



Washita Battlefield 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

A total of four fire and nine long-term monitoring transects were established at Washita Battlefield National Historic Site (NHS; Figure 1). The plant communities monitored include: upland grasslands consisting of sand bluestem-giant sandreed herbaceous vegetation, big bluestem-Indiangrass herbaceous vegetation, little bluestem-sideoats grama herbaceous vegetation, blue grama-sideoats grama herbaceous vegetation, and western wheatgrass herbaceous alliance; restoration grasslands consisting of reclaimed agricultural fields undergoing active prairie restoration; and disturbed grasslands consisting of cheatgrass semi-natural herbaceous vegetation, Johnsongrass herbaceous vegetation, and Bermudagrass vegetation. The disturbed grasslands have been considered for bison reintroduction and are of special interest to the park. In 2010, one fire and nine long-term transects were monitored. In 2011, all long-term transects were monitored, but no fire transects were monitored.



The disturbed grasslands of Washita Battlefield NHS have been considered for bison reintroduction and are of special interest to the park.

Results

These early monitoring results provide a baseline to measure future trends and should not be viewed as trends themselves. The extreme rainfall variation between the 2010 and 2011 field season has resulted in noticeable changes in plant response.

The grasslands at Washita Battlefield NHS have been plowed in the past and are in varying states of recovery. There are some areas of the southeastern uplands that are in quite good condition, while areas around the old homestead and railroad embankment continue to harbor major exotic plant components. The 20 species of grasses found in the transects are mainly perennial, but there are three problematic exotic grass species found among the natives. Little bluestem

Washita Battlefield NHS - 2010 Grassland/Fire Plots

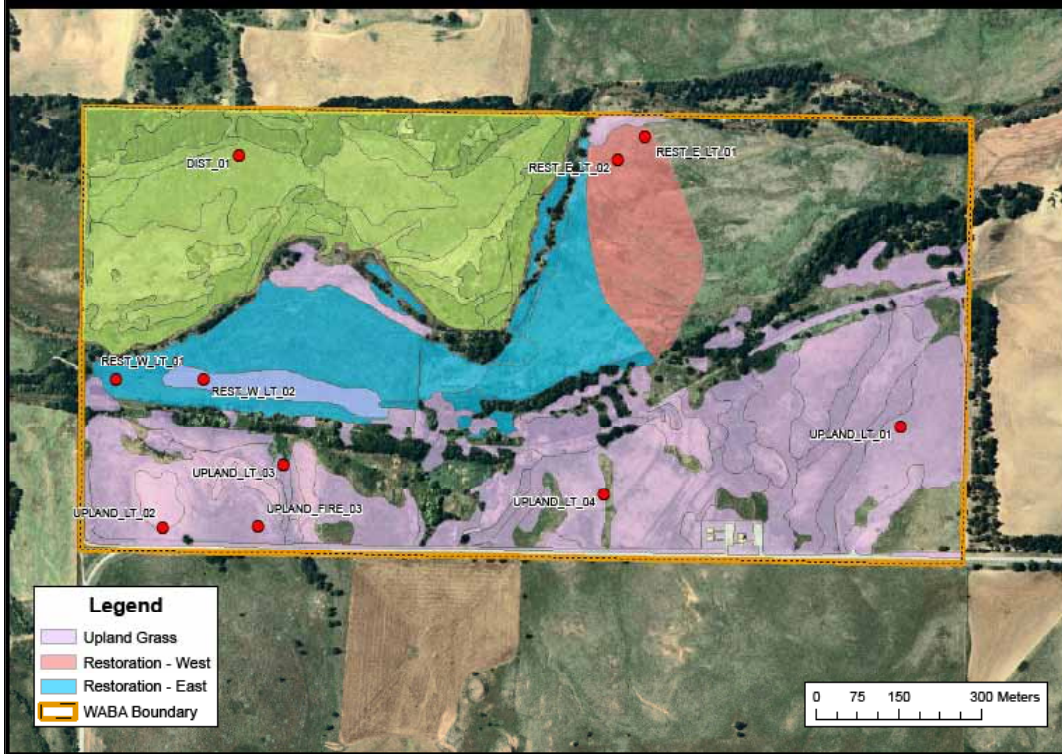


Figure 1. Monitoring transects (left), Washita Battlefield NHS.

