

Experimental fire in two different grassland ecosystems in the Southwestern United States

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Abstract

Over the last 150 years there have been profound changes in semiarid and aridland ecosystems, including overgrazing and shrub encroachment. Millions of dollars are spent annually for post-fire rehabilitation and restoration activities, yet rehabilitation and restoration is often not successful. Although the re-establishment of periodic fire is fundamental to the ecological restoration of southwestern grasslands, current management policies must be based less on historical fire regimes and more on land-use legacies along with dynamic climate change. Global change is leading to a more variable climate that includes more frequent extreme events, along with a potential shift in winter/summer rainfall patterns. Given the uncertainty of future scenarios for climate change and climate variability in the southwestern US we need to know now how fire seasonality - and over the long-term fire frequency – affect biodiversity and ecosystem functioning in semiarid and aridland ecosystems. We compare and contrast the results of a long-term, 18-year study examining effects of fire in the growing-vs. dormant season at return intervals of 3, 6, and 9 years on shortgrass steppe ecosystem components; with new experimental fire research in Chihuahuan Desert grassland examining the effects of spring, summer and winter fires on desert grassland ecosystems. Caution is warranted when interpreting the effects of prescribed fire on southwestern grasslands due to differences in season of occurrence, weather conditions, grassland uses, fire history, and fuel conditions in which a burn can occur. The length of time between fire and post-fire data collection will also greatly influence perceptions about fire effects.