

SPECIAL ISSUE

FIRE IN THE SOUTHWEST: INTEGRATING FIRE INTO MANAGEMENT OF CHANGING ECOSYSTEMS

Diverse fire regimes and contentious management issues coupled with continuing severe drought have presented southwestern land managers and fire scientists with daunting challenges. Recent and predicted changes in climate, fuels, and fire behavior are yielding unique management problems with few obvious solutions. Recent studies document that the southwest is experiencing and will likely continue to experience increased droughts and earlier and more severe fire seasons. Unprecedented human population growth, combined with expanding populations of some invasive plant species, provide additional challenges for land managers in the region.

This special edition includes research papers and forum articles that span both ecological and sociological aspects of managing fire in the southwest. The first paper, by Iniguez *et al.*, explores the interacting roles of topography, vegetation, and climate in a “sky island” mountain range of southern Arizona. They provide evidence that the changes in fire regimes through time in this isolated mountain range were contingent on a combination of regional climate and local landscape factors.

Smoke-cued seed germination and emergence is common in some frequent-fire ecosystems, but not well-studied in conifer forests of the southwest. In the second paper, Scott Abella presents results of greenhouse and field studies designed to assess whether aqueous smoke promotes plant emergence in 61 plant species commonly found in ponderosa pine forests in this region.

The next two papers address fire and invasive species. Smith *et al.* document the interaction of wildfire and drought on native shrubs and exotic saltcedar density in bosque (riparian forest) in central New Mexico. Robert Steidl and Andrea Litt explore how the invasion of an African bunchgrass, Lehmann lovegrass, influences the effects of fire on small mammals. These papers highlight the increasing challenge that managers face in designing management strategies for highly invaded ecosystems.

Burgeoning population growth into fire-prone areas of the southwest has been the impetus for increased fuel treatments in the wildland-urban interface (WUI). But, as Dicus *et al.* point out, vegetation is more than fuel. They present an approach to estimate other societal benefits of vegetation in a WUI, including air pollution removal and carbon sequestration and storage.

Studies documenting the long-term effects of prescribed fires are rare; most data come from relatively short-term assessments. In the next short communication, Ffolliott *et al.* summarize post-fire impacts 43 years after a prescribed burn in ponderosa pine forest.

The special issue concludes with four forum articles. The first, by Gottfried *et al.*, describes how ranchers and staff from both state and federal agencies and The Nature Conservancy are collaborating to reintroduce fire in the southern “borderlands” to improve landscape productivity and biological diversity. Weisz *et al.* describe a process for incorporating information on recent fires and insect outbreaks in state-and-transition models using an example from northern Arizona.

The final two forum papers relating to the Burned Area Emergency Response (BAER) program, whose teams of specialists make recommendations for immediate post-wildfire management recommendations to stabilize especially severely burned areas. Robichaud *et al.* outline new tools that have been designed or modified for BAER team use and make a case for the need for longer term monitoring of recovering ecosystems. Neary *et al.* address the question of whether BAER treatments can decrease post-wildfire desertification, or as they define it, the degradation caused by soil erosion and exotic species introduction.

Carolyn Hull Sieg
USDA Forest Service
Rocky Mountain Research Station
Flagstaff, Arizona 86001, USA

Peter Z. Fulé
Northern Arizona University
Flagstaff, Arizona 86001, USA

Molly Hunter
Northern Arizona University
Flagstaff, Arizona 86001, USA

Craig D. Allen
US Geological Survey
Los Alamos, New Mexico 87544, USA

Matthew L. Brooks
US Geological Survey
El Portal, California 95318, USA

Randy G. Balice
Los Alamos National Laboratory
Los Alamos, New Mexico 87544, USA