	5.00%	0.50%	0.0012
SPHAERALCEA COCCINEA	5.00%	0.50%	0.0012
HELIANTHUS PETIOLARIS	5.00%	0.50%	0.0012
ANNUAL BROMUS SPP	5.00%	0.50%	0.0011
ASTRAGALUS CRASSICARPUS	5.00%	0.50%	0.0011
ORYZOPSIS HYMENOIDES	5.00%	0.50%	0.0011
MELILOTUS SPP	5.00%	0.50%	0.0011
MACHAERANTHERA PINNATIFIDA	5.00%	0.50%	0.0011
PENSTEMON ERIANTHERUS	5.00%	0.50%	0.0011
CORISPERMUM HYSSOPIFOLIUM	5.00%	0.50%	0.0011

Table 3b. Plant Community Composition: Exotic Species.

Species	Frequency	Mean Cover	Importance Value
TRAGOPOGON DUBIUS	10.00%	0.50%	0.0023
MELILOTUS SPP	5.00%	0.50%	0.0011
CORISPERMUM HYSSOPIFOLIUM	5.00%	0.50%	0.0011
ANNUAL BROMUS SPP	5.00%	0.50%	0.0011

2000 Plant Community Monitoring Results: Needle & Thread – Blue grama mixedgrass prairie, Agate Fossil Beds NM

Table 1a. Plant Community Composition: Species Richness and Shannon Diversity.

All Species:

Species Richness:	81		
Total Shannon Diversity:	2.14	Total Shannon Evenness:	0.49
Mean Diversity (st dev):	1.97 (0.69)	Mean Evenness (st dev):	0.49 (0.14)

Native Species Only:

Native Species Richness:	76		
Total Shannon Diversity:	2.06	Total Shannon Evenness:	0.47
Mean Diversity (st dev):	1.92 (0.65)	Mean Evenness (st dev):	0.48 (0.13)

Table 1b. Plant Community Summary: Relative Frequency and Cover of Exotic Species.

Number of Exotic Species: 5

Number of Native Species: 76

Exotic Ratio: 0.062

	<u>Relative Frequency</u>	<u>Relative Cover</u>
Exotic	3.55%	2.80%
Native	96.45%	97.20%

Table 2a. Plant Community Structure: Ground Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Bare Soil	34.38%
Bare Rock	6.45%
Grass Litter	44.13%
Woody Debris	0.02%
Leaf Litter	0.02%
Unvegetated Surface	46.25%

Table 2b. Plant Community Structure: Vegetation Type Cover.

<u>Vegetation Type</u>	<u>Mean Percent Cover</u>
Grasses/Grass-Like	79.55%
Herbs	12.18%
Shrubs	7.50%

Table 3a. Plant Community Composition: Herbaceous and Shrub Species.

