

Annual Status Report:

1998 Plant Community Monitoring for
Scotts Bluff National Monument



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Prairie Cluster Long-Term Ecological Monitoring Program

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Plant Communities Monitored

Mixed Grass Prairie: Mixed grass prairie dominates the landscape at Scotts Bluff NM. Initial ordination and classification analysis were used to differentiate three vegetation types within the mixed grass prairie community: Stipa/Carex Mixed Grass Prairie and Degraded Stipa/Carex Mixed Grass Prairie. The degraded Stipa/Carex type is differentiated from the Stipa/Carex type by the relative frequency and cover of the exotic brome grasses. The degraded sites tend to be in the lower slope positions where historic disturbance was likely greatest.

Pine/Juniper Woodland: At the union of the steeply rising bluffs and the rolling prairie occurs the pine/juniper woodland community. The pine/juniper woodland possesses unique species not found in the surrounding prairie and contributes significantly to the total diversity. The potential impacts of prescribed fire on the pine/juniper woodlands are of particular interest to park managers. Monitoring was conducted and results reported for this community in 1998.

Restored Prairie: A long-term goal at Scotts Bluff NM is to restore the native prairie landscape seen by overland emigrants. A major component of this project is the restoration of prairie communities to disturbed sites. The structure and composition of the recent golf course restoration is monitored and may be compared to that of the adjacent mixed grass prairie in order to document restoration progress and to provide feedback regarding management activities. Prescribed fire, mowing and exotic removal are among the resource management activities influencing the restoration.

Eleven sample sites (110 10m² plots) were sampled in June and again in August 1998. Sampling procedures follow Jenkins et al., 1998. Data collection, processing and summary by Mike DeBacker, Keith Grabner, Sean Jenkins, Karola Mlekush, and Lisa Thomas.

Jenkins, S., G. Willson, M. DeBacker, L. Thomas. 1998. Protocol Design for Plant Community Monitoring. Draft

1998 Vegetation Summary: Mixed grass Prairie, Scotts Bluff NM

Three sample sites (30 plots) are located in the South Bluff management unit at the monument. A prescribed fire was conducted prior to our spring sampling in 1998. Consequently, a third consecutive year of data will be collected in 1999 to complete the data baseline.

Table 1a. Community Summary: Richness and Shannon Diversity.

<u>Richness (S)</u>	<u>Diversity (H')</u>	<u>Evenness (E)</u>
51 (300 m ²)	1.74	0.442

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

Number of Exotic Species: 6

Number of Native Species: 45

Exotic Ratio (R): 0.118

<u>Origin</u>	<u>Relative Frequency</u>	<u>Relative Cover</u>
Native	97.29%	99.88%
Exotic	2.71%	0.12%

Table 2a. Community Structure Summary: Ground Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Bare Soil	45.00%
Grass Litter	19.18%
Leaf Litter	1.85%
Unvegetated Surface	57.33%
Woody Debris	0.02%

Table 2b. Community Structure Summary: Shrub and Herbaceous Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Shrubs	3.25%
Herbs	107.78%

Table 3. Community Composition Summary: Herbaceous and Shrub Species.

