Fire and Invasive Species Management in Hot Deserts: Resources, Strategies, Tactics, and Response

By Alix Rogstad, Travis M. Bean, Aaryn Olsson, and Grant M. Casady

Deserts cover about one-fifth of the earth’s surface and occur where rainfall is less than 19 inches (50 cm) per year. Most deserts have specialized fauna that have evolved in tandem with specialized vegetation, and soils often have abundant nutrients but are water-limited. Ecologists have long acknowledged that once invasive species are established in these ecosystems, they have the ability to displace native plant and animal species, disrupt nutrient and fire cycles, and alter the character of the community by enhancing additional invasions.1–5

For the purposes of the Wildfire and Invasive Plants in American Deserts conference that was held in Reno, Nevada, in December 2008, North American deserts that occur at low latitudes were grouped as “hot deserts,” and include the Chihuahuan, Mojave, and Sonoran deserts of the American Southwest. These three deserts share common species such as creosote bush (Larrea tridentata [DC.] Coville), ocotillo (Fouquieria splendens Engelm.), and native bunch grasses (Bouteloua spp., Aristida spp., Muhlenbergia spp., etc.) that are negatively impacted by wildfires driven by invasive species. Although similarities exist, these deserts also have unique features and issues that can make land management challenging, especially in light of invasive species and large-scale wildfires moving across landscapes that are not adapted to fire.

Chihuahuan Desert

Covering nearly 250,000 square miles (647,500 km²), the Chihuahuan Desert is the largest of the North American deserts, and is considered to be one of the most biologically diverse arid regions in the world.6 It receives most of its precipitation in the summer and the northern reaches in southern New Mexico and southeastern Arizona are considerably colder than areas to the south. Largely because of its isolated location from other regions by Mexico’s two great mountain ranges, it has developed into one of the three most biologically rich deserts in the world, with up to 1,000 species adapted to that area. The Chihuahuan Desert stretches from extreme eastern Arizona to southern New Mexico through the Rio Grande drainage of west Texas/northern Mexico and spreads southward over the Mexican Plateau into the states of Chihuahua, Coahuila, southwestern Nuevo Leon, northeastern Durango, and San Luis Potosí. The desert is bounded to the east and west by the ranges of the Sierra Madre Oriental and the Sierra Madre Occidental, respectively. The northern and southern boundaries, more difficult to define, are usually based on such diagnostic indicators as climate, vegetation, or animal communities.6 Two features that make the Chihuahuan Desert region unique are the vast temperate grasslands that skirt the mountain flanks at mid-elevation and the diversity of...