Species	Frequency	Mean Cover	Importance Value
CAREX FILIFOLIA	100.00%	40.17%	0.2336
STIPA COMATA	95.00%	25.03%	0.1504
CALAMOVILFA LONGIFOLIA	40.00%	17.13%	0.0451
PSORALIDIUM LANCEOLATUM	60.00%	8.79%	0.0443
BOUTELOUA GRACILIS	90.00%	2.14%	0.0361
YUCCA GLAUCA	50.00%	6.40%	0.0288
OPUNTIA POLYACANTHA	80.00%	0.81%	0.0283
SCHIZACHYRIUM SCOPARIUM	35.00%	9.50%	0.0245
LYGODESMIA JUNCEA	65.00%	0.50%	0.0231
LESQUERELLA LUDOVICIANA	60.00%	0.50%	0.0197
LIATRIS PUNCTATA	50.00%	0.75%	0.0177
GAURA COCCINEA	50.00%	0.75%	0.0170
POA PRATENSIS	15.00%	17.67%	0.0165
GUTIERREZIA SAROTHRAE	35.00%	4.36%	0.0156
VIOLA NUTTALLII	45.00%	0.50%	0.0137
SPHAERALCEA COCCINEA	30.00%	0.50%	0.0120
PENSTEMON ANGUSTIFOLIUS	35.00%	0.50%	0.0111
ALLIUM TEXTILE	40.00%	0.50%	0.0110
RHUS TRILOBATA	15.00%	10.17%	0.0110
VULPIA OCTOFLORA	30.00%	0.50%	0.0106
SENECIO RIDDELLII	30.00%	0.50%	0.0092
MIRABILIS HIRSUTA	30.00%	0.50%	0.0092
ASTRAGALUS GRACILIS	20.00%	1.12%	0.0086
ELYMUS LANCEOLATUS ssp. LANCEOLATUS	25.00%	0.50%	0.0086
LATHYRUS POLYMORPHUS	30.00%	0.92%	0.0084
ARISTIDA PURPUREA	30.00%	0.50%	0.0077
TRAGOPOGON DUBIUS	20.00%	0.50%	0.0073
LITHOSPERMUM INCISUM	25.00%	0.50%	0.0072
ARTEMISIA FRIGIDA	25.00%	1.00%	0.0071
ARENARIA HOOKERI	25.00%	1.00%	0.0071
HELIANTHUS PETIOLARIS	15.00%	1.33%	0.0066
CYMOPTERUS ACAULIS	20.00%	1.12%	0.0065
PHLOX ANDICOLA	25.00%	0.50%	0.0065
MUSINEON TENUIFOLIUM	10.00%	7.75%	0.0061
OPUNTIA FRAGILIS	20.00%	0.50%	0.0059
ERIOGONUM ANNUUM	15.00%	0.50%	0.0053
PHLOX HOODII	15.00%	1.33%	0.0052
ERYSIMUM ASPERUM	20.00%	0.50%	0.0052
CRYPTANTHA CANA	15.00%	2.17%	0.0051
ARABIS HOLBOELLII	15.00%	0.50%	0.0046
MUHLENBERGIA PUNGENS	15.00%	1.33%	0.0045
CONYZA CANADENSIS	10.00%	0.50%	0.0040
SISYMBRIUM ALTISSIMUM	10.00%	0.50%	0.0040
MACHAERANTHERA PINNATIFIDA	10.00%	0.50%	0.0040
CIRSIIUM CANESCENS	10.00%	0.50%	0.0040
PSORALIDIUM TENUIFLORUM	10.00%	1.75%	0.0039
KOELERIA MACRANTHA	10.00%	1.75%	0.0039

Species	Frequency	Mean Cover	Importance Value
SENECIO CANUS	10.00%	1.75%	0.0039
LESQUERELLA ARENOSA	15.00%	0.50%	0.0039
CHENOPODIUM PRATERICOLA	10.00%	0.50%	0.0033
RUMEX VENOSUS	5.00%	3.00%	0.0026
TETRANEURIS ACAULIS	10.00%	0.50%	0.0026
DALEA CANDIDA var. OLIGOPHYLLA	10.00%	0.50%	0.0026
SPOROBOLUS CRYPTANDRUS	10.00%	0.50%	0.0026
DALEA PURPUREA	10.00%	0.50%	0.0026
ASTRAGALUS CERAMICUS	10.00%	0.50%	0.0026
CROTON TEXENSIS	5.00%	0.50%	0.0020
LUPINUS PLATTENSIS	5.00%	0.50%	0.0020
PLANTAGO PATAGONICA	5.00%	0.50%	0.0020
OENOTHERA NUTTALLII	5.00%	0.50%	0.0020
MELILOTUS SPP	5.00%	0.50%	0.0020
LEPIDIUM DENSIFLORUM	5.00%	0.50%	0.0020
ERIOGONUM CERNUUM	5.00%	0.50%	0.0020
LACTUCA SERRIOLA	5.00%	0.50%	0.0020
LACTUCA TATARICA var. PULCHELLA	5.00%	0.50%	0.0013
POLYGONUM RAMOSISSIMUM	5.00%	0.50%	0.0013
PARONYCHIA SESSILIFLORA	5.00%	0.50%	0.0013
PARONYCHIA DEPRESSA	5.00%	0.50%	0.0013
OXYTROPIS SERICEA	5.00%	0.50%	0.0013
OPUNTIA MACRORHIZA	5.00%	0.50%	0.0013
ASTRAGALUS MISSOURIENSIS	5.00%	0.50%	0.0013
CALYLOPHUS SERRULATUS	5.00%	0.50%	0.0013
EUPHORBIA ROBUSTA	5.00%	0.50%	0.0013
HETEROTHECA VILLOSA	5.00%	0.50%	0.0013
ERIGERON PUMILUS	5.00%	0.50%	0.0013
TOWNSENDIA GRANDIFLORA	5.00%	0.50%	0.0013
TRADESCANTIA OCCIDENTALIS	5.00%	0.50%	0.0013
COMANDRA UMBELLATA	5.00%	0.50%	0.0013
LINUM RIGIDUM	5.00%	0.50%	0.0013
CORYPHANTHA VIVIPARA	5.00%	0.50%	0.0013
ASTRAGALUS SPATULATUS	5.00%	0.50%	0.0013

