



Lake Meredith NRA and Alibates Flint Quarries NM

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 26 fire-event transects and 26 long-term monitoring transects were established at Lake Meredith National Recreation Area (NRA) and Alibates Flint Quarries National Monument (NM; Figure 1). The plant communities monitored include: upland grasslands consisting of blue grama-buffalograss herbaceous vegetation, sand sagebrush/ (sideoats grama, hairy grama) shrubland, and upland sloped/rolling hills vegetation complex; perennial bottomland consisting of perennial bottomland grassland complex and perennial bottomland/upper terrace, valley floor grassland complex; honey mesquite shrubland which is being type-converted to grassland; and cottonwood galleries which are of special concern to the park. In 2010, two fire and twenty-five long-term transects were monitored. It was determined that the effort, while valid, was too ambitious given the time and budget constraints; therefore, eight long-term transects have been dropped from the monitoring schedule. In 2011, 18 long-term transects and two fire transects were sampled in August.



Grassland plant community at Alibates Flint Quarries NM.

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. Most vegetation at the time of monitoring was dead or dormant, often resulting in difficulty identifying species or accurately determining cover. When a grass could be identified in its dormant state, its coverage was estimated as normal; when unable to identify other than presence, its coverage was listed under “dead” (even though it may just be dormant). Further refinement of monitoring during extreme drought will be made to the protocol to address these issues.

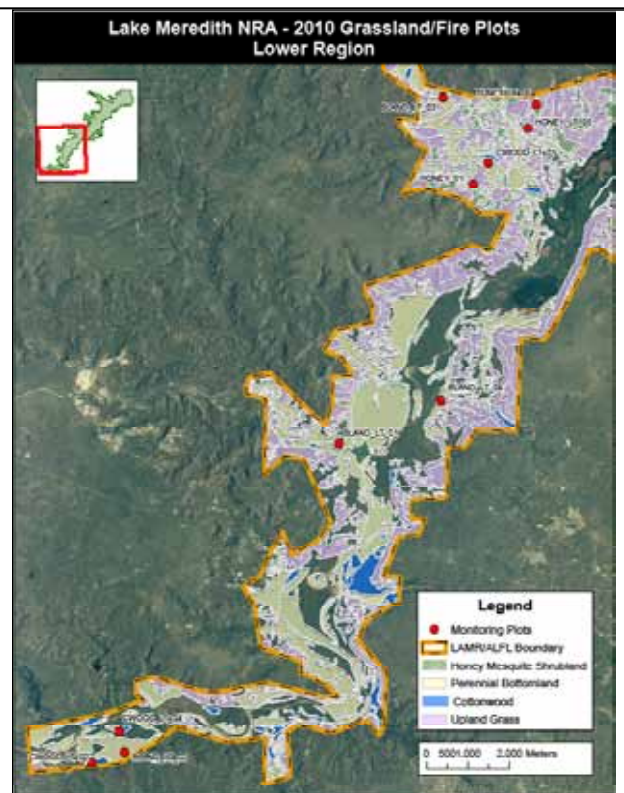
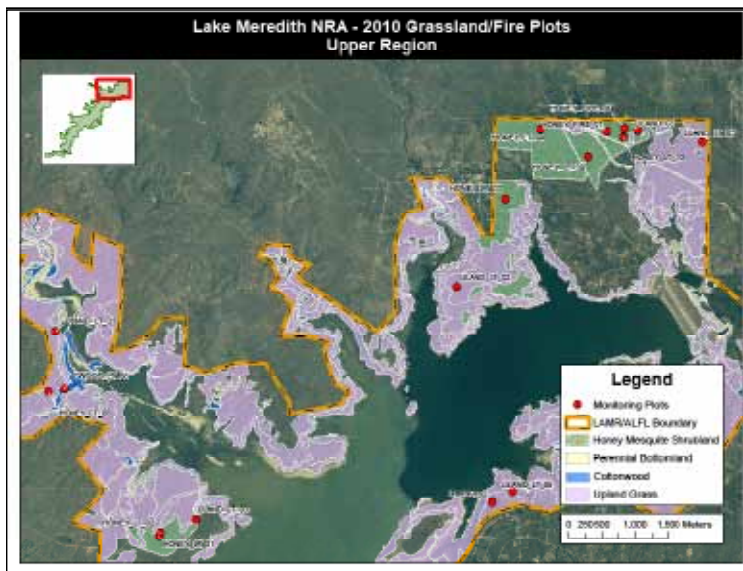


Figure 1. Monitoring transects, upper (top left) and lower (right) Lake Meredith NRA and Alibates Flint Quarries NM, 2010 and 2011.