Species	Common Name	Frequency	Mean Cover	Importance Value
<i>CAREX FILIFOLIA</i>	Sedge	100.00%	48.67%	0.2700
<i>STIPA COMATA</i>	Needle-and-thread grass	100.00%	34.00%	0.2040
<i>BOUTELOUA GRACILIS</i>	Blue gramma-grass	80.00%	4.67%	0.0575
<i>GAURA COCCINEA</i>	Scarlet gaura	70.00%	2.36%	0.0430
<i>BOUTELOUA CURTIPENDULA</i>	Side-oats gramma-grass	30.00%	19.56%	0.0417
<i>PASCOPYRUM SMITHII</i>	Western wheatgrass	56.67%	4.79%	0.0410
<i>SPHAERALCEA COCCINEA</i>	Scarlet mallow	63.33%	1.03%	0.0351
<i>LATHYRUS POLYMORPHUS</i>	Vetchling, wild pea	26.67%	17.31%	0.0343
<i>YUCCA GLAUCA</i>	Soap plant	43.33%	1.46%	0.0249
<i>ZIGADENUS VENENOSUS</i> var. <i>GRAMINEUS</i>	Death camas	43.33%	0.50%	0.0230
<i>CHENOPODIUM PRATERICOLA</i>	Narrow-leaf goosefoot	30.00%	2.67%	0.0189
<i>RHUS TRILOBATA</i>	Squaw-bush	16.67%	12.60%	0.0179
<i>SCHIZACHYRIUM SCOPARIUM</i>	Little bluestem	13.33%	11.62%	0.0138
<i>LYGODESMIA JUNCEA</i>	Skeleton-weed	23.33%	0.86%	0.0128
<i>OPUNTIA MACRORHIZA</i>	Plains prickly pear	23.33%	0.86%	0.0128
<i>ASTRAGALUS GRACILIS</i>	Milk-vetch	20.00%	0.92%	0.0110
<i>OPUNTIA POLYACANTHA</i>	Plains prickly pear	16.67%	1.50%	0.0096
<i>LITHOSPERMUM INCISUM</i>	Narrow-leaved puccoon	16.67%	0.50%	0.0088
<i>PHLOX ANDICOLA</i>	Phlox, Sweet William	16.67%	0.50%	0.0088
<i>HELIANTHUS ANNUUS</i>	Common sunflower	13.33%	2.37%	0.0082
<i>LEUCOCRINUM MONTANUM</i>	Mountain lily	13.33%	0.50%	0.0071
<i>LIATRIS PUNCTATA</i>	Blazing star, gay feather	13.33%	0.50%	0.0071
<i>MACHAERANTHERA PINNATIFIDA</i>	Aster	13.33%	0.50%	0.0071
<i>CALAMOVILFA LONGIFOLIA</i>	Sand-reed	6.67%	7.75%	0.0057
<i>ASTER ERICOIDES</i> var. <i>PANSUS</i>	Squarrose white wild aster	10.00%	1.33%	0.0057
<i>KOELERIA MACRANTHA</i>	Junegrass	10.00%	0.50%	0.0053
<i>VICIA AMERICANA</i>	American vetch	10.00%	0.50%	0.0053
<i>MUHLENBERGIA CUSPIDATA</i>	Muhly	3.33%	15.00%	0.0039
<i>STIPA VIRIDULA</i>	Green needle-grass	3.33%	15.00%	0.0039
<i>COMANDRA UMBELLATA</i>	Bastard toad-flax	6.67%	0.50%	0.0035
<i>DESCURAINIA SOPHIA</i>	Herb-sophia, tansy-mustard	6.67%	0.50%	0.0035
<i>OPUNTIA FRAGILIS</i>	Little prickly pear	6.67%	0.50%	0.0035
<i>PSORALEA ARGOPHYLLA</i>	Silvery scurf-pea	6.67%	0.50%	0.0035
<i>SOLIDAGO MISSOURIENSIS</i>	Missouri goldenrod	6.67%	0.50%	0.0035
<i>TRAGOPOGON DUBIUS</i>	Fistulous goat's beard	6.67%	0.50%	0.0035
<i>VIOLA NUTTALLII</i>	Yellow prairie violet	6.67%	0.50%	0.0035
<i>SPOROBOLUS CRYPTANDRUS</i>	Sand dropseed	3.33%	3.00%	0.0021
<i>ALLIUM TEXTILE</i>	Onion	3.33%	0.50%	0.0018
<i>ANNUAL BROMUS SPP</i>	<i>B. tectorum</i> , <i>B. japonicus</i>	3.33%	0.50%	0.0018
<i>ASTRAGALUS MISSOURIENSIS</i>	Nuttall milk-vetch	3.33%	0.50%	0.0018

Species	Common Name	Frequency	Mean Cover	Importance Value
<i>KRASCHENINNIKOVIA LANATA</i>	White sage, winter fat	3.33%	0.50%	0.0018
<i>MACHAERANTHERA CANESCENS</i>	Hoary aster	3.33%	0.50%	0.0018
<i>MIRABILIS LINEARIS</i>	Narrow-leaved umbrella-wort	3.33%	0.50%	0.0018
<i>NOTHOCALAIS CUSPIDATA</i>	False dandelion	3.33%	0.50%	0.0018
<i>PENSTEMON ALBIDUS</i>	White Beardtounge	3.33%	0.50%	0.0018
<i>POA PRATENSIS</i>	Kentucky bluegrass	3.33%	0.50%	0.0018
<i>PSORALEA ESCULENTA</i>	Breadroot scurf-pea	3.33%	0.50%	0.0018
<i>ROSA WOODSII</i>	Western rose	3.33%	0.50%	0.0018
<i>SALSOLA SPP</i>	Russian thistle	3.33%	0.50%	0.0018
<i>TARAXACUM OFFICINALE</i>	Common dandelion	3.33%	0.50%	0.0018
<i>THERMOPSIS RHOMBIFOLIA</i>	Buckbean	3.33%	0.50%	0.0018

Table 4. Community Composition Summary: Exotic Species.