Table 3b. Plant Community Composition: Exotic Species.

Species	Frequency	Mean Cover	Importance Value
POA PRATENSIS	15.00%	17.67%	0.0165
TRAGOPOGON DUBIUS	20.00%	0.50%	0.0073
SISYMBRIUM ALTISSIMUM	10.00%	0.50%	0.0040
MELILOTUS SPP	5.00%	0.50%	0.0020
LACTUCA SERRIOLA	5.00%	0.50%	0.0020

**2000 Plant Community Monitoring Results: Prairie Sandreed – Sand Bluestem Prairie,
Agate Fossil Beds NM**

Table 1a. Plant Community Composition: Species Richness and Shannon Diversity.

All Species:

Species Richness:	68	Total Shannon Evenness:	0.52
Total Shannon Diversity:	2.20	Mean Evenness (st dev):	0.51 (0.05)
Mean Diversity (st dev):	1.91 (0.28)		

Native Species Only:

Native Species Richness:	62	Total Shannon Evenness:	0.51
Total Shannon Diversity:	2.10	Mean Evenness (st dev):	0.50 (0.05)
Mean Diversity (st dev):	1.82 (0.27)		

Table 1b. Plant Community Summary: Relative Frequency and Cover of Exotic Species.

Number of Exotic Species: **6**
 Number of Native Species: **62**
 Exotic Ratio: **0.088**

	<u>Relative Frequency</u>	<u>Relative Cover</u>
Exotic	8.41%	2.74%
Native	91.59%	97.26%

Table 2a. Plant Community Structure: Ground Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Bare Soil	26.90%
Bare Rock	1.19%
Grass Litter	43.81%
Unvegetated Surface	43.13%

Table 2b. Plant Community Structure: Vegetation Type Cover.

<u>Vegetation Type</u>	<u>Mean Percent Cover</u>
Grasses/Grass-Like	79.68%
Herbs	9.54%
Shrubs	3.21%

Table 3a. Plant Community Composition: Herbaceous and Shrub Species.

