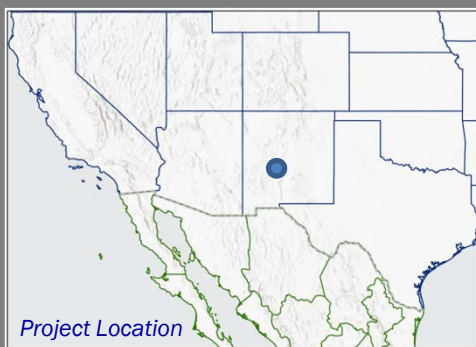


FIRE MANAGEMENT

Prescribed Burns for Grassland Management at the Sevilleta National Wildlife Refuge

The Sevilleta National Wildlife Refuge (SNWR) managed by the U.S. Fish and Wildlife Service since 1973, preserves 230,000 acres in central New Mexico. The refuge includes four distinct biomes, ranging from Chihuahuan Desert grassland to Pinyon-Juniper woodland. A collaboration between SNWR and the University of New Mexico led to the establishment of the Sevilleta Long Term Ecological Research (LTER) program in 1988 increasing the time scale of ecological studies at this site. The LTER supports research on the impacts of fire, drought, and vegetation change in semi-arid grasslands.



KEY ISSUES ADDRESSED

Wildfires are an important component of grassland systems. In absence of natural fire, managers mimic wildfire through the use of prescribed burns, which are considered a cost-effective method for maintaining grassland integrity. However, there is little information on when and how often to implement burns in grasslands because there is no historical fire record. Additionally, burns can have a negative impact on native grasses when applied during drought. Research conducted at the Sevilleta LTER is helping to provide information on when and how much to burn to preserve arid-land grassland integrity and to improve fire management in a changing climate.

PROJECT GOALS

- Contribute new knowledge on fire management for desert grasslands
- Increase native grass cover through prescribed burns
- Identify the most effective prescribed burn treatments within and across years to achieve desired response in plant communities

DROUGHT EFFECTS

The sensitivity of Chihuahuan Desert Grasslands to drought is well understood due to experiments at Sevilleta NWR. These studies provide insight for grassland management under imminent extreme water-limitation.



Igniting Prescribed Burns

PROJECT HIGHLIGHTS

Adaptive Management: Research is identifying fire management techniques to increase native grass recovery after prescribed burns in semiarid grasslands. To increase understanding of the role of fire in arid ecosystems, extensive monitoring is being conducted after prescribed burns to quantify grass recovery and plant compositional changes.

Fire Seasonality: An experiment on the Sevilleta LTER is determining the impact of timing of burns on grass recovery and plant community composition in Chihuahuan desert ecosystem.

Nutrient Availability: The effect of prescribed burns and timing on organic matter, ammonium, and nitrate was measured to test for differences in nutrient availability.

Fire and Drought: The LTER has initiated a long-term experiment to compare native grass recovery to multiple prescribed burns under a variety of precipitation scenarios and seasons. Prescribed burn treatments are re-applied in ten-year intervals.

Collaborators

- U.S. Department of Agriculture Forest Service
- University of New Mexico
- U.S. Fish and Wildlife Service
- Sevilleta Long Term Ecological Research

Funding Partners

- National Science Foundation
- U.S. Department of Agriculture Forest Service

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Photos courtesy of US Forest Service

LESSONS LEARNED

Fire seasonality affects native plant species productivity and composition. Fall burns favor an overall increase in species richness. Spring burns led to greatest increase in forb cover. Summer and fall burns had similar grass recovery.

Prolonged drought affects post-fire grass recovery. Reduced soil moisture inhibited black grama recovery and accounted for most of the variability across seasonal burns. Forbs out-competed grasses because they are able to access soil resources quickly and are less susceptible to drought. Fire homogenized soil nutrient distribution and organic matter increased after a summer burn.

Prescribed burns should be minimized during drought years because grasses take longer to regain ideal patch size and cover under conditions of reduced soil moisture. Recovery can take more than ten years if drought persists. Ideally, prescribed burns can be applied after rain events when soils and grasses are dry but soil moisture is still available in the root zone.

NEXT STEPS

- Re-application of prescribed burn treatments on native vegetation after a ten year recovery period
- Continue biannual monitoring of vegetation trends to assess effects of fire seasonality
- Monitor effects of fire on soil organic matter and erosion potential

PROJECT RESOURCES

For more information on this project, contact Paulette Ford: plford@fs.fed.us

For additional project resources and case studies, visit the Collaborative Conservation and Adaptation Strategy Toolbox: WWW.DESERTLCC.ORG/RESOURCE/CCAST



Experimental Burn Treatment Plots