Species	Common Name	Frequency	Mean Cover	Importance Value
<i>DESCURAINIA SOPHIA</i>	Herb-sophia, tansy-mustard	6.67%	0.50%	0.0035
<i>TRAGOPOGON DUBIUS</i>	Fistulous goat's beard	6.67%	0.50%	0.0035
<i>ANNUAL BROMUS SPP</i>	B. tectorum, B. japonicus	3.33%	0.50%	0.0018
<i>POA PRATENSIS</i>	Kentucky bluegrass	3.33%	0.50%	0.0018
<i>SALSOLA SPP</i>	Russian thistle	3.33%	0.50%	0.0018
<i>TARAXACUM OFFICINALE</i>	Common dandelion	3.33%	0.50%	0.0018

1998 Vegetation Summary: Degraded Mixed grass Prairie, Scotts Bluff NM

Four sample sites (40 plots) are located in the South Bluff management unit at the monument. A prescribed fire was conducted prior to our spring sampling in 1998. Consequently, a third consecutive year of data will be collected in 1999 to complete the data baseline.

Table 1a. Community Summary: Richness and Shannon Diversity.

<u>Richness (S)</u>	<u>Diversity (H')</u>	<u>Evenness (E)</u>
51 (400 m ²)	1.77	0.451

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

Number of Exotic Species: 7
Number of Native Species: 44
Exotic Ratio (R): 0.137

<u>Origin</u>	<u>Relative Frequency</u>	<u>Relative Cover</u>
Native	87.50%	86.51%
Exotic	12.50%	13.49%

Table 2a. Community Structure Summary: Ground Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Bare Soil	47.26%
Grass Litter	41.14%
Unvegetated Surface	54.75%

Table 2b. Community Structure Summary: Shrub and Herbaceous Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Shrubs	0.47%
Herbs	108.00%

Table 3. Community Composition Summary: Herbaceous and Shrub Species.