Species	Frequency	Mean Cover	Importance Value
STIPA COMATA	100.00%	29.63%	0.1917
CALAMOVILFA LONGIFOLIA	100.00%	21.08%	0.1387
BOUTELOUA GRACILIS	77.50%	15.03%	0.0829
ANDROPOGON HALLII	57.50%	20.85%	0.0803
LYGODESMIA JUNCEA	87.50%	0.50%	0.0281
VULPIA OCTOFLORA	85.00%	0.57%	0.0272
CONYZA CANADENSIS	70.00%	1.38%	0.0266
LACTUCA SERRIOLA	70.00%	1.39%	0.0252
TRADESCANTIA OCCIDENTALIS	75.00%	0.50%	0.0234
LITHOSPERMUM INCISUM	72.50%	0.50%	0.0231
YUCCA GLAUCA	37.50%	5.67%	0.0228
LESQUERELLA LUDOVICIANA	57.50%	0.61%	0.0189
ERIOGONUM ANNUUM	55.00%	0.50%	0.0176
KOELERIA MACRANTHA	30.00%	4.96%	0.0170
CAREX FILIFOLIA	20.00%	8.50%	0.0163
HELIANTHUS PETIOLARIS	37.50%	2.60%	0.0153
MIRABILIS HIRSUTA	42.50%	0.50%	0.0135
POA PRATENSIS	22.50%	5.33%	0.0127
CHENOPODIUM PRATERICOLA	40.00%	0.50%	0.0126
ARABIS HOLBOELLII	40.00%	0.50%	0.0123
TRAGOPOGON DUBIUS	40.00%	0.50%	0.0121
ELYMUS LANCEOLATUS ssp. LANCEOLATUS	37.50%	0.83%	0.0118
LEPIDIUM DENSIFLORUM	37.50%	0.50%	0.0116
LUPINUS PLATTENSIS	20.00%	5.06%	0.0108
LATHYRUS POLYMORPHUS	27.50%	1.64%	0.0098
ARTEMISIA FRIGIDA	25.00%	2.20%	0.0096
RUMEX VENOSUS	27.50%	0.50%	0.0080
VIOLA NUTTALLII	22.50%	0.50%	0.0073
OENOTHERA NUTTALLII	20.00%	0.50%	0.0066
GAURA COCCINEA	20.00%	0.81%	0.0065
SILENE DRUMMONDII	20.00%	0.50%	0.0058
OPUNTIA FRAGILIS	17.50%	0.86%	0.0057
OPUNTIA MACRORHIZA	17.50%	0.86%	0.0057
PSORALIDIUM LANCEOLATUM	10.00%	4.13%	0.0055
ALLIUM TEXTILE	17.50%	0.50%	0.0051
SENECIO RIDDELLII	17.50%	0.50%	0.0051
ERIGERON BELLIDIASTRUM	10.00%	4.13%	0.0048
OENOTHERA ALBICAULIS	15.00%	0.50%	0.0048
DESCURAINIA PINNATA	15.00%	0.50%	0.0045
LIATRIS PUNCTATA	12.50%	0.50%	0.0041
PENSTEMON ANGUSTIFOLIUS	12.50%	0.50%	0.0041
GUTIERREZIA SAROTHRÆ	15.00%	0.50%	0.0040
ASTRAGALUS MISSOURIENSIS	12.50%	0.50%	0.0039
PHLOX ANDICOLA	12.50%	0.50%	0.0036
LUPINUS PUSILLUS	7.50%	0.50%	0.0029
CIRSIIUM CANESCENS	10.00%	0.50%	0.0029
SALSOLA SPP	7.50%	1.33%	0.0026
ASTRAGALUS LAXMANNII VAR. ROBUSTIOR	7.50%	0.50%	0.0026

Species	Frequency	Mean Cover	Importance Value
PLANTAGO PATAGONICA	7.50%	0.50%	0.0021
ARENARIA HOOKERI	7.50%	0.50%	0.0020
SISYMBRIUM ALTISSIMUM	5.00%	0.50%	0.0015
HEDEOMA HISPIDUM	5.00%	0.50%	0.0015
POLYGONUM RAMOSISSIMUM	5.00%	0.50%	0.0015
ANNUAL BROMUS SPP	5.00%	0.50%	0.0015
ARTEMISIA CAMPESTRIS	5.00%	0.50%	0.0013
CYMOPTERUS ACAULIS	5.00%	0.50%	0.0013
SCHIZACHYRIUM SCOPARIUM	2.50%	3.00%	0.0011
MACHAERANTHERA PINNATIFIDA	2.50%	0.50%	0.0008
BOUTELOUA CURTIPENDULA	2.50%	0.50%	0.0008
CALYLOPHUS SERRULATUS	2.50%	0.50%	0.0008
LAPPULA OCCIDENTALIS var. OCCIDENTALIS	2.50%	0.50%	0.0008
ORYZOPSIS HYMENOIDES	2.50%	0.50%	0.0007
POA SECUNDA	2.50%	0.50%	0.0007
ERYSIMUM ASPERUM	2.50%	0.50%	0.0007
TETRANEURIS ACAULIS	2.50%	0.50%	0.0007
HETEROTHECA VILLOSA	2.50%	0.50%	0.0007
PHYSALIS HISPIDA	2.50%	0.50%	0.0007
SPOROBOLUS CRYPTANDRUS	2.50%	0.50%	0.0007

Table 3b. Plant Community Composition: Exotic Species.

