



Fort Larned National Historic Site

2011 Exotic Plant Monitoring

Exotic plants represent one of the most significant threats to natural resources in national parks. Exotic plants are a concern 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.

Invasive exotic plants have been consistently ranked as a top vital sign for long-term monitoring as part of the NPS Inventory & Monitoring Program. During final selection of vital signs in 2006, invasive exotic plant monitoring was recognized across all Southern Plains 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 (see Figure 1). In 2011, exotic plant monitoring occurred in June. A total of 87 vector blocks were monitored resulting in 4,350 linear meters surveyed on one side of the park boundary. In addition, eight permanent transects within the landscape were sampled for a total of 40 2x1 meter plots. Exotics were detected in every vector block. Eighteen species of exotics were detected with primary and secondary monitoring (see Table 1). SOPN has now completed one full rotation of panels scheduled and re-visits will begin in 2012.

Results

Land use around the Fort makes exotic plant management very difficult. Except for immediately surrounding the Fort, land has been repeatedly plowed and used as agricultural fields. The riparian area of the Pawnee River has been drawn down in recent years, resulting in an altered hydrological regime that affords the establishment of exotics in the alluvial soils of the streambed.

Smooth brome (*Bromus inermis*) was detected in 82% of the primary vector blocks and 88% of the secondary transects monitored in 2011. It is a deep rooting, rhizomatous, highly persistent perennial grass that colonizes old fields, becoming

Smooth Brome (*Bromus inermis*) was the most commonly found exotic species in 2011 at Fort Larned NHS.



NPS

particularly troublesome to land managers. This grass forms thick mats of roots underground and large quantities of litter, effectively excluding any preferred natives through efficient competition.

Field bindweed (*Convolvulus arvensis*) was present in 69% of the primary vector blocks and 75% of the secondary transects. This perennial taprooted exotic is drought tolerant and an abundant seeder, with the ability to establish from small bits of vegetative material. Field bindweed, ranked as “noxious” in Kansas and surrounding states, is an effective colonizer with the ability to blanket an area; it climbs over existing vegetation, intercepting rainfall and shading out other plants. Its deep taproot insures continued regeneration and it is very difficult to destroy.

A third species, cheatgrass (*Bromus tectorum*) was found in 53% of primary vector blocks but was absent in interior secondary transects. This cool-season annual produces dense stands and abundant seed and has the capacity to alter native plant communities. The lack of cheatgrass within the landscape may be caused by the monotypic nature of smooth brome, which is taller, more robust and also a dense colonizer.

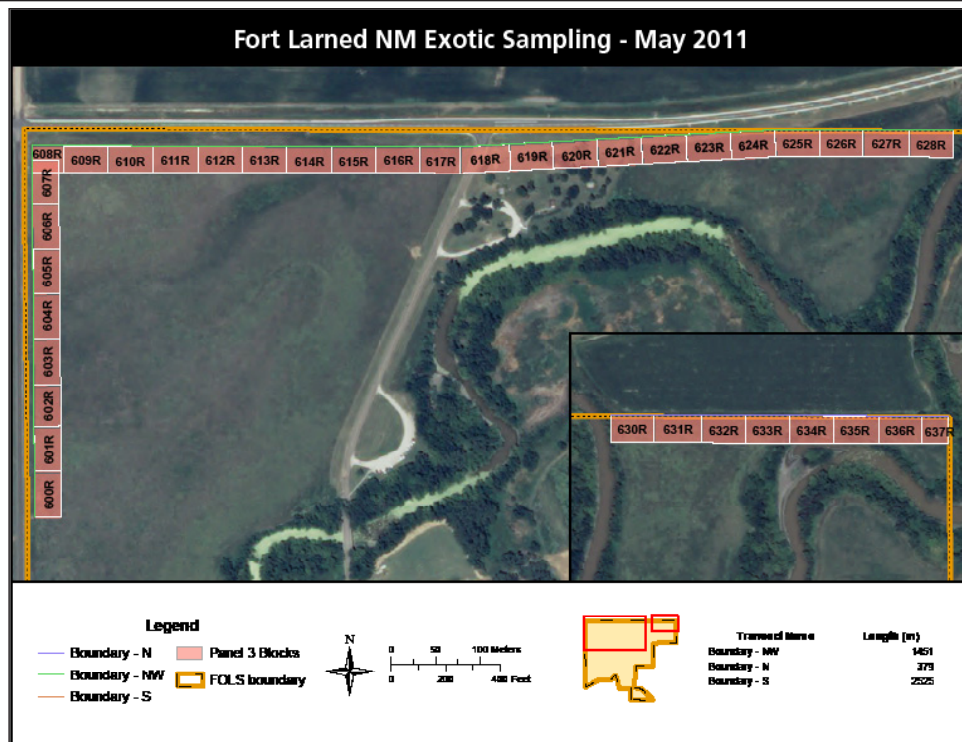


Figure 1. Individual vector blocks sampled, Fort Larned NHS, 2011.

Table 1. Number and percentage of primary and secondary sample units where each species was detected, Fort Larned NHS, 2011.

Scientific name	Common name	Primary vector blocks (n=87)		Secondary transects (n=8)	
		Total	% blocks	Total	% transects
<i>Bromus inermis</i>	smooth brome	71	81.6092	7	87.5
<i>Convolvulus arvensis</i>	field bindweed	60	68.9655	6	75
<i>Bromus tectorum</i>	cheatgrass	46	52.8736	—	—
<i>Kochia scoparia</i>	kochia	35	40.2299	1	12.5
<i>Rumex patientia</i>	patience dock	33	37.931	—	—
<i>Chenopodium album</i>	common lambsquarters	19	21.8391	4	50
<i>Tragopogon dubius</i>	western salsify	19	21.8391	—	—
<i>Melilotus alba</i>	white sweetclover	12	13.7931	—	—
<i>Setaria viridis</i>	green bristlegrass	12	13.7931	—	—
<i>Meilotus officinalis</i>	yellow sweetclover	9	10.3448	2	25
<i>Taraxacum officinale</i>	dandelion	6	6.8966	—	—
<i>Medicago sativa</i>	alfalfa	5	5.7471	—	—
<i>Sorghum halepense</i>	Johnsongrass	4	4.5977	—	—
<i>Cynodon dactylon</i>	Bermuda grass	2	2.2989	—	—
<i>Lamium amplexicaule</i>	henbit	2	2.2989	—	—
<i>Tribulus terrestris</i>	puncturevine	2	2.2989	—	—
<i>Conium maculatum</i>	poison hemlock	1	1.1494	—	—
<i>Poa pratensis</i>	Kentucky bluegrass	—	—	1	12.5