

The Southwestern Deserts



Wildfire and Invasive Species

In the past, the stunning Mojave and Sonoran deserts of the southwestern United States were generally considered fireproof. There simply was not enough fuel to carry a fire through the sparse shrubs and cacti in these unique ecosystems.

Recently, however, some nonnative grasses have become established in these deserts, transforming fireproof desert into highly flammable grassland. For example, buffelgrass, which hails originally from Africa, is spreading rapidly over large parts of the Sonoran Desert. Another grass, known as red brome, is spreading through the Mojave.

These grasses are adapted to fire, sprouting again quickly and densely after a fire sweeps through. Unfortunately, their rapid return pushes out the native species, including the iconic saguaro, or giant, cactus, which is not adapted to frequent fire. While climate change is not directly implicated in the spread of these grasses, scientists are concerned that warming temperatures will allow invasive grasses to spread further in the desert Southwest and to extend into higher elevations.



Invasive grasses are making desert landscapes more prone to fire. Warming temperatures may help these grasses continue to thrive and expand in the American Southwest.

Images courtesy of T. Esque, USGS.





Photos taken from the same vantage point near Los Alamos, New Mexico, in 2002 (left) and in 2004 (right), during and after a major drought devastated the area.

Images courtesy of D. Allen, USGS.

The Piñon Pine

Large swaths of the American Southwest are covered with piñon-juniper woodlands—a vegetation type too scrubby to be called a forest but with too many trees to be called a shrubland. As its name implies, it is characterized by two types of evergreens: piñon pines and junipers. Although these plants can typically tolerate drought, extreme conditions can push even these tough species past their limits.

The “Four Corners” region where New Mexico, Arizona, Colorado, and Utah meet is not known for being particularly wet. But the drought that descended on the region from 2000 to 2003 was abnormally severe because it combined low precipitation—25–50 percent less than the long-term average—with unusually high temperatures. By the end of 2003, a large number of the piñons in the region were dead. The main cause of death was infestation by the pine bark beetle, which often targets trees that have been weakened by other stresses—in this case, heat and drought. The widespread loss of these pine trees caused a major ecological change over a large area.

In general, we do not know the thresholds for such major changes before they occur. This example highlights the threat that a stressful event that would not normally trigger a dramatic ecological change may do so when an ecosystem is subject to many interacting stresses.