Species	Common Name	Frequency	Mean Cover	Importance Value
<i>CAREX FILIFOLIA</i>	Sedge	100.00%	38.18%	0.2303
<i>STIPA COMATA</i>	Needle-and-thread grass	100.00%	31.88%	0.2013
<i>PASCOPYRUM SMITHII</i>	Western wheatgrass	85.00%	14.97%	0.1048
<i>ANNUAL BROMUS SPP</i>	B. tectorum, B. japonicus	67.50%	21.33%	0.1031
<i>SPHAERALCEA COCCINEA</i>	Scarlet mallow	80.00%	4.31%	0.0594
<i>BOUTELOUA GRACILIS</i>	Blue gramma-grass	57.50%	1.37%	0.0349
<i>CHENOPODIUM PRATERICOLA</i>	Narrow-leaf goosefoot	52.50%	0.62%	0.0300
<i>GAURA COCCINEA</i>	Scarlet gaura	47.50%	1.03%	0.0281
<i>LYGODESMIA JUNCEA</i>	Skeleton-weed	42.50%	0.65%	0.0244
<i>HELIANTHUS ANNUUS</i>	Common sunflower	37.50%	1.00%	0.0221
<i>OPUNTIA MACRORHIZA</i>	Plains prickly pear	25.00%	0.50%	0.0142
<i>TRAGOPOGON DUBIUS</i>	Fistulous goat's beard	17.50%	0.50%	0.0099
<i>LACTUCA SERRIOLA</i>	Prickly lettuce	15.00%	0.50%	0.0085
<i>BOUTELOUA CURTIPENDULA</i>	Side-oats gramma-grass	10.00%	5.38%	0.0079
<i>CALAMOVILFA LONGIFOLIA</i>	Sand-reed	5.00%	20.25%	0.0074
<i>VIOLA NUTTALLII</i>	Yellow prairie violet	12.50%	0.50%	0.0071
<i>SPOROBOLUS CRYPTANDRUS</i>	Sand dropseed	10.00%	2.37%	0.0065
<i>SOLIDAGO MISSOURIENSIS</i>	Missouri goldenrod	10.00%	1.75%	0.0062
<i>PSORALIDIUM TENUIFLORUM</i>	Gray scurf-pea	7.50%	6.17%	0.0062
<i>SCHIZACHYRIUM SCOPARIUM</i>	Little bluestem	5.00%	15.00%	0.0062
<i>ASTRAGALUS GRACILIS</i>	Milk-vetch	10.00%	1.12%	0.0060
<i>OPUNTIA POLYACANTHA</i>	Plains prickly pear	10.00%	1.12%	0.0060
<i>PSORALEA ARGOPHYLLA</i>	Silvery scurf-pea	7.50%	2.17%	0.0048
<i>MUHLENBERGIA CUSPIDATA</i>	Muhly	5.00%	9.00%	0.0048
<i>LITHOSPERMUM INCISUM</i>	Narrow-leaved puccoon	7.50%	0.50%	0.0042
<i>MIRABILIS LINEARIS</i>	Narrow-leaved umbrella-wort	7.50%	0.50%	0.0042
<i>SALSOLA SPP</i>	Russian thistle (S. kali or S. collina)	7.50%	0.50%	0.0042
<i>VICIA AMERICANA</i>	American vetch	7.50%	0.50%	0.0042
<i>YUCCA GLAUCA</i>	Soap plant	5.00%	1.75%	0.0031
<i>ASCLEPIAS PUMILA</i>	Milkweed	2.50%	15.00%	0.0031
<i>DESCURAINIA PINNATA</i>	Tansy-mustard	5.00%	0.50%	0.0028
<i>KOELERIA MACRANTHA</i>	Junegrass	5.00%	0.50%	0.0028
<i>PHLOX ANDICOLA</i>	Phlox, Sweet William	5.00%	0.50%	0.0028
<i>VULPIA OCTOFLORA</i>	Six-weeks fescue	5.00%	0.50%	0.0028
<i>LACTUCA OBLONGIFOLIA</i>	Blue lettuce	2.50%	3.00%	0.0017
<i>LATHYRUS POLYMORPHUS</i>	Vetchling, wild pea	2.50%	3.00%	0.0017
<i>OPUNTIA FRAGILIS</i>	Little prickly pear	2.50%	3.00%	0.0017
<i>PHYSALIS HEDERIFOLIA</i> var. <i>COMATA</i>	Ground cherry	2.50%	3.00%	0.0017
<i>TOXICODENDRON RADICANS</i>	Common poison-ivy	2.50%	3.00%	0.0017
<i>ALLIUM TEXTILE</i>	Onion	2.50%	0.50%	0.0014

Species	Common Name	Frequency	Mean Cover	Importance Value
<i>ASTER ERICOIDES</i> var. <i>PANSUS</i>	Squarrose white wild aster	2.50%	0.50%	0.0014
<i>BRICKELLIA EUPATORIOIDES</i>	Aster	2.50%	0.50%	0.0014
<i>CALYLOPHUS SERRULATUS</i>	Evening-primrose	2.50%	0.50%	0.0014
<i>CAREX DURIUSCULA</i>	Sedge	2.50%	0.50%	0.0014
<i>CHENOPODIUM ALBUM</i>	Lamb's quarters, pigweed	2.50%	0.50%	0.0014
<i>DESCURAINIA SOPHIA</i>	Herb-sophia, tansy-mustard	2.50%	0.50%	0.0014
<i>LIATRIS PUNCTATA</i>	Blazing star, gay feather	2.50%	0.50%	0.0014
<i>ORYZOPSIS HYMENOIDES</i>	Indian ricegrass	2.50%	0.50%	0.0014
<i>PENSTEMON ALBIDUS</i>	White Beardtounge	2.50%	0.50%	0.0014
<i>TARAXACUM OFFICINALE</i>	Common dandelion	2.50%	0.50%	0.0014
<i>ZIGADENUS VENENOSUS</i> var. <i>GRAMINEUS</i>	Death camas	2.50%	0.50%	0.0014

Table 4. Community Composition Summary: Exotic Species.

