



## Prairie Restoration



*It is an environment where nothing comes between me,  
the sky, the horizons, and my dreams.*  
—Ed Butterfield, 1988

FORT UNION NATIONAL MONUMENT (NM), PHOTO BY DAWNELLE MALONE

The American prairie has provided sustenance and shelter to people in the southern Great Plains for thousands of years. However, few areas are currently protected and many have been fundamentally altered by past human use. By restoring the native plants, animals, and processes of the prairie, we restore the natural heritage that has shaped our cultural heritage.

In 2008, five national parks in the National Park Service's Southern Plains Inventory and Monitoring Network (Southern Plains Network) began working together on prairie restoration projects. For these efforts, the network works with partners, other parks, and specialists to build on existing knowledge and to share resources, successes, and lessons learned within the National Park Service, local communities, and the region.

### What is restoration?

The goal of *ecological restoration* is to return an anthropogenically altered ecosystem to its "natural state." Restored ecosystems help restore important ecological services, such as cleaning air and water, cooling and reduction of greenhouse gases, and maintaining biodiversity. Restoration can repair damage to an ecosystem but also improve the lives of humans by renewing economic opportunities and rejuvenating traditional cultural practices. Restoration can be achieved in many ways, sometimes by connecting the damaged ecosystem to the larger landscape, repairing processes, or involving stakeholders.

Prescribed fire was used to restore this savanna in central Texas. Before (top left), during (top right and bottom left), and after (bottom right) prescribed fire.



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## Why are native species important?

Native plant species—vegetation that evolved with and adapted to local freezing, drought, common diseases, and herbivores outside the sphere of human influence—provide key ecological services to native systems, as well as important economic and aesthetic benefits for humans in those systems. Grasses are integral to prairie life and are well-adapted to fire. The roots of grasses are underground and enrich soil by bringing up deeply buried minerals and providing channels for rainwater to



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Burrowing owls prey on prairie dogs and use their burrows for shelter. By preserving prairie dogs, we also preserve burrowing owls.

penetrate the ground and replenish aquifers. After a fire, new growth sprouts from the roots and attracts native grazing animals, which were hunted by early Americans. Humans have also used grass as forage for livestock, grains for food and flour, and as materials for basketry and rope.

Unfortunately, nearly 25% of all native plant species in North America are at risk of becoming extinct, largely due to the presence of nonnative species. These nonnative invasives, whether introduced accidentally or intentionally as agricultural crops or landscape ornamentals, frequently outcompete native species. This leads to individual species loss, endangering natural habitats, soil erosion, and loss of genetic diversity necessary for stable, balanced ecosystems. Today, much of the prairie is dominated by invasive species associated with anthropogenic disturbances like fire suppression and water development.

## Grasslands of the southern plains

The southern plains extend south from about Kansas to Texas, and include a variety of grassland ecoregions, each characterized by a distinct group of species, relationships between species and processes, and environmental conditions, such as precipitation, elevation, and extreme temperatures. Three of these ecoregions are present in the national park areas of the Southern Plains Network:

- **Western short grasslands** lie west of the Texas panhandle and extend north through Oklahoma and western Kansas. They support one of the highest diversities of birds, mammals, and butterflies in the U.S. However, bird populations that are endemic (native only to a particular area) to shortgrass prairie are the fastest-declining bird populations in North America. **About 40% of this ecoregion remains intact.**
- **Central and southern mixed grasslands** (mixed-grass prairie) lie in eastern Colorado, western Kansas, and western Oklahoma and Texas, and support the highest number of plant species compared to other prairie types because two ecoregions meet here: the tall and short grasslands. Mixed-grass prairies support many reptile species and provide important breeding areas for birds and stopover sites for migratory birds, particularly in wetland areas. **About 5% of this ecoregion remains intact.**
- The **central forest/grassland transition zone**, present in Chickasaw National Recreation Area and the surrounding area, comprises savanna (grasslands with scattered trees), prairie, and woodlands. Most of the ecoregion has been converted to farmland, including a portion of the park. **Less than 1% of this ecoregion remains intact.**



NPS

Western short grasslands (Pecos National Historical Park, NM).



NPS/TOMMYE FOLTS-ZETNER

Central and southern mixed grasslands (Washita Battlefield National Historic Site, OK).



NPS/TOMMYE FOLTS-ZETNER

Central forest/grassland transition zone (Chickasaw National Recreation Area, OK).

## Why does so little prairie remain intact?

Agricultural conversion, overgrazing, and fire suppression have fundamentally altered North American prairie systems. Prior to European settlement, grasslands in the southern plains were regularly disturbed by fire (natural and human-ignited), drought, mammal migrations, and grazing by other native ungulates. The vast majority of systems change began with Euro-American settlement, particularly after the passage of the 1862 Homestead Act. Under the Act, a homesteader could claim 160 acres of land, provided they lived on the land and improved it by building a dwelling and sowing a few crops—an opportunity toward economic freedom. After five years, the homesteader could file for the land deed, though many were abandoned by that time. Since the homesteading era, family farms have gradually



Increasing conversion to agriculture, overgrazing, and fire suppression threaten the North American prairie. This satellite photo shows Fort Larned National Historic Site (KS), and the surrounding area, which is largely converted to agriculture.