continues to be the most abundant grass, found in all transects. This native bunchgrass is highly desirable for its extensive root system and wildlife habitat. The forbs are evenly divided between annuals and perennials and are very diverse. The bare ground/litter ratio appears stable but may reflect the lack of prescribed fire for the past few years.

The fields in the floodplain of the Washita River have been undergoing restoration for many years and have a good mix of perennial grasses, but they lack a good forb component. This area experiences inundation every few years and has experienced much disturbance over the past century. Exotic grasses and trees continue to be problematic in this area from local and upstream propagules.

Exotic plants are a problem, but an active eradication program may help restore balance to the grasslands. Johnsongrass (*Sorghum halepense*) and KR bluestem (*Bothriochloa ischaemum*) are two perennial grasses that threaten grassland health, in addition to the exotic bromes (*Bromus japonicus* and *B. tectorum*). Siberian elm (*Ulmus pumila*) continues to invade the grasslands due to their numerous seed production and their historic planting in shelter belts. Exotic species are discussed in greater detail in the Exotic Plant Monitoring Annual Report.

Prescribed fire has been a management tool over the past eight years (Figure 2), with the majority of the park having been burned between 2003 to 2007. Since that time, environmental conditions have not allowed additional burning. No wildland fires have been reported in recent history.

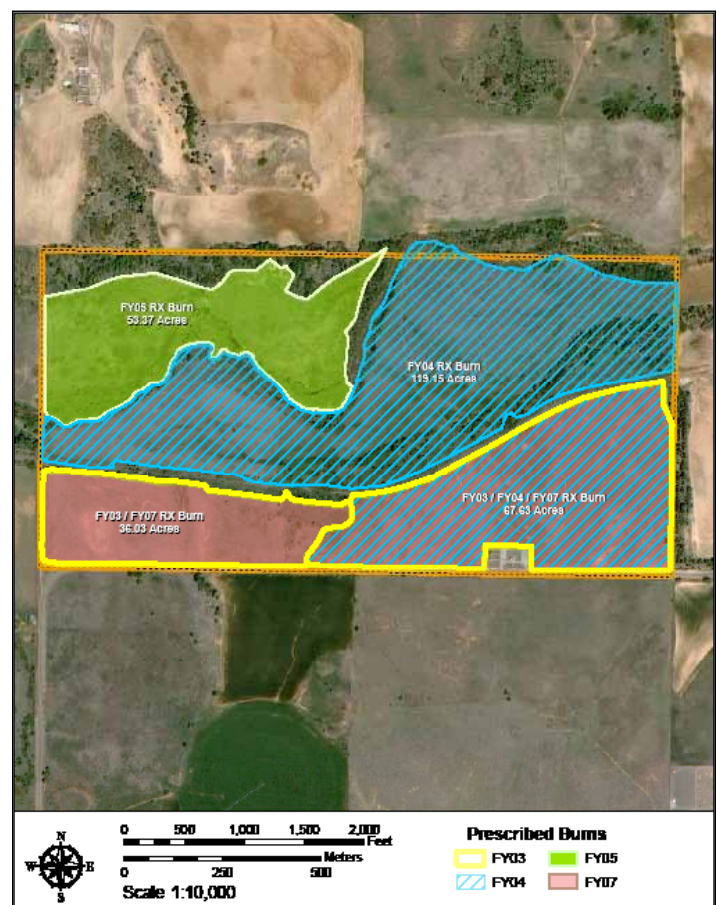


Figure 2. Prescribed treatment or wildland fires since 2003, Washita Battlefield NHS.