

Annual Status Report:

2000 Plant Community Monitoring for
Scotts Bluff National Monument



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Prairie Cluster Long-term Ecological Monitoring Program

April 2001

Plant Communities Monitored

Restored Mixedgrass Prairie: A long-term goal at Scotts Bluff NM is to preserve and restore the native prairie landscape seen by overland emigrants. A major component of this project is the restoration of prairie to disturbed sites. The structure and composition of the recent golf course restoration is monitored, as is the adjacent mixedgrass prairie. Results are compared to measure restoration progress and to provide feedback regarding the effectiveness of prescribed fire, mowing and exotic removal. Two sampling sites (20 plots) are located in the restoration unit.

Pine/Juniper Woodland: At the transition of the steeply rising bluffs and the rolling prairie is located the pine/juniper woodlands. The pine/juniper woodlands possess unique species not found in the surrounding prairie and are a significant component of the park's biotic diversity. Managers are concerned about the potential impacts of prescribed fire on the pine/juniper woodlands and monitoring results allow managers to guard against any unanticipated results. Two sample sites (20 plots) are located in the woodlands.

The pine woodlands are fragile and sensitive and workers must be cautious to minimize the impact of sampling. Consequently, the woodlands were sampled only once in June 2000. Two sample sites in the restoration 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: Restored Mixedgrass Prairie,
Scotts Bluff NM**

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

All Species:

Species Richness:	45	Total Shannon Evenness:	0.53
Total Shannon Diversity:	2.02	Mean Evenness (st dev):	0.45 (0.25)
Mean Diversity (st dev):	1.60 (1.07)		

Native Species Only:

Native Species Richness:	31	Total Shannon Evenness:	0.60
Total Shannon Diversity:	2.07	Mean Evenness (st dev):	0.51 (0.06)
Mean Diversity (st dev):	1.52 (0.50)		

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

Number of Exotic Species: **14**

Number of Native Species: **31**

Exotic Ratio: **0.311**

	<u>Relative Frequency</u>	<u>Relative Cover</u>
Exotic	37.59%	63.74%
Native	62.41%	36.26%

Table 2a. Plant Community Structure: Ground Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Bare Soil	39.03%
Bare Rock	0.37%
Grass Litter	50.00%
Woody Debris	0.15%
Leaf Litter	0.17%
Unvegetated Surface	59.75%

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

<u>Vegetation Type</u>	<u>Mean Percent Cover</u>
Grasses/Grass-Like	84.75%
Herbs	13.88%
Shrubs	1.12%