Species	Frequency	Mean Cover	Importance Value
LACTUCA SERRIOLA	70.00%	1.39%	0.0252
POA PRATENSIS	22.50%	5.33%	0.0127
TRAGOPOGON DUBIUS	40.00%	0.50%	0.0121
SALSOLA SPP	7.50%	1.33%	0.0026
SISYMBRIUM ALTISSIMUM	5.00%	0.50%	0.0015
ANNUAL BROMUS SPP	5.00%	0.50%	0.0015

**2000 Plant Community Monitoring Results: Prairie Sandreed – Sand Bluestem Prairie,
Upland Disturbance, Agate Fossil Beds NM**

Table 1a. Plant Community Composition: Species Richness and Shannon Diversity.

All Species:

Species Richness:	60	Total Shannon Evenness:	0.53
Total Shannon Diversity:	2.15	Mean Evenness (st dev):	0.51 (0.02)
Mean Diversity (st dev):	1.95 (0.09)		

Native Species Only:

Native Species Richness:	52	Total Shannon Evenness:	0.48
Total Shannon Diversity:	1.90	Mean Evenness (st dev):	0.50 (0.03)
Mean Diversity (st dev):	1.82 (0.09)		

Table 1b. Plant Community Summary: Relative Frequency and Cover of Exotic Species.

Number of Exotic Species: **8**

Number of Native Species: **52**

Exotic Ratio: **0.133**

	<u>Relative Frequency</u>	<u>Relative Cover</u>
Exotic	16.65%	19.25%
Native	83.35%	80.75%

Table 2a. Plant Community Structure: Ground Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Bare Soil	27.08%
Bare Rock	0.07%
Grass Litter	50.13%
Unvegetated Surface	45.13%

Table 2b. Plant Community Structure: Vegetation Type Cover.

<u>Vegetation Type</u>	<u>Mean Percent Cover</u>
Grasses/Grass-Like	88.48%
Herbs	14.13%
Shrubs	1.28%

Table 3a. Plant Community Composition: Herbaceous and Shrub Species.

