# ARIZONA-SONORA DESERT MUSEUM

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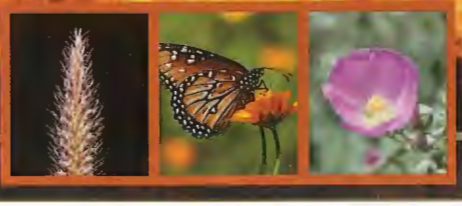
# NEWS

## Buffelgrass: *Making Wildfires Wilder*



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Rincon Valley, Arizona. © 2008 NPS Photo, K. Ellet

# The Sonoran Desert, Transformed By One Wild

By Chris McDonald, Natural Resources Advisor, Southeast California, University of California Cooperative Extension; Perry Grissom,

**Imagine** walking through the saguaro-palo verde forest at the foothills of many of our Sonoran Desert mountains. You navigate the familiar mix of trees, shrubs, and cacti of all types, separated by lots of barren ground. If a lightning bolt were to strike a palo verde tree, the resulting fire would fail to carry because rocks and bare ground dominate the desert floor. Even after a wet winter, the carpet of native annuals might not provide enough fuel to carry a large fire.

Hiking up a different slope, you enter a large saguaro stand embedded in knee-high and yellow-dry buffelgrass (*Pennisetum ciliare*), a native of the highly flammable African savannah. The yellow patches weren't there 40 years ago, but they are here now, spreading north and to higher elevations on the mountainsides and in the washes, along roadsides, and in vacant lots.

## IN THE BEGINNING...

For centuries before the arrival of Europeans, naturally occurring fires in the Sonoran Desert were extremely rare. Native annual plants occasionally filled in some of the bare spaces, but they still had a difficult time sustaining large fires because of relatively light fuel loads and large gaps that fires could not jump.

Weeds from Europe, especially annual grasses like red brome (*Bromus madritensis* subspecies *rubens*) and Mediterranean grass (*Schismus* species), greatly increased the occurrence of fire in the Sonoran Desert, as well as the Mojave Desert. Following wet winters these non-native grasses proliferate and increase the continuity and amount of grass available to feed a fire. Under hot, dry, and windy conditions (which are fairly common in the desert), these weeds have helped fuel fires that burned hundreds of thousands of acres at a time, such as the Cave Creek Complex Fire north of Phoenix in 2005, which burned Arizona's tallest recorded saguaro.

## AND NOW, BUFFELGRASS...

If the invasion of red brome and other invasive grasses weren't enough, beginning in the 1930s buffelgrass was imported into southern Arizona and Sonora to control erosion and feed cattle. In the 1960s buffelgrass spread along roadsides, and by the 1980s it was invading undisturbed natural areas. Buffelgrass quickly outcompetes native vegetation and fills in bare areas creating a fire hazard.

Roadsides blackened by buffelgrass fires are common south of the border. North of the border, small buffelgrass fires are on the rise. The first conspicuous fire was on July 4, 1994, when the traditional fireworks display set ablaze the top of "A" Mountain (Sentinel Peak). An estimated 20 or 30 buffelgrass fires, often reported as "brush fires," happen in Tucson and surrounding areas every year.

Research from experimental fires in Avra Valley west of Tucson indicates that buffelgrass can produce extreme fire behaviors. Buffelgrass can create fuel loads many times heavier than has ever been recorded in the Sonoran Desert, including those of red brome and Mediterranean grass. A buffelgrass-fueled fire can burn at temperatures over 1600°F, hot enough to melt aluminum. These fires can spread so fast that they can outrun equipment-laden fire fighters. When compared to fires fueled by annual plants, such as the invasive red brome, buffelgrass-fueled fires burn much hotter, spread much faster, and the flames are many times taller.

When annual plants were the main fuel in desert fires, fire threatened only after wet winters. Buffelgrass is a perennial plant that thrives under our regular monsoonal rains and during warmer winters; it is flammable most of the year, every year.

