

Western Ecological Research Center

Publication Brief for Resource Managers

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Alien Plants and Fire in Desert Tortoise Habitat

Alien plants and fire have recently been recognized as significant land management problems in the Mojave and Colorado deserts, especially as they relate to management of the federally threatened desert tortoise. Very little information is currently available on the types of alien plants present and what their ecological effects may be, or on the characteristics and potential effects of the current fire regime in this region. To provide this information, USGS scientists Dr. Matt Brooks and Todd Esque published a state-of-knowledge synthesis on invasive plants and fire in the Mojave and Colorado deserts for a special journal issue focused entirely on North American tortoise research.

Surveys conducted among land managers and field scientists identified 116 species of alien plants in the Mojave and Colorado desert flora, and this is undoubtedly an underestimate of the actual number of species present. The vast majority of species were annuals, dominated by *Bromus rubens*, *Schismus* spp., and *Erodium cicutarium*, which are currently widespread and abundant. These species can compete with native plants, and *B. rubens*, in particular, has contributed to significant increases in fire frequency since the 1970s. Native desert plants are often poorly adapted to fire, and recurrent fire has converted native shrubland to alien annual grassland in some areas. Changes in plant communities caused by alien plants and recurrent fire may negatively affect native animals such as the desert tortoise by altering habitat structure and the species composition of their food plants.

Analyses of agency fire records indicate that there are regional hotspots of fire activity. Fire frequency and total area burned were greater in the Mojave than in the Colorado desert between 1980 and 1995. Although most fires occurred along roads and were caused by

Management Implications:

- Management of alien plants and fire should be closely integrated, because alien plants produce some of the most hazardous fuels and fires promote alien plant dominance and may facilitate plant invasions.
- The best ways to reduce fire frequency are to minimize increases in fuel loads caused by alien annual plants and reduce the number of fires started by humans.
- Early detection and eradication of new alien species should be a land management priority, especially for those species that pose significant fire threats.
- Desert fires should be suppressed in most cases.

humans, the larger fires tended to be located in remote wildland areas and were caused by lightning. The annual number of fires increased in both deserts between 1980 and 1995, due to an increase in the number of fires caused by humans.

The dominance of alien annual plants and the frequency of fire may increase in the future, along with increased levels of urbanization and atmospheric nitrogen and carbon dioxide. Increases or decreases in rainfall could also cause changes in alien plant dominance and fire frequency. Additional information on the ecology and effects of invasive plants and fire in the Mojave and Colorado deserts are needed to develop effective management plans.

Brooks, M. L., and T. C. Esque. 2002. Alien plants and fire in desert tortoise (Gopherus agassizii) habitat of the Mojave and Colorado deserts. Chelonian Conservation Biology 4:330-340.