Species	Common Name	Frequency	Mean Cover	Importance Value
<i>ANNUAL BROMUS SPP</i>	B. tectorum, B. japonicus	67.50%	21.33%	0.1031
<i>TRAGOPOGON DUBIUS</i>	Fistulous goat's beard	17.50%	0.50%	0.0099
<i>LACTUCA SERRIOLA</i>	Prickly lettuce	15.00%	0.50%	0.0085
<i>SALSOLA SPP</i>	Russian thistle (S. kali or S. collina)	7.50%	0.50%	0.0042
<i>CHENOPODIUM ALBUM</i>	Lamb's quarters, pigweed	2.50%	0.50%	0.0014
<i>DESCURAINIA SOPHIA</i>	Herb-sophia, tansy-mustard	2.50%	0.50%	0.0014
<i>TARAXACUM OFFICINALE</i>	Common dandelion	2.50%	0.50%	0.0014

1998 Vegetation Summary: Mixed grass Prairie, Saddle Rock Unit, Scotts Bluff NM

Two sample sites (20 plots) are located in mixed grass prairie in the Saddle Rock unit. The sample sites are adjacent to the recent restoration.

Table 1a. Community Summary: Richness and Shannon Diversity.

<u>Richness (S)</u>	<u>Diversity (H')</u>	<u>Evenness (E)</u>
21 (200 m ²)	1.41	0.462

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

Number of Exotic Species: 3

Number of Native Species: 18

Exotic Ratio (R): 0.143

<u>Origin</u>	<u>Relative Frequency</u>	<u>Relative Cover</u>
Native	93.55%	99.09%
Exotic	6.45%	0.91%

Table 2a. Community Structure Summary: Ground Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Bare Rock	0.05%
Bare Soil	41.25%
Grass Litter	35.25%
Unvegetated Surface	43.75%
Woody Debris	0.02%

Table 2b. Community Structure Summary: Shrub and Herbaceous Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Shrubs	5.58%
Herbs	109.33%

Table 3. Community Composition Summary: Herbaceous and Shrub Species.

Species	Common Name	Frequency	Mean Cover	Importance Value
<i>CAREX FILIFOLIA</i>	Sedge	100.00%	61.25%	0.3472
<i>STIPA COMATA</i>	Needle-and-thread grass	100.00%	25.13%	0.1900
<i>BOUTELOUA GRACILIS</i>	Blue gramma-grass	95.00%	11.55%	0.1244
<i>PASCOPYRUM SMITHII</i>	Western wheatgrass	65.00%	12.23%	0.0870
<i>KRASCHENINNIKOVIA LANATA</i>	White sage, winter fat	55.00%	10.05%	0.0684
<i>SPHAERALCEA COCCINEA</i>	Scarlet mallow	60.00%	0.92%	0.0508
<i>ORYZOPSIS HYMENOIDES</i>	Indian ricegrass	30.00%	5.75%	0.0317
<i>ANNUAL BROMUS SPP</i>	B. tectorum, B. japonicus	20.00%	1.12%	0.0171
<i>SALSOLA SPP</i>	Russian thistle (S. kali or S. collina)	15.00%	5.33%	0.0156
<i>LYGODESMIA JUNCEA</i>	Skeleton-weed	10.00%	1.75%	0.0088
<i>SPOROBOLUS CRYPTANDRUS</i>	Sand dropseed	10.00%	1.75%	0.0088
<i>CHENOPODIUM PRATERICOLA</i>	Narrow-leaf goosefoot	10.00%	0.50%	0.0083
<i>GAURA COCCINEA</i>	Scarlet gaura	10.00%	0.50%	0.0083
<i>BUCHLOE DACTYLOIDES</i>	Buffalo-grass	5.00%	3.00%	0.0047
<i>AMARANTHUS ALBUS</i>	Tumbleweed	5.00%	0.50%	0.0041
<i>ARTEMISIA FRIGIDA</i>	Prairie-sagewort	5.00%	0.50%	0.0041
<i>ERYSIMUM ASPERUM</i>	Western wallflower	5.00%	0.50%	0.0041
<i>HELLANTHUS ANNUUS</i>	Common sunflower	5.00%	0.50%	0.0041
<i>OPUNTIA MACRORHIZA</i>	Plains prickly pear	5.00%	0.50%	0.0041
<i>TRAGOPOGON DUBIUS</i>	Fistulous goat's beard	5.00%	0.50%	0.0041
<i>YUCCA GLAUCA</i>	Soap plant	5.00%	0.50%	0.0041

Table 4. Community Composition Summary: Exotic Species.