Firefighter igniting a prescribed fire in a buffelgrass field, Avra Valley, Arizona. © 2008 NPS Photo, K. Fillet

# Weed

Fire Ecologist, Saguaro National Park, National Park Service; Julio L. Betancourt, Senior Scientist, U.S. Geological Survey


Invasive species: buffelgrass (*Pennisetum ciliare*) and fountaingrass (*Pennisetum setaceum*). © 2005 ASDM, Mark Dimmitt

## FIGHTING DESERT FIRES HAS NEVER BEEN MORE DIFFICULT.

Previously, fires in the desert were fueled by annual plants and often could be handled by firefighters with hand tools and a small amount of water, or even by homeowners with rakes and garden hoses. If buffelgrass continues to invade the Sonoran Desert, fire behavior will be so severe that old techniques will no longer work. Protecting your home from a buffelgrass fire could be an extremely dangerous and difficult undertaking, and for wildland firefighters, protecting natural areas will be not only harder, but more expensive.

In the past, fires usually started in the mountains, but not in the desert, and there was little connection between the two. Red brome and its associates changed that, and buffelgrass is threatening to up the ante. The desert foothills once provided a ready-made, maintenance-free fuel break between the Sky Islands and our towns in the valleys, but they are now filling in with thick grass. Today, fires starting in the desert can run up the mountain into our woodlands and forests, as they did during the Cave Creek Complex Fire. The reverse is also true—forest fires can now spread into desert foothills that are increasingly urbanized.

## DISASTROUS EFFECTS ON NATIVE VEGETATION

Ecologists have documented the damage to native Sonoran Desert plants in several of the wildfires fueled by the non-native annual grasses. They found that most native Sonoran Desert plants are unaccustomed to fire while non-native grasses quickly recover. As these non-native grasses spread and increase in density, the fires grow increasingly hotter and larger, inducing a vicious grass-fire cycle.

Saguaros have a thin waxy layer covering their stem, which conserves moisture and keeps pathogens out of their watery interiors, yet this waxy layer provides little protection from a fire. A fire scorching a saguaro's skin is sometimes enough to lead to its death. Saguaro mortality after red brome/Mediterranean grass fires has been found to range from 31 to 85%. Young saguaro plants suffer higher mortality rates as they are often found under flammable shrubs, which "nurse" them before they dominate the skyline. After one buffelgrass fire many saguaros will die, and after a second fire saguaros in that burned area will be even more rare.

Many other desert plants are also harmed by fire, including cacti, palo verde, yucca, and creosote. After a single fire, desert plants can take 40 years to recolonize burned areas, and the species that recolonize are usually different than those species present before fire. For example, where cacti and trees such as saguaro, cholla, barrel cactus, and palo verde dominate before a fire, small shrubs such as bursage, broom snakeweed, and brittlebush can dominate a community after a fire. In addition, non-native weeds commonly