The grasslands are currently under major drought stress, and it remains to be seen how they will react to an extended drought. In 2010, a wide variety of native perennial grasses were found in the transects, although many in the bottomlands had been affected by aerial spraying conducted for saltcedar (*Tamarisk* spp.) control; drought stress made it impossible to determine if they had recovered in 2011. Active gas drilling within park boundaries has caused fragmentation of the grasslands and added to the problem of exotic plant introduction and spread. There is a great diversity of forbs throughout the various plant communities, with two-thirds of them perennial.

There are currently no active restoration areas within the park, but this will change in future years. If relatively healthy patches of grassland can be located, these could serve as seed sources for restoration.

Exotic forbs found in the transects were annuals, with prickly Russian thistle (*Salsola tragus*) being found in all plant communities and the most abundant forb overall. It has been observed blanketing well sites throughout the park, and combined with its characteristics of widespread dispersal of numerous seeds and ease of dispersal on well roads, will likely ensure it is a permanent component of the park flora. There are many exotic species and due to the long, linear nature of the park, control of these species will be problematic.

There has been an active prescribed burn program at Lake Meredith NRA for many years. 2009 saw burning on either side of the dam with a goal of reducing mesquite. Four parcels in the Mullinaw Crossing area and one parcel of the Rosita area were burned in 2010 (Figure 2). Earlier treatments have taken place but no information is available at this time.

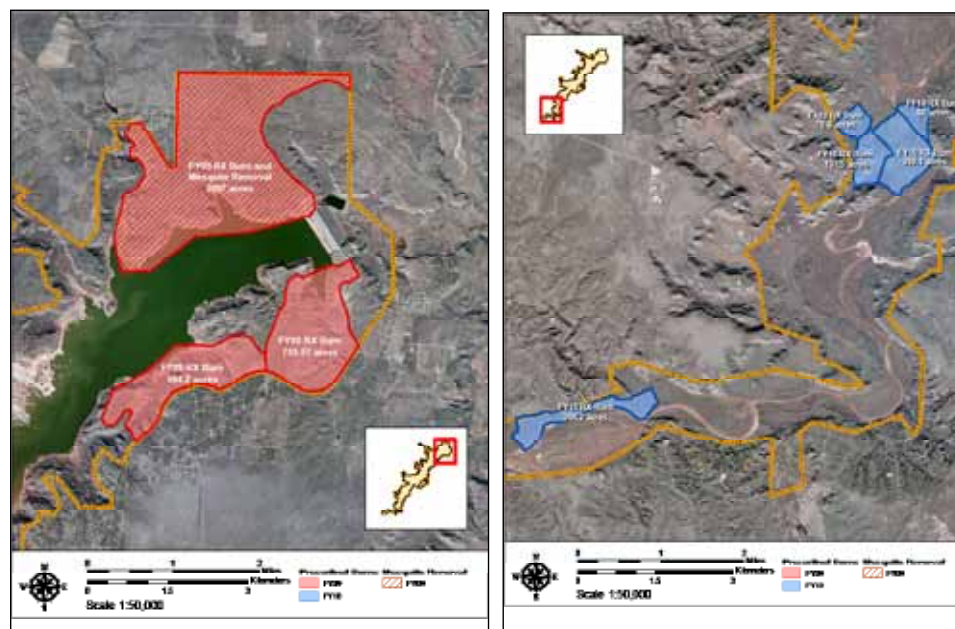


Figure 2. Prescribed treatment or wildland fires since 2009, upper (far left) and lower (near left) Lake Meredith NRA and Alibates Flint Quarries NM, 2010.