Species	Frequency	Mean Cover	Importance Value
CALAMOVILFA LONGIFOLIA	100.00%	30.03%	0.1752
STIPA COMATA	100.00%	25.98%	0.1572
ANNUAL BROMUS SPP	50.00%	35.75%	0.0944
BOUTELOUA GRACILIS	100.00%	9.83%	0.0761
HELIANTHUS PETIOLARIS	85.00%	1.79%	0.0315
PASCOPYRUM SMITHII	55.00%	5.36%	0.0291
LYGODESMIA JUNCEA	85.00%	0.50%	0.0264
MELILOTUS SPP	60.00%	2.75%	0.0253
CHENOPODIUM PRATERICOLA	75.00%	0.50%	0.0234
LACTUCA SERRIOLA	70.00%	0.68%	0.0224
ELYMUS LANCEOLATUS ssp. LANCEOLATUS	50.00%	2.45%	0.0206
ARTEMISIA FRIGIDA	50.00%	2.45%	0.0201
CONYZA CANADENSIS	50.00%	2.20%	0.0199
LUPINUS PLATTENSIS	25.00%	8.40%	0.0180
VULPIA OCTOFLORA	50.00%	1.00%	0.0168
GAURA COCCINEA	50.00%	0.75%	0.0161
LACTUCA TATARICA var. PULCHELLA	35.00%	2.93%	0.0152
ASTER ERICOIDES	35.00%	2.93%	0.0147
SALSOLA SPP	35.00%	2.57%	0.0141
SPHAERALCEA COCCINEA	45.00%	0.50%	0.0140
TRADESCANTIA OCCIDENTALIS	45.00%	0.50%	0.0140
LATHYRUS POLYMORPHUS	40.00%	1.12%	0.0136
LITHOSPERMUM INCISUM	40.00%	0.50%	0.0124
LEPIDIUM DENSIFLORUM	40.00%	0.50%	0.0123
ERIOGONUM ANNUUM	35.00%	0.50%	0.0109
TRAGOPOGON DUBIUS	35.00%	0.50%	0.0108
SISYMBRIUM ALTISSIMUM	25.00%	0.50%	0.0078
POLYGONUM RAMOSISSIMUM	20.00%	0.50%	0.0063
LAPPULA OCCIDENTALIS var. OCCIDENTALIS	15.00%	0.50%	0.0047
LESQUERELLA LUDOVICIANA	15.00%	0.50%	0.0047
DESCURAINIA PINNATA	15.00%	0.50%	0.0047
MIRABILIS HIRSUTA	15.00%	0.50%	0.0047
CIRSIIUM CANESCENS	15.00%	0.50%	0.0046
CLEOME SERRULATA	10.00%	0.50%	0.0031
PENSTEMON ANGUSTIFOLIUS	10.00%	0.50%	0.0031
PSORALIDIUM TENUIFLORUM	10.00%	0.50%	0.0031
ORYZOPSIS HYMENOIDES	10.00%	0.50%	0.0031
DESCURAINIA SOPHIA	10.00%	0.50%	0.0031
MACHAERANTHERA PINNATIFIDA	10.00%	0.50%	0.0031
ARABIS HOLBOELLII	10.00%	0.50%	0.0031
ASTRAGALUS LOTIFLORUS	10.00%	0.50%	0.0031
RUMEX VENOSUS	10.00%	0.50%	0.0031
PHLOX ANDICOLA	10.00%	0.50%	0.0031
AMBROSIA PSILOSTACHYA	5.00%	3.00%	0.0021
ASTRAGALUS MISSOURIENSIS	5.00%	0.50%	0.0016
AMPHIACHYRIS DRACUNCULOIDES	5.00%	0.50%	0.0016
POA PRATENSIS	5.00%	0.50%	0.0016

Species	Frequency	Mean Cover	Importance Value
ASTRAGALUS GRACILIS	5.00%	0.50%	0.0016
PHYSALIS HISPIDA	5.00%	0.50%	0.0016
EUPHORBIA GLYPTOSPERMA	5.00%	0.50%	0.0016
OPUNTIA FRAGILIS	5.00%	0.50%	0.0016
PSORALIDIUM LANCEOLATUM	5.00%	0.50%	0.0016
HELIANTHUS ANNUUS	5.00%	0.50%	0.0016
GAURA PARVIFLORA	5.00%	0.50%	0.0016
OENOTHERA ALBICAULIS	5.00%	0.50%	0.0015
SPOROBOLUS CRYPTANDRUS	5.00%	0.50%	0.0015
EUPHORBIA MISSURICA	5.00%	0.50%	0.0015
OENOTHERA NUTTALLII	5.00%	0.50%	0.0015
OROBANCHE FASCICULATA	5.00%	0.50%	0.0015
SENECIO CANUS	5.00%	0.50%	0.0015

Table 3b. Plant Community Composition: Exotic Species.

Species	Frequency	Mean Cover	Importance Value
ANNUAL BROMUS SPP	50.00%	35.75%	0.0944
MELILOTUS SPP	60.00%	2.75%	0.0253
LACTUCA SERRIOLA	70.00%	0.68%	0.0224
SALSOLA SPP	35.00%	2.57%	0.0141
TRAGOPOGON DUBIUS	35.00%	0.50%	0.0108
SISYMBRIUM ALTISSIMUM	25.00%	0.50%	0.0078
DESCURAINIA SOPHIA	10.00%	0.50%	0.0031
POA PRATENSIS	5.00%	0.50%	0.0016

**2000 Plant Community Monitoring Results: Western Wheatgrass Mixedgrass Prairie,
Agate Fossil Beds NM**

Table 1a. Plant Community Composition: Species Richness and Shannon Diversity.

