

## Western Ecological Research Center

# Publication Brief for Resource Managers

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## Spatial and Temporal Patterns of Wildfires in the Mojave Desert

Fire has been historically infrequent in the Mojave Desert, and its increased prevalence caused by the invasion of non-native annual grasses is a major concern for land managers there. The effects of wildfires on the federally threatened desert tortoise and on general plant diversity and wildlife habitat are major management issues. In a recent issue of the *Journal of Arid Environments*, USGS scientists Dr. Matt Brooks and J. R. Matchett described the frequency and extent of burning among different ecological zones, distributions of lightning vs. human caused fires, trends in these variables among rainfall years, and general patterns across the entire Mojave Desert.

The authors used fire data from the U.S. Department of the Interior and Forest Service interagency fire record database for the period 1980–2004. They evaluated the fire history response variables in relationship to four of the five ecological zones described for the Mojave Desert, which represent the major upland fuel types in this region. They found that the most dramatic changes have occurred in middle elevation shrublands dominated by creosotebush, Joshua tree, and/or blackbrush, where most of the fires occurred between 1980 and 2004. This zone is more susceptible than other areas of the Mojave Desert to increased fire size following years of high rainfall. Increases in fire size are likely related to the flush of non-native annual grasses (red brome, in particular), which produce continuous fuelbeds following years of high rainfall. This dynamic also has occurred to some degree at lower elevations, but the background cover of native perennial fuels there is already very low, muting the effects of the ephemeral fuels.

At elevations above the middle elevation shrublands, fire size does not vary with rainfall, indicating that

### Management Implications:

- Results in this study are based on 25 years of fire data and should be re-evaluated periodically, perhaps at 5-year intervals, to maintain current information to assist in managing fire in the region.
- Future analyses need to stratify the region based on the four ecological zones used in this paper, or even more precise vegetation categories if appropriate spatial data are developed for the entire region in the future.
- It appears that the middle elevation ecological zone is most susceptible to the establishment of a grass/fire cycle, especially where numerous very large fires have occurred in the northeastern Mojave Desert. The low elevation zone is also susceptible, but to a lesser degree.
- Other vegetation types of the world with similar native woody fuels may be similarly susceptible to altered fire regimes caused by non-native grass invasions.
- Very low elevation vegetation types that are too sparse to begin with, or higher elevation types that are already sufficient to carry fire, do not seem to be as sensitive to fire regime changes caused by non-native annual grasses.

native woody fuels dictate fire regimes there. These results suggest that an invasive plant/fire regime cycle is currently establishing in the middle and possibly the low elevation shrublands of the Mojave Desert, but not at higher elevations.

*Brooks, M. L., and J. R. Matchett. 2006. Spatial and temporal patterns of wildfires in the Mojave Desert, 1980–2004. Journal of Arid Environments 67:148–164.*