Species	Common Name	Frequency	Mean Cover	Importance Value
<i>ANNUAL BROMUS SPP</i>	B. tectorum, B. japonicus	20.00%	1.12%	0.0171
<i>SALSOLA SPP</i>	Russian thistle (S. kali or S. collina)	15.00%	5.33%	0.0156
<i>TRAGOPOGON DUBIUS</i>	Fistulous goat's beard	5.00%	0.50%	0.0041

1998 Vegetation Summary: Restored Mixed grass Prairie, Scotts Bluff NM

1998 was the first year of monitoring in the restoration. A second year of data will be collected in 1999 to complete a baseline.

Table 1a. Community Summary: Richness and Shannon Diversity.

<u>Richness (S)</u>	<u>Diversity (H')</u>	<u>Evenness (E)</u>
45 (200 m ²)	2.39	0.629

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

Number of Exotic Species: 11

Number of Native Species: 34

Exotic Ratio (R): 0.244

<u>Origin</u>	<u>Relative Frequency</u>	<u>Relative Cover</u>
Native	76.40%	62.38%
Exotic	23.60%	37.62%

Table 2a. Community Structure Summary: Ground Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Bare Rock	0.22%
Bare Soil	49.28%
Grass Litter	24.50%
Leaf Litter	0.78%
Unvegetated Surface	66.25%
Woody Debris	0.40%

Table 2b. Community Structure Summary: Shrub and Herbaceous Cover.

<u>Structural Component</u>	<u>Mean Percent Cover</u>
Shrubs	0.37%
Herbs	90.53%

Table 3. Community Composition Summary: Herbaceous and Shrub Species.

Species	Common Name	Frequency	Mean Cover	Importance Value
<i>ANNUAL BROMUS SPP</i>	B. tectorum, B. japonicus	50.00%	39.30%	0.1281
<i>PASCOPYRUM SMITHII</i>	Western wheatgrass	85.00%	16.15%	0.1095
<i>SPOROBOLUS CRYPTANDRUS</i>	Sand dropseed	75.00%	18.17%	0.1049
<i>VERBENA BRACTEATA</i>	Prostrate vervain	75.00%	16.23%	0.0970
<i>MELILOTUS SPP</i>	M. albus , M. officinalis	45.00%	20.11%	0.0678
<i>STIPA COMATA</i>	Needle-and-thread grass	60.00%	9.79%	0.0563
<i>BUCHLOE DACTYLOIDES</i>	Buffalo-grass	85.00%	1.24%	0.0398
<i>STIPA VIRIDULA</i>	Green needle-grass	50.00%	6.90%	0.0390
<i>BROMUS INERMIS</i>	Smooth brome	55.00%	5.36%	0.0382
<i>BOUTELOUA GRACILIS</i>	Blue gramma-grass	65.00%	1.46%	0.0312
<i>BOUTELOUA CURTIPENDULA</i>	Side-oats gramma-grass	40.00%	3.25%	0.0232
<i>SALSOLA SPP</i>	Russian thistle (S. kali or S. collina)	45.00%	0.78%	0.0199
<i>TRAGOPOGON DUBIUS</i>	Fistulous goat's beard	45.00%	0.78%	0.0199
<i>SPHAERALCEA COCCINEA</i>	Scarlet mallow	25.00%	6.30%	0.0187
<i>ARTEMISIA FRIGIDA</i>	Prairie-sagewort	40.00%	0.50%	0.0171
<i>RATIBIDA COLUMNIFERA</i>	Columnar coneflower	35.00%	1.21%	0.0163
<i>GRINDELIA SQUARROSA</i>	Curly-top gum-weed	35.00%	0.86%	0.0157
<i>KRASCHENINNIKOVIA LANATA</i>	White sage, winter fat	35.00%	0.50%	0.0150
<i>AMARANTHUS ALBUS</i>	Tumbleweed	30.00%	0.92%	0.0135
<i>CAREX FILIFOLIA</i>	Sedge	30.00%	0.50%	0.0128
<i>CONVOLVULUS ARVENSIS</i>	Field-bindweed	20.00%	4.13%	0.0125
<i>ELYMUS SPP</i>		20.00%	0.50%	0.0086
<i>HORDEUM PUSILLUM</i>	Little barley	20.00%	0.50%	0.0086
<i>ORYZOPSIS HYMENOIDES</i>	Indian ricegrass	20.00%	0.50%	0.0086
<i>PSATHYROSTACHYS JUNCEA</i>	Russian wildrye	10.00%	7.75%	0.0083
<i>YUCCA GLAUCA</i>	Soap plant	15.00%	1.33%	0.0071
<i>LIATRIS PUNCTATA</i>	Blazing star, gay feather	15.00%	0.50%	0.0064
<i>PHYSALIS HEDERIFOLIA</i> var. <i>COMATA</i>	Ground cherry	15.00%	0.50%	0.0064
<i>CALAMOVILFA LONGIFOLIA</i>	Sand-reed	10.00%	1.75%	0.0050
<i>SETARIA VIRIDIS</i>	Green foxtail-grass	10.00%	1.75%	0.0050
<i>GAURA COCCINEA</i>	Scarlet gaura	10.00%	0.50%	0.0043
<i>HORDEUM JUBATUM</i>	Foxtail-barley	10.00%	0.50%	0.0043
<i>MIRABILIS LINEARIS</i>	Narrow-leaved umbrella-wort	10.00%	0.50%	0.0043
<i>AMBROSIA PSILOSTACHYA</i>	Western ragweed	5.00%	3.00%	0.0028
<i>PHYSALIS LONGIFOLIA</i>	Longflower ground cherry	5.00%	3.00%	0.0028
<i>AGROPYRON CRISTATUM</i>	Crested wheatgrass	5.00%	0.50%	0.0021
<i>ASTRAGALUS GRACILIS</i>	Milk-vetch	5.00%	0.50%	0.0021
<i>CIRSIIUM CANESCENS</i>	Thistle	5.00%	0.50%	0.0021
<i>DACTYLIS GLOMERATA</i>	Orchard grass	5.00%	0.50%	0.0021
<i>LAPPULA OCCIDENTALIS</i> var. <i>OCCIDENTALIS</i>	Western stickseed	5.00%	0.50%	0.0021

