



Fort Larned National Historic Site

2010 Exotic Plant Monitoring

Exotic plants represent one of the most significant threats to natural resources in national parks due to their abilities to reproduce prolifically, rapidly colonize new areas, displace native species, alter ecosystem processes across multiple scales, and detract from the interpretive value of park resources. In the Great Plains, grasslands have been increasingly degraded and fragmented, which results in increasing chances of exotic plant species invasions. Prevention and early detection are the principal strategies for successful invasive exotic plant management.

Invasive exotic plant monitoring was recognized across all Southern Plains Inventory & Monitoring Network (SOPN) parks as the most important shared monitoring need. The objectives of monitoring high-priority exotics in areas of high and low invasion probability are to: (1) detect exotic species introductions early, (2) determine changes in the status and trend (density, abundance, or extent), and (3) determine changes in species composition.

Methods

Overall sampling at Fort Larned National Historic Site (NHS) occurs on paved and unpaved roads, trails, and boundaries of the main unit over its full three-year rotation. In 2010, exotic plant monitoring occurred at Fort Larned NHS for two days in June. A total of 45 vector blocks were monitored resulting in 440 linear meters surveyed on both sides of paved entrance road, 275 linear meters surveyed on one side of paved boundary road, and one linear kilometer surveyed on one side of unpaved boundary road (Figure 1). In addition, twelve permanent transects within the landscape were sampled for a total of 60 4x1 meter plots.

Results

Smooth brome (*Bromus inermis*) was the most commonly found exotic in both primary and secondary monitoring (Table 1). All but one vector block (98%) contained smooth brome as evenly distributed patches to matrices running from the vector edge deep into the landscape. Nine secondary transects contained smooth brome, generally in all plots, with cover as much as 80%. Yellow sweetclover (*Melilotus officinalis*) was found in 62% of the vector blocks and 58% of transects. It was found as scattered to evenly distributed patches deep into the landscape on all vectors, although less densely and deeply on the far southern boundary. Kochia (*Kochia scoparia*) was detected in 42% of the vector blocks but only 2 secondary transects. It was found as individual

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plants in a few blocks along the entrance road, but more commonly and frequently as scattered patches in the southwestern and southern boundaries.

Field bindweed (*Convolvulus arvensis*) appeared in 38% of the vector blocks and was the second most common exotic in the eight secondary transects (67%). Found on all vectors, bindweed appeared most often as scattered patches but displayed some areas of even distribution, always within the first 12 meters but often running up to and over 20 meters into the landscape. Toothed spurge (*Euphorbia dentata*) was found in 36% of the vector blocks and one transect. Black medic clover (*Medicago lupulina*) and dandelion (*Taraxacum officinale*) were also found in 36% of the vector blocks but not in any transects. Western salsify (*Tragopogon dubius*) was observed in 31% of vector blocks and one secondary transect. Common lambsquarters (*Chenopodium album*) was detected in 24% vector blocks and two transects. Redroot pigweed (*Amaranthus retroflexus*) and Bermuda grass (*Cynodon dactylon*) also were found in 24% of the vector blocks.

Cheatgrass (*Bromus tectorum*) and hairy crabgrass (*Digitaria sanguinalis*) were seen in 22% of the vector blocks.

Several species of exotics were found in a minimal number of vector blocks and a few secondary transects. Henbit (*Lamium amplexicaule*) was detected in seven vector blocks along the southern boundary as scattered patches within the first two meters of the vector. Canada thistle (*Cirsium arvense*) and patience dock (*Rumex patientia*) appeared in six vector blocks. Bull thistle (*Cirsium vulgare*), Johnsongrass (*Sorghum halepense*), hemlock (*Conium maculatum*), flixweed (*Descurainia sophia*), and white clover (*Trifolium repens*) were all found up to 20 meters into the landscape.

Figure 1. Individual vector blocks sampled, Fort Larned NHS, 2010.



Table 1. Number and percentage of primary and secondary sample units where each species was detected, Fort Larned NHS, 2010.

Scientific name	Common name	Primary vector blocks (n=45)		Secondary transects (n=12)	
		Total	% blocks	Total	% transects
<i>Bromus inermis</i>	Smooth brome	44	98	9	75
<i>Melilotus officinalis</i>	Yellow sweetclover	28	62	7	58
<i>Kochia scoparia</i>	Kochia	19	42	2	17
<i>Convolvulus arvensis</i>	Field bindweed	17	38	9	75
<i>Euphorbia dentata</i>	Toothed spurge	16	36	1	8
<i>Medicago lupulina</i>	Black medic clover	16	36	0	0
<i>Taraxacum officinale</i>	Dandelion	16	36	0	0
<i>Tragopogon dubius</i>	Western salsify	14	31	1	8
<i>Amaranthus retroflexus</i>	Red-root pigweed	11	24	0	0
<i>Chenopodium album</i>	Common lambsquarters	11	24	2	17
<i>Cynodon dactylon</i>	Bermuda grass	11	24	0	0
<i>Bromus tectorum</i>	Cheatgrass	10	22	0	0
<i>Digitaria sanguinalis</i>	Hairy crabgrass	10	22	0	0
<i>Lamium amplexicaule</i>	Henbit	7	16	0	0
<i>Cirsium arvense</i>	Canada thistle	6	13	0	0
<i>Rumex patientia</i>	Patience dock	6	13	0	0
<i>Cirsium vulgare</i>	Bull thistle	5	11	0	0
<i>Sorghum halepense</i>	Johnsongrass	4	9	0	0
<i>Conium maculatum</i>	Poison hemlock	2	4	0	0
<i>Descurainia sophia</i>	Flixweed	2	4	0	0
<i>Salsola tragus</i>	Prickly Russian thistle	2	4	0	0
<i>Trifolium repens</i>	White clover	2	4	0	0
<i>Lolium perenne</i>	Perennial ryegrass	1	2	0	0
<i>Rumex crispus</i>	Curly dock	1	2	1	8
<i>Tribulus terrestris</i>	Puncturevine	1	2	0	0
<i>Bromus japonicus</i>	Japanese brome	1	2	1	8
<i>Poa pratensis</i>	Kentucky bluegrass	0	0	1	8
<i>Sonchus asper</i>	Spiny sowthistle	0	0	1	8