All Species:

Species Richness:	27		
Total Shannon Diversity:	1.25	Total Shannon Evenness:	0.38
Mean Diversity (st dev):	1.25	Mean Evenness (st dev):	0.38

Native Species Only:

Native Species Richness:	18		
Total Shannon Diversity:	1.04	Total Shannon Evenness:	0.36
Mean Diversity (st dev):	1.04	Mean Evenness (st dev):	0.36

Table 1b. Plant Community Summary: Relative Frequency and Cover of Exotic Species.

Number of Exotic Species: 9

Number of Native Species: 18

Exotic Ratio: 0.333

	<u>Relative Frequency</u>	<u>Relative Cover</u>
Exotic	39.00%	56.02%
Native	61.00%	43.98%

Table 2a. Plant Community Structure: Ground Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Bare Soil	10.75%
Bare Rock	0.05%
Grass Litter	73.25%
Unvegetated Surface	37.75%

Table 2b. Plant Community Structure: Vegetation Type Cover.

<u>Vegetation Type</u>	<u>Mean Percent Cover</u>
Ferns	16.05%
Grasses/Grass-Like	94.00%
Herbs	5.00%

Table 3a. Plant Community Composition: Herbaceous and Shrub Species.

Species	Frequency	Mean Cover	Importance Value
POA PRATENSIS	100.00%	62.50%	0.3216
PASCOPYRUM SMITHII	100.00%	30.75%	0.1836
EQUISETUM LAEVIGATUM	100.00%	16.05%	0.1198
LACTUCA SERRIOLA	80.00%	0.50%	0.0417
ANNUAL BROMUS SPP	50.00%	1.00%	0.0272
LACTUCA TATARICA var. PULCHELLA	50.00%	1.00%	0.0272
CHENOPODIUM PRATERICOLA	50.00%	0.50%	0.0261
SISYMBRIUM ALTISSIMUM	50.00%	0.50%	0.0261
HELIANTHUS ANNUUS	40.00%	1.75%	0.0230
HELIANTHUS PETIOLARIS	40.00%	1.75%	0.0230
CHENOPODIUM BERLANDIERI	40.00%	1.12%	0.0220
MELILOTUS SPP	30.00%	1.33%	0.0167
DESCURAINIA SOPHIA	30.00%	0.50%	0.0157
CALAMOVILFA LONGIFOLIA	30.00%	0.50%	0.0157
CONYZA CANADENSIS	30.00%	0.50%	0.0157
ASTER ERICOIDES	20.00%	0.50%	0.0104
CAMELINA MICROCARPA	20.00%	0.50%	0.0104
DESCURAINIA PINNATA	20.00%	0.50%	0.0104
ELYMUS LANCEOLATUS ssp. LANCEOLATUS	20.00%	0.50%	0.0104
GAURA COCCINEA	20.00%	0.50%	0.0104
SALSOLA SPP	20.00%	0.50%	0.0104
ASCLEPIAS SPECIOSA	10.00%	3.00%	0.0063
CIRSIIUM FLODMANII	10.00%	0.50%	0.0052
IVA XANTHIFOLIA	10.00%	0.50%	0.0052
KOCHIA SCOPARIA	10.00%	0.50%	0.0052
MIRABILIS HIRSUTA	10.00%	0.50%	0.0052
GAURA PARVIFLORA	10.00%	0.50%	0.0052

Table 3b. Plant Community Composition: Exotic Species.

Species	Frequency	Mean Cover	Importance Value
POA PRATENSIS	100.00%	62.50%	0.3216
LACTUCA SERRIOLA	80.00%	0.50%	0.0417
ANNUAL BROMUS SPP	50.00%	1.00%	0.0272
SISYMBRIUM ALTISSIMUM	50.00%	0.50%	0.0261
MELILOTUS SPP	30.00%	1.33%	0.0167
DESCURAINIA SOPHIA	30.00%	0.50%	0.0157
SALSOLA SPP	20.00%	0.50%	0.0104
CAMELINA MICROCARPA	20.00%	0.50%	0.0104
KOCHIA SCOPARIA	10.00%	0.50%	0.0052