Bent's Old Fort National Historic Site

2011 Grasslands and Fire Effects Monitoring

Grassland vegetation is the most widespread vegetation type occurring in the Southern Plains. Fire, along with climate, is the biggest determinant of whether grasslands preclude forests, and also is a critical natural process and a primary influence on the plant and wildlife communities of national parks. Monitoring grassland vegetation communities and the effects of fire will help Southern Plains park managers better understand the dynamic nature of these ecosystems and provide an early warning of abnormal conditions. This information can help managers make effective decisions, including planning of prairie restoration efforts.

The overall goal of monitoring Southern Plains grassland communities is to help park managers better understand the dynamic nature of grassland vegetation ecosystems and the processes that influence them. Specific objectives are to: (1) determine status and trends in plant species composition (richness and diversity) and community structure (relative abundance, frequency, distribution, ground cover) of remnant, disturbed, and restored grasslands; (2) document the location, extent, and timing of wildland and prescribed fires and management treatments; and (3) determine status and trends in soil structure (erosion potential, infiltration rate, compaction, texture, stability) and soil chemistry (bulk soil carbon to nitrogen ratios).

Methods

The Southern Plains Inventory & Monitoring Network (SOPN) has identified a total of seven fire and thirteen long-term monitoring transects at Bent's Old Fort National Historic Site (NHS; Figure 1). The plant communities monitored are: Alkali sacaton-inland saltgrass herbaceous vegetation; blue grama-buffalo grass herbaceous vegetation; cottonwood-inland saltgrass woodland; cottonwood temporarily flooded woodland alliance; and a grassland restoration area. Park management is interested in monitoring the cottonwood and restoration communities, though they are not part of Fire Program monitoring and only long-term monitoring will take place in these areas. In 2010 and 2011, all long-term monitoring transects were monitored during July; no fire-event transects were monitored in 2010 or 2011.

Results

The extreme rainfall variation between the 2010 and 2011 field seasons resulted in noticeable changes in plant response.

NPS

Park management is interested in monitoring the cottonwood and restoration communities in Bent's Old Fort NHS.

2010 was a year of average to above-normal rainfall and green vegetation, but the winter was dry and the following spring brought no rainfall. 2011 was a year of extreme drought across the southern plains. These early monitoring results provide a baseline to measure future trends and should not be viewed as trends themselves.

The native grasslands at Bent's Old Fort NHS appear to be in fairly good condition. Our opinion is based on the variety and dominance of native perennial grasses, no remnant upland and riparian grasslands have been located to provide a true comparison. While exotic grass species can be found in the park, they do not appear in the transects (except for one small occurrence of Johnsongrass (*Sorghastrum halepense*) and seem to be limited to disturbed areas. The grasses have maintained their coverage well during the 2011 drought, with only minimal cover reduction in a few species.

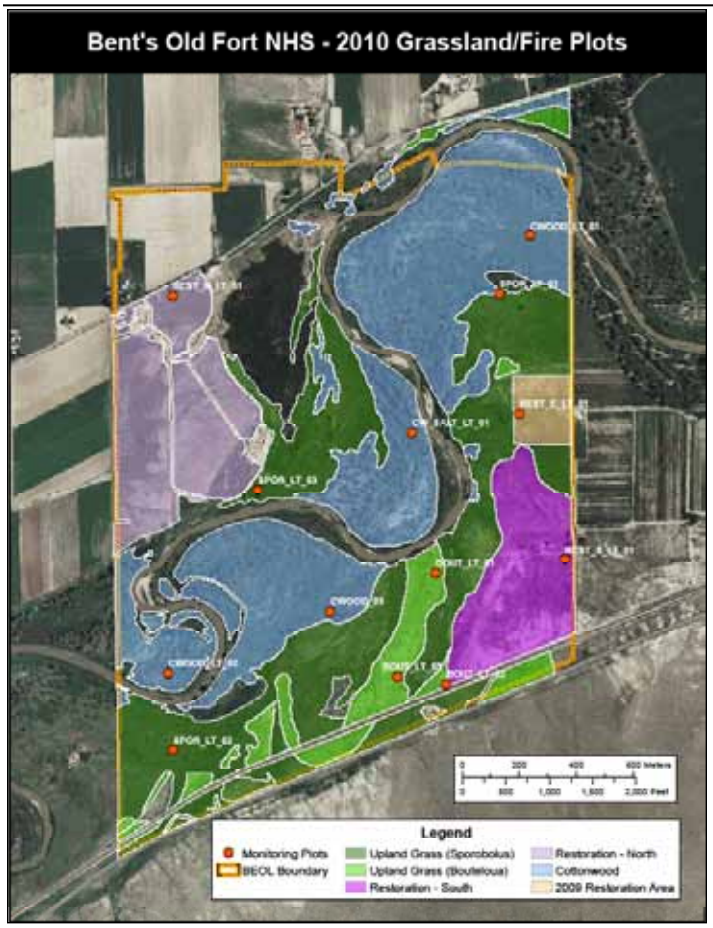

Figure 1. Monitoring transects, Bent's Old Fort NHS.

