

Site Characteristics of Intact Shortgrass Steppe in the Southern Great Plains USA

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Introduction Steppe, a mid-latitude, semiarid grassland has a wide global distribution. It is estimated that in the United States less than 23 percent of true shortgrass steppe still exists in native vegetation (National Grasslands Management Review Team Report, 1995). The Kiowa National Grassland long-term, 18-year, experimental fire research site is one such area. Located in the southern Great Plains, the site still contains most of its native vegetation. The site has never been plowed, although it was grazed by livestock until 1990 (Ford and Johnson, 2006). Information about natural ecosystem processes and responses to disturbance in relatively intact ecosystems can be used to enhance remediation of disturbed lands (Pyke et al., 2003). This paper reviews site characteristics of the unburned treatment of the 18-year fire experiment from 1995-2004, during extreme drought. Though the mean annual precipitation (MAP) for the site was 356 mm, most actual total annual precipitation for the site over the ten year period was generally lower (Fig.1).

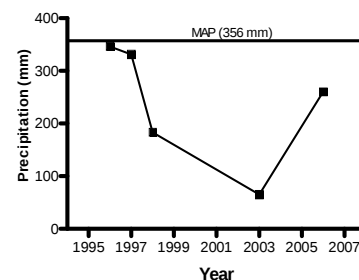


Figure 1 Total annual precipitation

Methods The study site is located 36° 31' 20" N, 103° 3' 30"W. The loam soils on the site support an almost shrubless grassland. The experimental design was completely randomized. The treatments were dormant- and growing-season fire, and unburned. Plots were 2-ha in size (N=5). One 100-m, line-point intercept transect (500 points/line) per plot was used to measure ground cover; and soil cores were collected along the transect(Table 1).

Table 1. Unburned response variables, mean (SD), 1995, 1997, 2003, 2004.

Collection Period (a subset from the first 10 years)	Sept-Oct 1995	March 1997	Aug-Sept 1997	Mar-Aug 2003	October 2004
Variable					
% Forb cover	1.0	< 1	3.0	< 1.0	< 1.0
% Litter cover	1.1	16 (7)	0.9	60 (1)	47 (3)
% Bare ground	0.5	13 (5)	3.7	12 (5)	23 (2)
% Grass	60.2	66 (9)	73	28 (4)	23 (2)
% Shrub cover	0.6	< 1	0.1	< 1.0	< 1.0
% Soil organic matter	1.44	No Data	1.23	3.99 (0.12)	4.79 (0.10)

Results During the drought years, soil organic matter increased over 50%, while grass cover decreased over 50%. Bare ground and litter increased substantially. Shrub cover and forb cover remained stable.

Conclusion Knowledge of the direction and magnitude of change in intact grasslands under natural conditions will allow us to know whether grassland condition is a response to a variable climate, versus the result of management activities, i.e., prescribed fire. This in turn will aid in the remediation of disturbed lands.

References

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