



Bent's Old Fort 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.

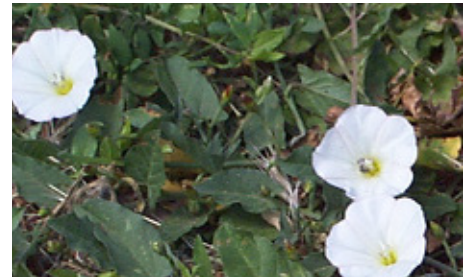
Methods

Overall sampling at Bent's Old Fort National Historic Site (NHS) includes most of the roadways and some trails within the park over a three-year rotation. During 2011, exotic-plant monitoring occurred at Bent's Old Fort NHS in late June. The 2011 vectors sampled included unpaved maintenance roads on the south side of the Arkansas River, a portion of the unpaved maintenance road and loop trail in the north bank riparian area, and sections of the eastern and southern park boundary (Figure 1). SOPN has now completed one full 3-year panel rotation and will begin re-visiting vectors in 2012.

Results

The improvement and maintenance of healthy grasslands and understory vegetation to facilitate succession will greatly assist in limiting the potential for exotic invasion. Mowed areas allow established low-growing exotics access to sunlight, stimulating their expansion while reducing the vigor of native plants. Prairie dogs disturb the soil, eliminate all but low-growing plants, and maintain an early successional state—all prime conditions for the spread of field bindweed. Riparian areas are frequently impacted by seasonal flooding, providing more mesic habitats enjoyed by a suite of exotics and fresh propagules from upstream exotic populations.

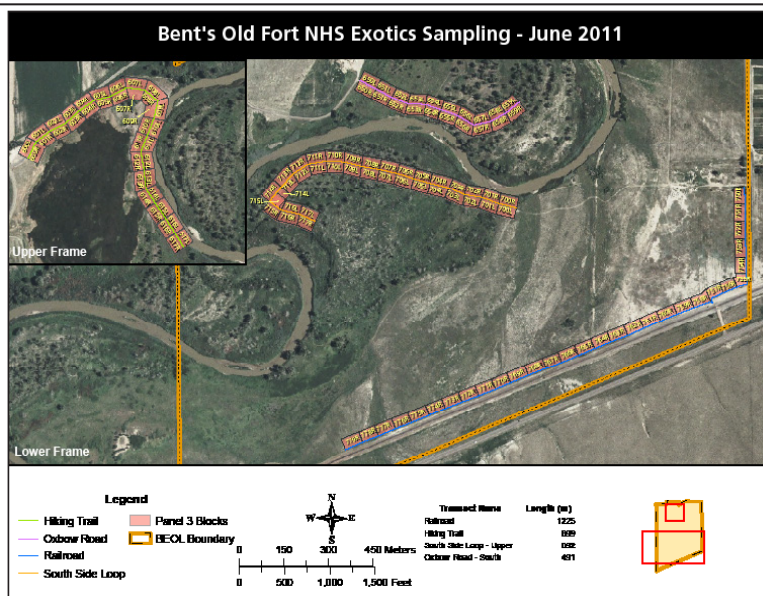
Field bindweed (*Convolvulus arvensis*) was commonly found in 2011 at Bent's Old Fort NHS.



NPS

Kochia (*Kochia scoparia*) was the most frequently encountered exotic this field season in both the primary vector blocks and the secondary interior monitoring, with scattered to evenly distributed patches throughout (see Table 1). This drought-tolerant annual exotic produces abundant seed that are widely distributed as the spent plant breaks from its roots and blows across the prairie. Kochia is an early successional plant that readily establishes in sites with soil disturbance, outcompeting other native early successional and responding favorably to increased nitrogen in the soil. It persists in the landscape by developing dense stands and maintaining increased nitrogen levels through annual foliage shedding. Kochia can also increase the fine-fuel load leading to a more intense fire capacity.

The second most frequently detected plant in both primary and secondary monitoring is field bindweed (*Convolvulus arvensis*), found in scattered patches around the Arch wetland and evenly distributed patches in the highly disturbed prairie dog town. It was seldom encountered on the vectors nearest the Arkansas River. The perennial taprooted bindweed is also drought tolerant and an abundant seeder, with the ability to establish from small bits of vegetative material. Field bindweed, ranked as "noxious" in Colorado 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 is very difficult to destroy.



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USGS

Figure 1. Individual vector blocks sampled at Bent's Old Fort NHS, 2011.

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

Scientific name	Common name	Primary vector blocks (N=122)		Secondary transects (N=13)	
		Total	% blocks	Total	% of transects
<i>Kochia scoparia</i>	kochia	81	66.39	7	53.85
<i>Convolvulus arvensis</i>	field bindweed	36	29.51	6	46.15
<i>Asparagus officinalis</i>	garden asparagus	27	22.13	—	—
<i>Typha angustifolia</i>	narrowleaf cattail	25	20.49	—	—
<i>Cirsium arvensis</i>	Canada thistle	20	16.39	—	—
<i>Salsola tragus</i>	prickly Russian thistle	19	15.57	2	15.36
<i>Tamarix chinensis</i>	saltcedar	11	9.02	—	—
<i>Bromus tectorum</i>	cheatgrass	8	6.56	—	—
<i>Rumex crispus</i>	curly dock	7	5.74	1	7.70
<i>Sorghum halepense</i>	Johnsongrass	7	5.74	1	7.70
<i>Arundo donax</i>	giant reed	5	4.10	—	—
<i>Melilotus alba</i>	white sweetclover	5	4.10	—	—
<i>Tribulus terrestris</i>	puncturevine	5	4.10	—	—
<i>Lactuca seriola</i>	prickly lettuce	4	3.28	—	—
<i>Thinopyrum ponticum</i>	rush wheatgrass	4	3.28	—	—
<i>Bromus inermis</i>	smooth brome	2	1.64	—	—
<i>Tragopogon dubius</i>	western salsify	2	1.64	—	—
<i>Conium maculatum</i>	poison hemlock	1	0.82	—	—
<i>Taraxacum officinale</i>	dandelion	1	0.82	—	—
<i>Verbascum thapsus</i>	common mullein	1	0.82	—	—
None	no exotics found	4	3.36	—	—