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

Species	Frequency	Mean Cover	Importance Value
ANNUAL BROMUS SPP	90.00%	50.36%	0.2791
SPOROBOLUS CRYPTANDRUS	85.00%	14.24%	0.0966
MELILOTUS SPP	55.00%	18.73%	0.0673
STIPA COMATA	65.00%	12.54%	0.0639
BROMUS INERMIS	85.00%	5.26%	0.0620
PASCOPYRUM SMITHII	80.00%	4.91%	0.0588
STIPA VIRIDULA	45.00%	12.28%	0.0555
BOUTELOUA CURTIPENDULA	55.00%	1.41%	0.0294
BOUTELOUA GRACILIS	55.00%	2.27%	0.0257
ARTEMISIA FRIGIDA	50.00%	1.50%	0.0198
TRAGOPOGON DUBIUS	40.00%	0.50%	0.0184
PHYSALIS HEDERIFOLIA var. COMATA	25.00%	0.50%	0.0178
KOCHIA SCOPARIA	40.00%	0.81%	0.0149
KRASCHENINNIKOVIA LANATA	35.00%	0.50%	0.0148
AGROPYRON CRISTATUM	35.00%	0.50%	0.0148
CONVOLVULUS ARVENSIS	20.00%	1.12%	0.0129
SALSOLA SPP	35.00%	0.50%	0.0128
SPHAERALCEA COCCINEA	35.00%	0.86%	0.0114
RATIBIDA COLUMNIFERA	30.00%	0.92%	0.0098
MACHAERANTHERA GRINDELIOIDES	20.00%	4.13%	0.0097
PSATHYROSTACHYS JUNCEA	20.00%	4.13%	0.0097
CHENOPODIUM PRATERICOLA	20.00%	0.50%	0.0082
MACHAERANTHERA PINNATIFIDA ssp.	15.00%	0.50%	0.0066
PINNATIFIDA var. PINNATIFIDA			
ELYTRIGIA REPENS var. REPENS	10.00%	7.75%	0.0066
ORYZOPSIS HYMENOIDES	10.00%	7.75%	0.0066
BUCHLOE DACTYLOIDES	10.00%	3.00%	0.0064
LIATRIS PUNCTATA	20.00%	0.50%	0.0062
CALAMOVILFA LONGIFOLIA	20.00%	0.50%	0.0062
AMBROSIA PSILOSTACHYA	15.00%	2.17%	0.0058
YUCCA GLAUCA	15.00%	1.33%	0.0052
LEPIDIUM DENSIFLORUM	15.00%	0.50%	0.0046
ARISTIDA PURPUREA	10.00%	1.75%	0.0037
SISYMBRIUM ALTISSIMUM	5.00%	0.50%	0.0036
DALEA CANDIDA	10.00%	0.50%	0.0031
ELYMUS CANADENSIS	10.00%	0.50%	0.0031
LAPPULA OCCIDENTALIS var. OCCIDENTALIS	10.00%	0.50%	0.0031
MIRABILIS HIRSUTA	10.00%	0.50%	0.0031
CHENOPODIUM BERLANDIERI	5.00%	3.00%	0.0021
DESCURAINIA SOPHIA	5.00%	0.50%	0.0015
GAURA COCCINEA	5.00%	0.50%	0.0015
HELIANTHUS ANNUUS	5.00%	0.50%	0.0015
PHYSALIS LONGIFOLIA	5.00%	0.50%	0.0015
POA PRATENSIS	5.00%	0.50%	0.0015
SCHIZACHYRIUM SCOPARIUM	5.00%	0.50%	0.0015
LACTUCA SERRIOLA	5.00%	0.50%	0.0015

Table 3b. Plant Community Composition: Exotic Species.

Species	Frequency	Mean Cover	Importance Value
ANNUAL BROMUS SPP	90.00%	50.36%	0.2791
MELILOTUS SPP	55.00%	18.73%	0.0673
BROMUS INERMIS	85.00%	5.26%	0.0620
TRAGOPOGON DUBIUS	40.00%	0.50%	0.0184
KOCHIA SCOPARIA	40.00%	0.81%	0.0149
AGROPYRON CRISTATUM	35.00%	0.50%	0.0148
CONVOLVULUS ARVENSIS	20.00%	1.12%	0.0129
SALSOLA SPP	35.00%	0.50%	0.0128
PSATHYROSTACHYS JUNCEA	20.00%	4.13%	0.0097
ELYTRIGIA REPENS var. REPENS	10.00%	7.75%	0.0066
SISYMBRIUM ALTISSIMUM	5.00%	0.50%	0.0036
POA PRATENSIS	5.00%	0.50%	0.0015
LACTUCA SERRIOLA	5.00%	0.50%	0.0015
DESCURAINIA SOPHIA	5.00%	0.50%	0.0015

2000 Plant Community Monitoring Results: Pine/Juniper Woodlands, Scotts Bluff NM

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

All Species:

Species Richness:	41	Total Shannon Evenness:	0.58
Total Shannon Diversity:	2.15	Mean Evenness (st dev):	0.57 (0.04)
Mean Diversity (st dev):	1.98 (0.15)		

Native Species Only:

Native Species Richness:	37	Total Shannon Evenness:	0.58
Total Shannon Diversity:	2.08	Mean Evenness (st dev):	0.56 (0.04)
Mean Diversity (st dev):	1.92 (0.12)		

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

Number of Exotic Species: 4

Number of Native Species: 37

Exotic Ratio: 0.098

	<u>Relative Frequency</u>	<u>Relative Cover</u>
Exotic	7.06%	1.56%
Native	92.94%	98.44%

Table 2a. Plant Community Structure: Ground Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Bare Soil	60.50%
Bare Rock	10.63%
Grass Litter	8.33%
Woody Debris	1.60%
Leaf Litter	3.80%
Unvegetated Surface	62.75%

