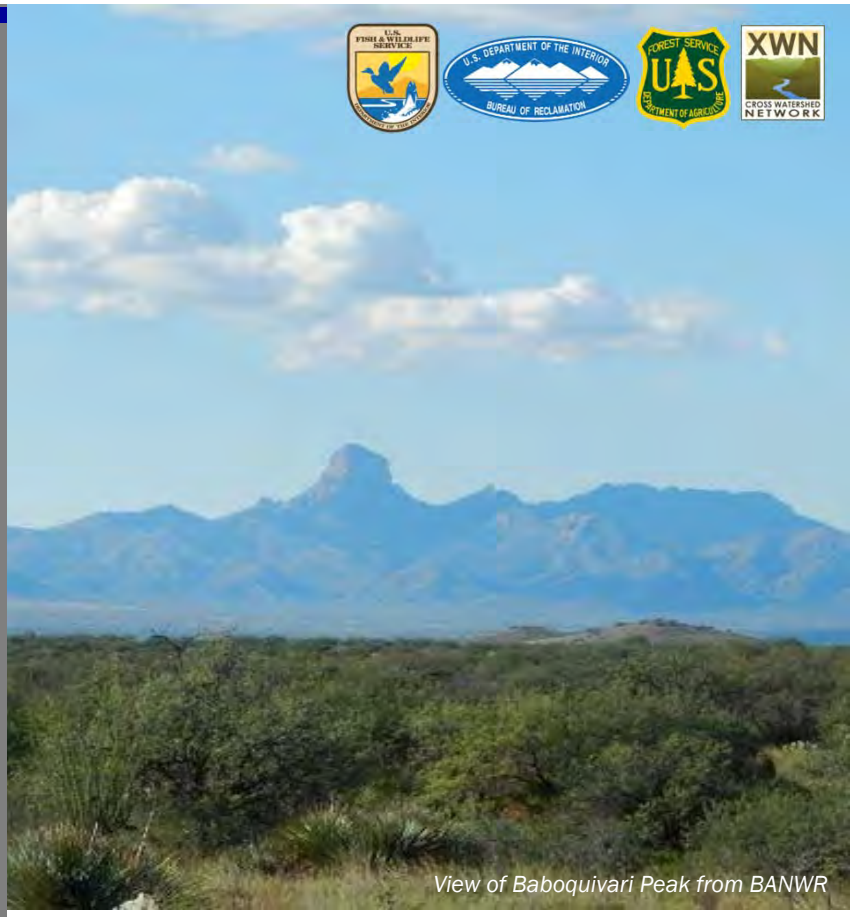
ACTIONABLE SCIENCE

Determining Prescribed Fire Compatibility with Masked Bobwhite Quail Habitat Rehabilitation



View of Baboquivari Peak from BANWR

The Buenos Aires National Wildlife Refuge (BANWR) is in the Altar Valley of Southeast Arizona. BANWR has employed prescribed fire for over three decades to reintroduce historic fire regimes, reduce woody species encroachment, and enhance productivity of native semidesert plants. Vegetation monitoring efforts began in 2013 to assess the response of plant communities to the Multi-Unit Burn Plan using modern fire and habitat monitoring tools important to improving recovery for the critically endangered masked bobwhite quail for which the refuge was created in 1985.


Project Location

KEY ISSUES ADDRESSED

Monitoring is a key step in adaptive management. BANWR has successfully implemented a prescribed fire program for several decades. However, little monitoring has been done at scales that sufficiently sample refuge-wide variability to assess the outcome of fire prescriptions and progress intended goals. Objectives of prescribed fire at BANWR are to address ecological effects of fire suppression such as the large increase of mesquite tree cover in grassland ecosystems since Anglo-American settlement. Introduction of invasive perennial grasses has greatly altered plant community composition and fire effects. The monitoring effort at BANWR seeks to use modern field and remote-sensing methods to inform fire management and the masked bobwhite quail recovery program.

PROJECT GOALS

- Compare fire management histories with vegetation field plots to assess masked bobwhite habitat conditions
- Improve field methods for monitoring fine-fuel loads, vegetation composition and structure in semidesert grasslands
- Examine how a range of biotic and abiotic factors contribute to habitat conditions in addition to fire application

ADAPTIVE MANAGEMENT

Refuge managers are incorporating vegetation monitoring results into alternative habitat improvement efforts, including creating mesquite brush piles that provide cover for quail and other small wildlife species.

Calibrating the Field Ceptometer

PROJECT HIGHLIGHTS

Capturing Variability: Over 400 plots have been sampled that represent the spectrum of biophysical conditions at the refuge spanning all management units with known fire frequency histories.

Landscape-Scale Models: Field data has been integrated with remotely-sensed satellite imagery to populate spatial models to estimate conditions within unsampled areas at a landscape scale. Spatial models were used to predict vegetation classes, fine-fuel biomass, and percent cover for woody and herbaceous plants and bare ground.

New Technologies: This project tested the use of a field ceptometer that measures photosynthetically active radiation (PAR) intercepted by plants. It estimates plant leaf area index (LAI) for predicting fine-fuel biomass and fuel loads more efficiently than destructive sampling, allowing for larger sample sizes.

Collaborators

Northern Arizona University, Lab of Conservation Biology and Landscape Ecology

Funding Partners

US Fish and Wildlife Service, Joint Fire Science Program

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Photos courtesy of US Fish and Wildlife Service

LESSONS LEARNED

There is clear need for repeated long-term sampling to determine how variability in climate and precipitation patterns interplay with management actions to affect the vegetation and fuel characteristics.

Prescribed fire has not achieved the desired result of enhancing native vegetation characteristics for masked bobwhite. Instead, nonnative plants are now more dominant, desirable shrub cover has been reduced, and mesquite encroachment has only been reduced in the highest burn frequencies where Lehmann lovegrass dominates.

Drainages currently contain the best habitat for masked bobwhite quail. This could be related to fire exclusion, higher soil-moisture availability, and increased plant diversity and habitat heterogeneity.

NEXT STEPS

- Encourage implementation of short- and long-term vegetation monitoring program to help guide management activities
- Identify additional treatments to promote native plant species and priority sites for quail habitat improvement
- Develop and use rapid habitat assessment techniques to inform refuge-wide suitability modeling for masked bobwhite quail

PROJECT RESOURCES

For more information on this project, contact Steve Sesnie: steve_sesnie@fws.gov

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

Estimating Vegetation Cover