



Sand Creek Massacre 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 Sand Creek Massacre National Historic Site (NHS) occurs on unpaved roads over its full three-year rotation. In 2010, exotic plant monitoring occurred for 2.5 days in early July. The vectors sampled were the ceremony road, county road, cutoff road, and Lower Monument Road, North. A total of 122 vector blocks were monitored, for a total of 3.05 linear kilometers sampled on both sides (Figure 1). In addition, 12 permanent transects within the landscape were sampled for a total of 60 4x1 meter plots. No exotics were observed in two vector blocks.

Results

Kochia (*Kochia scoparia*) was the most commonly found exotic species this field season and was found in 78% of vector blocks sampled (Table 1) and 67% of secondary transects. Kochia was most frequently found as single plants to scattered patches up to 12 meters into the landscape, with the exception of the ceremony and cutoff roads where it was frequently found up to 22 meters. The secondary permanent transect monitoring showed kochia to be the most prevalent forb encountered with mean transect cover of 25% or more in the transects near the Chivington ditch. Prickly Russian thistle (*Salsola tragus*) was present in 51% of vector blocks sampled and 50% of secondary transects. The densest areas are found



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Kochia (*Kochia scoparia*) was the most common exotic found at Sand Creek Massacre NHS in 2010.

near the overlook and an area along the county road. Western salsify (*Tragopogon dubius*) was found in 50% of the vector blocks, most frequently as individual plants ranging deep into the landscape.

Yellow sweetclover (*Melilotus officinalis*) was present in 11% of vector blocks sampled and 17% of secondary transects. The secondary transects where it was found were both in the cottonwoods at the riparian area in 1% or less cover. A close relative, white sweetclover (*Melilotus alba*), was found in similar riparian areas and densities and could possibly be a white or faded version of the yellow sweetclover. Cheatgrass (*Bromus tectorum*) was found as scattered individual plants in 2% of the vector blocks and no secondary transects. When

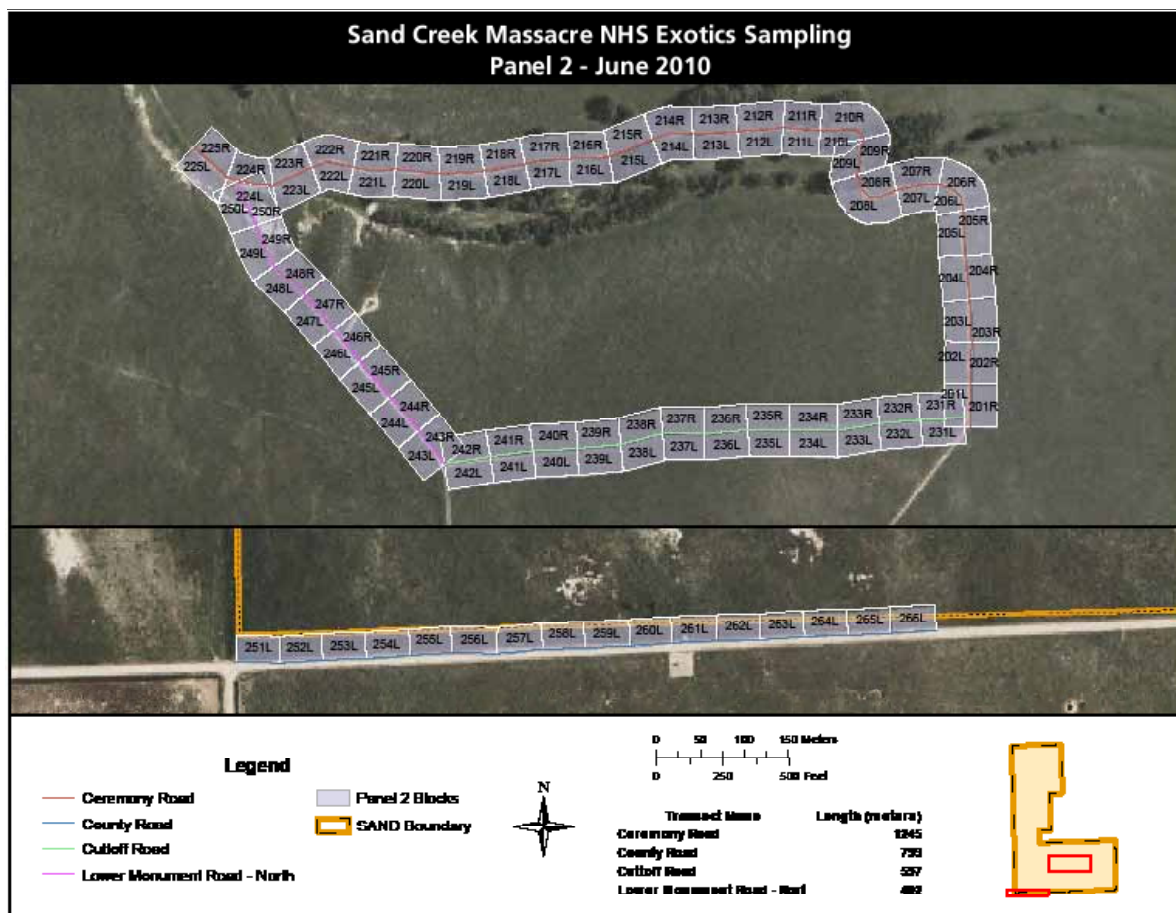


Figure 1. Individual vector blocks sampled, Sand Creek Massacre NHS, 2010.

found it was within 2 meters of the vector and is likely spread by tires.

Three exotic species were found in secondary transects within the landscape, but not along monitored vectors. Common goosefoot (*Chenopodium album*) is suspected in two transects but encountered only in one plot each of transects and with

less than 1% cover. Of greater concern are field bindweed (*Convolvulus arvensis*) and prickly lettuce (*Lactuca serriola*), found in one transect each. Field bindweed was present the southeastern prairie dog town with cover up to 20%, while prickly lettuce was found in one plot of a cottonwood transect at less than 1% cover.

Table 1. Number and percentage of primary and secondary sample units where each species was detected, Sand Creek Massacre NHS, 2010.

Scientific name	Common name	Primary sample units (n=122)		Secondary sample units (n=12)	
		Total	% blocks	Total	% transects
<i>Kochia scoparia</i>	Kochia	95	78	8	67
<i>Salsola tragus</i>	Prickly Russian thistle	62	51	6	50
<i>Tragopogon dubius</i>	Western salsify	61	50	0	0
<i>Melilotus officinalis</i>	Yellow sweetclover	14	11	2	17
<i>Melilotus alba</i>	White sweetclover	8	7	1	8
<i>Bromus tectorum</i>	Cheatgrass	2	2	0	0
<i>Chenopodium album</i>	Common lambsquarters	0	0	2	17
<i>Convolvulus arvensis</i>	Field bindweed	0	0	1	8
<i>Lactuca serriola</i>	Prickly lettuce	0	0	1	8