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

<u>Vegetation Type</u>	<u>Mean Percent Cover</u>
Grasses/Grass-Like	26.98%
Herbs	9.63%
Shrubs	7.05%

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

Species	Frequency	Mean Cover	Importance Value
CAREX FILIFOLIA	80.00%	22.25%	0.2380
THERMOPSIS RHOMBIFOLIA	65.00%	10.62%	0.1013
BOUTELOUA CURTIPENDULA	75.00%	5.37%	0.0791
CERCOCARPUS MONTANUS	70.00%	4.04%	0.0623
ELYMUS LANCEOLATUS ssp. LANCEOLATUS	85.00%	2.79%	0.0603
RHUS TRILOBATA	80.00%	3.09%	0.0590
YUCCA GLAUCA	70.00%	1.57%	0.0410
VICIA AMERICANA	80.00%	0.81%	0.0400
KOELERIA MACRANTHA	75.00%	1.00%	0.0386
STIPA COMATA	60.00%	0.50%	0.0278
SCHIZACHYRIUM SCOPARIUM	40.00%	2.63%	0.0271
SOLIDAGO MISSOURIENSIS	50.00%	1.00%	0.0244
LATHYRUS POLYMORPHUS	45.00%	1.06%	0.0242
ANNUAL BROMUS SPP	45.00%	0.50%	0.0204
ARTEMISIA FRIGIDA	35.00%	0.50%	0.0147
POA PRATENSIS	25.00%	1.50%	0.0132
GUTIERREZIA SAROTHRAE	30.00%	0.50%	0.0130
ANTENNARIA PARVIFOLIA	25.00%	0.50%	0.0112
OXYTROPIS SERICEA	25.00%	0.50%	0.0109
PHLOX ANDICOLA	20.00%	0.50%	0.0091
HEDEOMA DRUMMONDII	20.00%	0.50%	0.0088
ARABIS HOLBOELLII	15.00%	1.33%	0.0082
GAURA COCCINEA	15.00%	0.50%	0.0063
OPUNTIA POLYACANTHA	10.00%	1.75%	0.0059
TRAGOPOGON DUBIUS	10.00%	0.50%	0.0050
MELILOTUS SPP	10.00%	0.50%	0.0046
PENSTEMON ANGUSTIFOLIUS	10.00%	0.50%	0.0046
ROSA WOODSII	10.00%	0.50%	0.0046
PASCOPYRUM SMITHII	10.00%	0.50%	0.0046
RIBES CEREUM	10.00%	0.50%	0.0046
ERIGERON CANUS	10.00%	0.50%	0.0042
BRICKELLIA GRANDIFLORA	10.00%	0.50%	0.0042
CRYPTANTHA CANA	5.00%	0.50%	0.0025
ERIOGONUM ANNUM	5.00%	0.50%	0.0025
LIATRIS PUNCTATA	5.00%	0.50%	0.0025
ZIGADENUS VENENOSUS var. GRAMINEUS	5.00%	0.50%	0.0025
OPUNTIA MACRORHIZA	5.00%	0.50%	0.0025
SYMPHORICARPOS OCCIDENTALIS	5.00%	0.50%	0.0025
CYMOPTERUS ACAULIS	5.00%	0.50%	0.0025
CALAMOVILFA LONGIFOLIA	5.00%	0.50%	0.0021
LITHOSPERMUM INCISUM	5.00%	0.50%	0.0021

Table 3b. Plant Community Composition: Exotic Species.

Species	Frequency	Mean Cover	Importance Value
ANNUAL BROMUS SPP	45.00%	0.50%	0.0204
POA PRATENSIS	25.00%	1.50%	0.0132
TRAGOPOGON DUBIUS	10.00%	0.50%	0.0050
MELILOTUS SPP	10.00%	0.50%	0.0046

Table 3c. Plant Community Composition: Tree Seedling and Sapling Regeneration (individuals/m²)

Species	Seedlings	Small Saplings	Large Saplings
JUNIPERUS VIRGINIANA	0	0.01	0.01
PINUS PONDEROSA	0.01	0	0.015