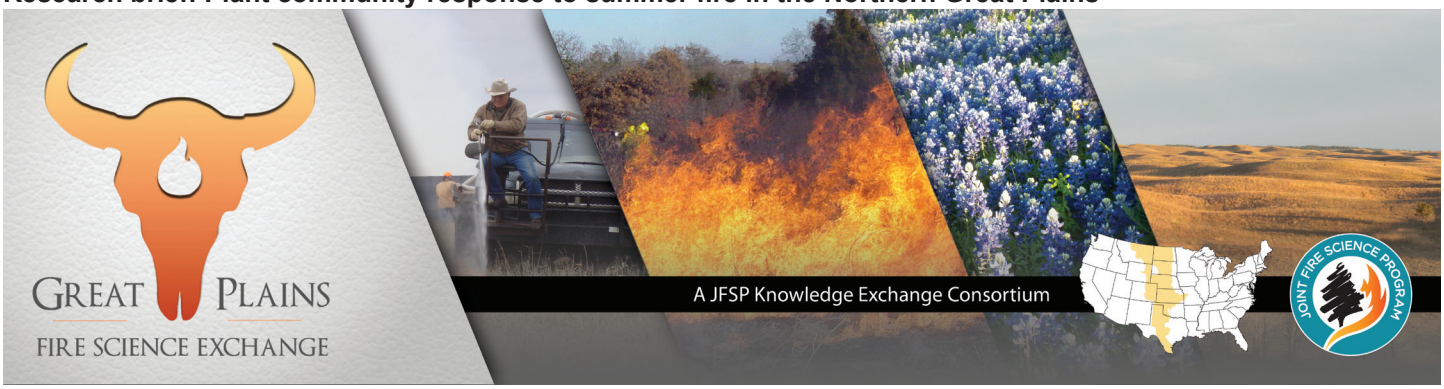

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Plant community response to summer fire in the Northern Great Plains

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INTRODUCTION

Fire is common in the western Great Plains, but much less well studied than in eastern prairies. Wildfires most commonly occur in July and August in these semi-arid rangelands covered with cool-season grasses, but the impact of summer fires has not been well researched. Soil temperature and moisture are important factors in forage productivity and previous research concluded that summer fire reduced productivity in dry northern mixed-grass prairie while showing no impact on productivity on more mesic mixed-grass prairie. Summer fires remove vegetation and litter, increasing soil temperatures and favoring cool-season grasses. If cool-season grasses provide most of the forage, then increasing their productivity may lead to increased forage production. In drier areas with less precipitation, moisture may be the key factor to forage production.

LOCATION

The study was conducted at Fort Keogh Livestock and Range Research Laboratory in southeast Montana. Annual precipitation is about 13 inches and there are about 120 frost-free days each year. Needle-and-thread (*Hesperostipa comata*), western wheatgrass (*Pascopyrum smithii*), threadleaf sedge (*Carex filifolia*), blue grama (*Bouteloua gracilis*), and Sandberg bluegrass (*Poa secunda*), along with several species of sagebrush are the primary vegetation on the loam soil site. The study site had been grazed by cattle for decades but was not grazed during this experiment.

TREATMENT

Sixteen plots slightly smaller than 2 acres were laid out within a 74 acre pasture. Half the plots were burned and half the plots were left unburned. Burn plots were fired in late August. Soil temperature, soil moisture, standing crop, current-year vegetation (biomass), species composition, litter weight and root weights were measured. Two soil temperature sensors were buried 4 inches under the ground in each plot. An 8-inch soil moisture sampling unit was buried so that the top of the unit was just below the soil surface. Circular frames about 22.25 inches in diameter were used to take vegetative samples. Twenty soil cores were collected from each plot to a depth of 12 inches, dried, and weighed. Roots were washed out of the cores and weighed. Vegetation was clipped at ground level, dried, and weighed. Plant abundance was estimated visually and the relative abundance for various species and classes of plants was determined. Biomass was collected one and two years after burning.

RESULTS

Soil temperatures were about 1 degree cooler on burned plots compared to unburned plots when conditions were dry, but temperatures were similar when conditions were wet. Soil water content was greatest on unburned plots, but there was less than 1% difference in soil moisture during the growing season between burned and unburned plots.

Original publication:
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