Chickasaw National Recreation Area

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 ten fire and ten long-term monitoring transects have been established at Chickasaw National Recreation Area (NRA; Figure 1). The plant communities monitored are: upland grasslands comprised of little bluestem–sideoats grama–blue grama herbaceous vegetation; little bluestem–Indiangrass–sideoats grama herbaceous vegetation; hairy grama–sideoats grama herbaceous vegetation; and seep muhly–sideoats grama–Illinois bundleflower herbaceous vegetation; and an Old Field habitat which contains the Johnsongrass semi-natural herbaceous association. The Old Field habitat is slowly being restored by the park to native grasslands and is an area of specific concern to management. In 2010, four fire and nine long-term transects were monitored in June and September, while 2011 saw all long-term transects and two fire transects monitored in June.

Results

These early-monitoring results provide a baseline to measure future trends and should not be viewed as trends themselves.

NPS

A total of ten fire and ten long-term monitoring transects were established at Chickasaw NRA.

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

The grasslands at Chickasaw NRA continue to undergo transformation in an effort to re-establish midgrass savannah, determined to have been an historic state. Intensive clearing of eastern red cedar (*Juniperus virginiana*) and an active prescribed burn program result in a mosaic of grasslands in varying succession. While grasses continue to respond favorably to these burns, the overall shift appears to be to shrubland; thickets of various sumacs (*Rhus* species), dewberries (*Rubus* species), green catbriar (*Smilax bonanox*), and poison ivy (*Toxicodendron radicans*) quickly spring up. Thirty-seven species of grass have been identified in monitoring transects through 2011, the majority being

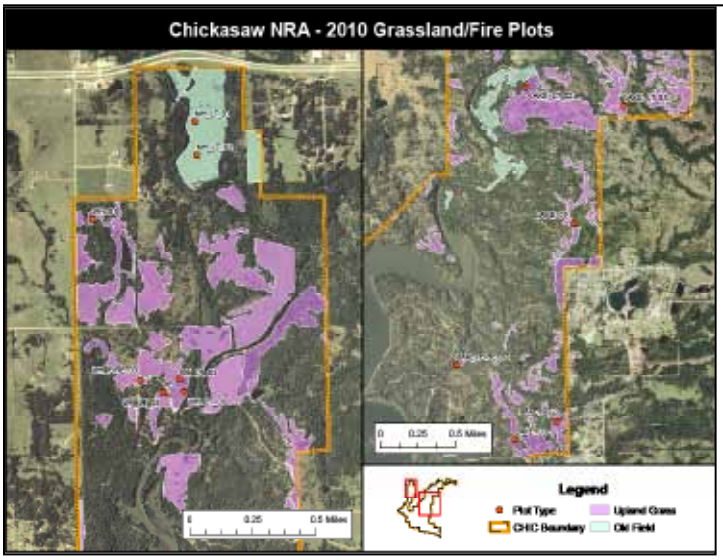

Figure 1. Monitoring transects, Chickasaw NRA.

perennial natives, and forbs are quite diverse throughout the grassland.

Vegetation management activity is taking place throughout the park, and active restoration is being undertaken on a large Johnsongrass (*Sorghum halepense*) hayfield in the Guy Sandy area. This area has been seeded with "placeholder" species while Johnsongrass is being eradicated. Progress is being made, but this will be a slow process until good rainfall returns and native grasses can be restored. While eastern red cedar is being thinned in areas of the park, most of this activity is taking place in deciduous woodlands and not within the scope of our sampling.

Various exotic plant species are widespread throughout Chickasaw NRA. The perennial Johnsongrass is prevalent in many areas as remnants of past agricultural use and other disturbances. Another agricultural remnant, sericea lespedeza (*Lespedeza cuneata*) is widespread throughout the park, found wherever there are deeper soils and sunlight. There are a number of native *Lespedeza* species at Chickasaw NRA, often intermixed with sericea lesedeza, so control of the exotic will be very difficult. Exotic species are discussed in greater detail in the Exotic Plant Monitoring Annual Report.