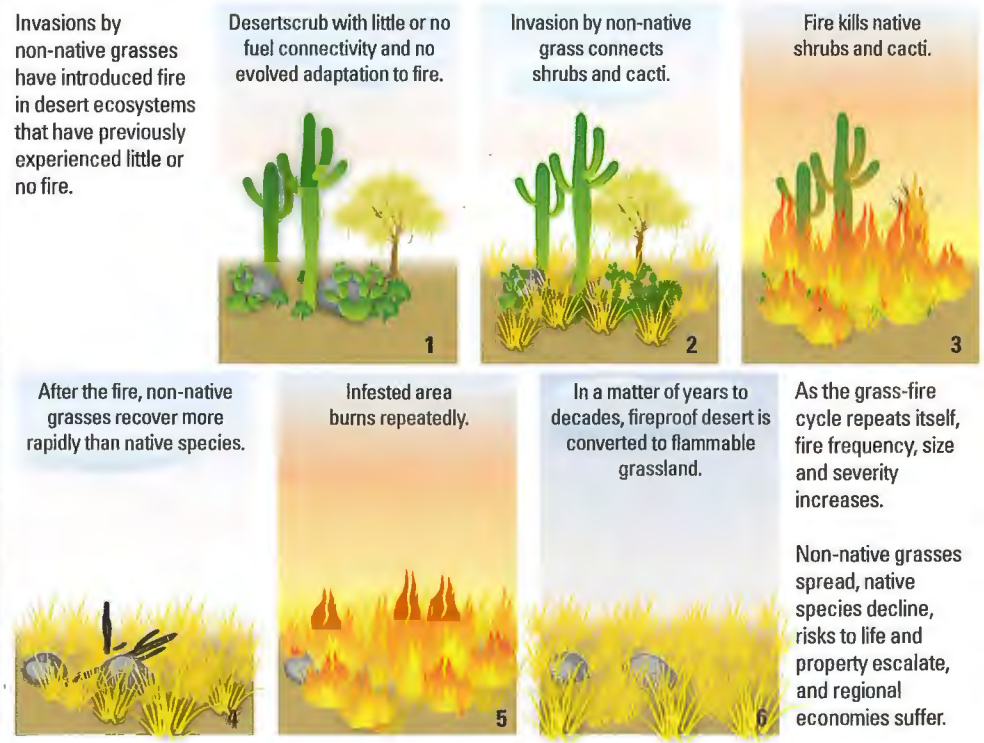


Illustration courtesy of Julio Betancourt, USGS

*Pennisetum ciliare* invasion; Pan Quemado, Tucson, Arizona. © 2003 ASDM, Mark Dimmitt

invade burned areas, further hindering re-colonization by native plants. When an area experiences repeated fires, more of the native plants that are sensitive to fire are removed and species that are tolerant of fire, such as buffelgrass, dominate.

We have the choice to take action and stop the spread of buffelgrass. We know what happens when buffelgrass dominates: saguaros and other slow-growing plants die, fires become more prevalent and extensive, and diverse shrublands are converted to impoverished grasslands.

## OTHER SERIOUS IMPACTS OF THE BUFFELGRASS INVASION

Potential economic impacts include decreased property values in infested and increasingly fire-prone areas, losses in tourism revenues with a decaying ecological backdrop, and escalating weed control and fire suppression budgets across jurisdictions.

Air quality and infrastructure could be threatened by more frequent, larger, and more intense wildfires. Also, as cities and towns plan growth, development, and protection of public safety, they will encounter a novel and fast-evolving fire risk.

As invasions progress and critical habitat for rare species is diminished, efforts will likely accelerate to formally protect more species, increasing conflicts

over land use. Moreover, simple purchase and setting aside of "pristine" desert no longer will be an effective conservation strategy without the resources provided to manage invasive grasses and associated wildfires.

## WHAT CAN YOU DO ABOUT BUFFELGRASS?

The most sustainable control efforts begin at home, so after you learn how to recognize buffelgrass and how to remove it, start with your own property or business, and then engage your neighbors and homeowners' association. Voice your support for aggressive control efforts on public lands and rights-of way. Schedule a presentation for your church, homeowners' association, and other community venues by contacting the Pima County Environmental Education Department (eeducation@pima.gov). Also, the non-profit Southern Arizona Buffelgrass Coordination Center and its partners are working with scientists, public agencies, and the public to map buffelgrass and coordinate the control effort. You can educate yourself and others or sign up at www.buffelgrass.org for organized volunteer efforts. The Museum's Web site (www.desertmuseum.org/invaders/invaders_buffelgrass.php) also has additional information about buffelgrass, including how to identify it. Visit phoenix.gov/planning/dpfguide.pdf to learn how to create fire-defensible space for your home, and cals.arizona.edu/firewise/index.html to learn to become firewise.

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THE MISSION OF THE ARIZONA-SONORA DESERT MUSEUM
IS TO INSPIRE PEOPLE TO LIVE IN HARMONY WITH THE NATURAL WORLD BY FOSTERING LOVE, APPRECIATION, AND UNDERSTANDING OF THE SONORAN DESERT.