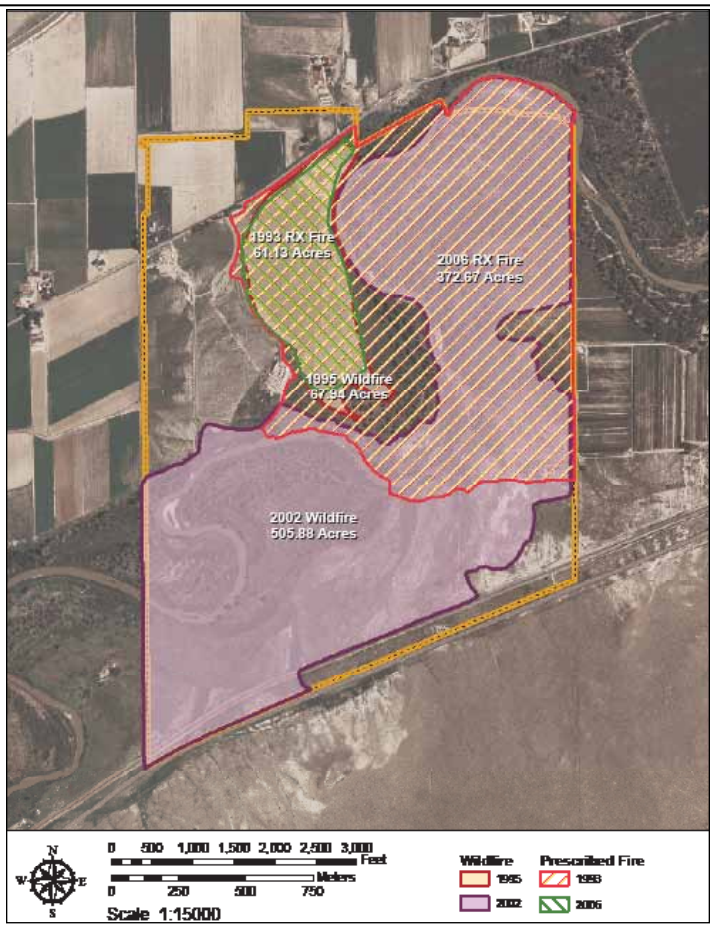

Figure 2. Prescribed treatment or wildland fires since 1993, Bent's Old Fort NHS.

Of the three restoration areas monitored by the SOPN, only one seems to be undergoing active restoration. This area has a good diversity of well-established native grasses but fewer forb species than one would anticipate. The presence and expansion of the exotic field bindweed (*Convolvulus arvensis*) is of particular concern, but is still in low enough numbers that control may be effective. The two remaining potential restoration areas are south of the Arkansas River and have been active prairie dog towns until affected by plague in 2010. These areas lack a grass component except for a small amount of inland saltgrass (*Distichlis spicata*). Forbs are present in minimal quantities; those most dominant being exotics.

The annual exotic kochia (*Kochia scoparia*) and perennial field bindweed were the most prevalent exotics found in the interior grasslands, followed closely by prickly Russian thistle (*Salsola tragus*). Kochia is found in varying quantities throughout the park, with greatest coverage in the cottonwood transects, while field bindweed prefers drier upland sites and prairie dog towns. Of greatest concern is the observation of field bindweed's strong growth and seed set while native grasses and forbs were primarily drought-dormant in 2011. This competitive advantage points to continued expansion of this exotic, particularly if the drought persists, and is reflected by the doubling of coverage of this noxious weed at Bent's Old Fort NHS in 2011. Exotic species are discussed in greater detail in the Exotic Plant Monitoring Annual Report.

There were no wildfires or prescribed burns conducted in 2010 or 2011. The last prescribed burn was in 2006 in the northeast quadrant of the park (Figure 2). A major wildfire in 2002 burned the majority of land south of the Arkansas River. It is unknown at this time when or where the next prescribed fire will be conducted.