Chickasaw NRA supports an active prescribed burning and thinning program. A prescribed burn has taken place in 2009 in the northeastern sector covering 50 acres (Figure 2). Earlier burns have taken place in the Guy Sandy area and north of Veteran's Lake, but no details have been given. Recent prescribed burns have been delayed due to weather conditions. Thinning (over 2,500 acres) and defensible space clearing (164.6 acres) have taken place in 2009 and 2010 in the area behind the Nature Center, the Guy Sandy area, and around Lake of the Arbuckles.

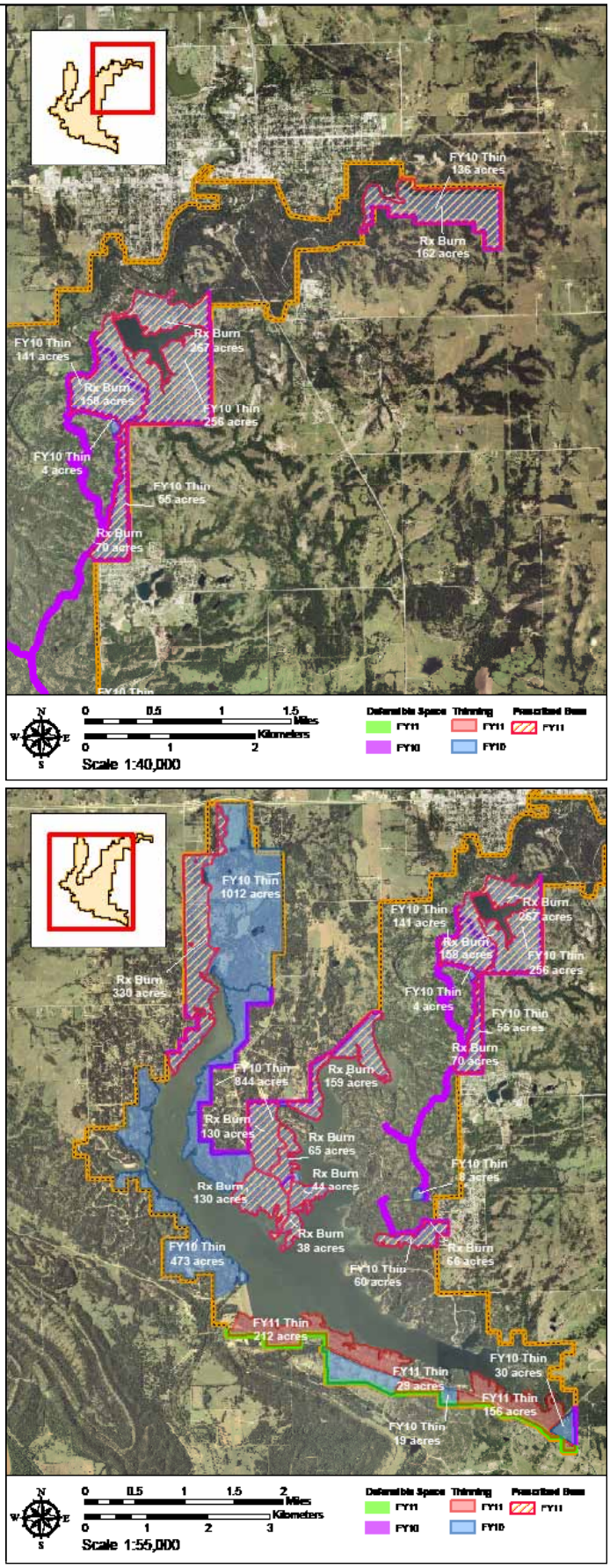

Figure 2. Prescribed treatment or wildland fires since 2009 in eastern (top) and western Chickasaw NRA (bottom).