## What are the benefits of restoring a small tract of land?

The plains have given us some of our most powerful national images. Yet in a way, those iconic “amber waves of grain” are more a reflection of contemporary human relationships with the land than of America’s natural beauty. Because it can be hard to imagine what these grasslands might have looked like prior to Euro-American settlement and the introduction of large-scale agriculture, restoring even small tracts of native prairie provides us with a window into our natural heritage that would otherwise be irrecoverable. With shoulder-high big bluestem (*Andropogon gerardii*), and some of the richest biodiversity in the country, restored prairies can provide

## The current restoration project

To preserve native ecosystems, we need to preserve native plants. Each of the national parks collaborating on this project is working on individual restoration projects at their park and creating habitat for native species. At the same time, these parks are sharing knowledge and tools to help other parks restore similar ecosystems. To begin the restoration projects, the National Park Service partnered with the Lady Bird Johnson Wildflower Center to learn from their experience in restoration. Though the areas of land being restored by the National Park Service are small, these projects are opportunities to share the concept of and knowledge about restoration with visitors, local communities, and the region.

transitioned to ownership by large corporate agribusinesses, which converted large tracts of land to monocultures (single crop).

These landscape-scale agricultural changes were associated with many smaller-scale events, including exotic invasions, damming and pumping for local irrigation and development, livestock and human traffic, and encroachment by woody shrubs due to wildfire suppression. Perhaps most significantly, American bison (*Bison bison*), which contributed to shaping the structure of shortgrass prairie communities, were regionally extirpated by the 1880s.

Few grasslands are preserved in the southern Great Plains, and many of those that are protected today were previously altered. The establishment of woodlots, woody shrubs in water corridors, and shelterbelts significantly contributed to the loss of genetic diversity in grasslands, which in turn has led to the decline of several species that were once abundant but are now considered rare or are listed as threatened, endangered, or of special concern by state agencies. Four are known to occur in the Southern Plains Network: burrowing owl (*Athene cunicularia*), black-tailed prairie dog (*Cynomys ludovicianus*), mountain plover (*Charadrius montanus*), and Texas horned lizard (*Phrynosoma cornutum*). The lesser prairie chicken (*Tympanuchus pallidicinctus*) and swift fox (*Vulpes velox*) may also occur in the southern plains.



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Pronghorn antelope have provided food for humans since we entered the plains. Fort Union National Monument (NM).

sources of food, medicine, and spirituality, as well as cultural, aesthetic, educational, and scientific benefits in addition to valuable ecosystem services.



NPS/HEIDI SOSINSKI

To preserve native ecosystems and our natural heritage, we need to preserve native plants.

## How to get started

### **Make a plan**

Thorough planning is one of the most important elements of a successful restoration project. First, the planning team needs to carefully consider the area to be restored. The team should identify the types and conditions of plant, animal, and soil communities within the restoration site; identify the desired future condition and specify goals; create a timeline for the project; and address logistical and administrative issues. To define the desired future condition, the Southern Plains Network planning team examined relatively undisturbed “reference sites” within the parks or at nearby protected areas.

Because localized ecosystems are integrated with larger landscapes, it is also important to assess how past and current land use by nearby landowners may affect ecosystem processes, such as animal migrations, fire suppression or ignitions, and flooding or flood control. These factors may have shaped the current condition of the restoration site and may continue to influence the site after it is restored.

### **Evaluate restoration techniques**

During the planning process, it is necessary to evaluate the array of restoration techniques that might be appropriate for the site. Successful techniques for restoring native vegetation vary by plant species and the site conditions—often this can mean removing or changing a specific disturbance such as invasive plants. For some sites, the parks collect or purchase local sources of native seed for planting. Staff and

volunteers collect seed both by hand and by mechanical means, such as a seed harvester. Seed is either scattered on the surface of the soil or drilled into it. Alternatively, seeds are germinated and the propagated seedlings are planted. In several parks, school groups and volunteers are helping to restore sites by collecting and sowing seed. As those restored sites become better established, the volunteers will be able to return to the parks as visitors and see the effects of their efforts.

### **Restore native processes**

Restoring native processes can also be important to restoration. The disturbances to the southern plains caused by migrating herds of native bison could potentially be mimicked by livestock, or restored with native ungulates. Judicious use of prescribed fire can also help return natural disturbance regimes to the prairie.

### **Follow through**

Restoration efforts require commitment and monitoring to determine whether adjustments are needed over time. In most cases, though, native species form self-sustaining plant communities that do not require much maintenance once established. Climate change may alter the environmental factors that shape the prairie. Adaptive management—management adjustments made based on the results of continuous monitoring—can be an important tool in caring for the restored sites.

Learn from the successes and lessons learned from nearby restoration projects. Contact your local native plant center or National Park Service site to get details on restoring a particular site in a specific ecosystem. Park staff and restoration experts worked closely together to carefully plan the restoration project at Sand Creek Massacre National Historic Site (CO), shown here.



## For more information

... about restoration in the southern plains: see the Learning Center of the American Southwest, [www.southwestlearning.org](http://www.southwestlearning.org), or visit a park participating in the project (see right), either in person or online at [www.nps.gov](http://www.nps.gov).

... about native plants and restoration: see the Lady Bird Johnson Wildflower Center at the University of Texas at Austin, [www.wildflower.org](http://www.wildflower.org), or contact your local native plant center.

... about general resources on restoration: see the Global Restoration Network, [www.globalrestorationnetwork.org](http://www.globalrestorationnetwork.org).

*Parks with active or planned restoration projects in the southern plains as of 2009:*

- Bent's Old Fort National Historic Site (CO)
- Chickasaw National Recreation Area (OK)
- Fort Larned National Historic Site (KS)
- Lake Meredith National Recreation Area (TX)
- Lyndon B. Johnson National Historical Park (TX)
- Pecos National Historical Park (NM)
- San Antonio Missions National Historical Park (TX)
- Sand Creek Massacre National Historic Site (CO)
- Washita Battlefield National Historic Site (OK)

## Partners in Restoration