Species	Common Name	Frequency	Mean Cover	Importance Value
<i>MACHAERANTHERA PINNATIFIDA</i> ssp. <i>PINNATIFIDA</i> var. <i>PINNATIFIDA</i>	Aster	5.00%	0.50%	0.0021
<i>MUHLENBERGIA CUSPIDATA</i>	Muhly	5.00%	0.50%	0.0021
<i>MUHLENBERGIA PUNGENS</i>	Muhly	5.00%	0.50%	0.0021
<i>SCHEDONNARDUS PANICULATUS</i>	Tumble-grass	5.00%	0.50%	0.0021
<i>SOLANUM TRIFLORUM</i>	Cut-leaved nightshade	5.00%	0.50%	0.0021

Table 4. Community Composition Summary: Exotic Species.

Species	Common Name	Frequency	Mean Cover	Importance Value
<i>ANNUAL BROMUS SPP</i>	B. tectorum, B. japonicus	50.00%	39.30%	0.1281
<i>MELILOTUS SPP</i>	M. albus , M. officinalis	45.00%	20.11%	0.0678
<i>BROMUS INERMIS</i>	Smooth brome	55.00%	5.36%	0.0382
<i>SALSOLA SPP</i>	Russian thistle (S. kali or S. collina)	45.00%	0.78%	0.0199
<i>TRAGOPOGON DUBIUS</i>	Fistulous goat's beard	45.00%	0.78%	0.0199
<i>CONVOLVULUS ARVENSIS</i>	Field-bindweed	20.00%	4.13%	0.0125
<i>PSATHYSTACHYS JUNCEA</i>	Russian wildrye	10.00%	7.75%	0.0083
<i>SETARIA VIRIDIS</i>	Green foxtail-grass	10.00%	1.75%	0.0050
<i>AGROPYRON CRISTATUM</i>	Crested wheatgrass	5.00%	0.50%	0.0021
<i>DACTYLIS GLOMERATA</i>	Orchard grass	5.00%	0.50%	0.0021
<i>LAPPULA OCCIDENTALIS</i> var. <i>OCCIDENTALIS</i>	Western stickseed	5.00%	0.50%	0.0021