

WHY BIRDS NEED COWS | MADAGASCAR'S HIDDEN RICHES | A SWAMP MYSTERY SOLVED

# Audubon

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# GRASSROOTS REVIVAL

To survive the next century, grassland birds will need the help of ranchers—and more than a few strategically managed cows.

BY HANNAH WATERS

**Grasslands are tough. They can survive extremes, from heat waves and cold snaps to torrential downpours and droughts.** They require turbulence. For millennia wildfires enhanced prairie soil and ensured grass's dominance by burning back woody shrubs and saplings. Bison followed the fires to graze on tender, new growth of grasses and sedges; as they fed, their hooves aerated and manure fertilized the soil, giving rise to abundant wildflowers. The combined forces shaped the Great Plains, a mosaic of hundreds of grass, wildflower, and sedge species at various stages of growth spanning 550 million acres. The patchwork of habitats supports diverse insects, dozens of songbird species, and myriad mammals.

Despite their resilience, barely one-third of central North America's historical grasslands persist today. Farming and development have razed 90 percent of its tallgrass prairie, three-quarters of its mixed prairie, and half of its shortgrass prairie. "It actually dwarfs what we're seeing in the rainforest in the sheer scale and size and intensity of the crisis," says Marshall Johnson, executive director of Audubon Dakota. That destruction has in turn hit grassland birds, which have declined by more than 40 percent since the 1960s; some species have seen even steeper declines.

Audubon's North American Grasslands & Birds Report, published this summer, highlights the added perils that climate change poses to the Great Plains' avian denizens. Heat, erratic rainfall, and drought may make significant areas inhospitable to certain species within decades. Audubon scientists built climate models that incorporate temperature, precipitation, vegetation, and other characteristics of the habitats 38 grassland-bird species occupy. They found that 16 species will likely see most of their current range become uninhabitable if Earth's temperature rises by 3 degrees Celsius; if we limit warming to 1.5 degrees, the number facing this threat drops to just three.

The data also point to places, called "strongholds," that will provide crucial habitat for grassland birds through the coming changes—if those lands are managed optimally. With more than 80 percent of U.S. grasslands privately owned, ranchers are key to protecting those critical areas. "Grazing is probably the most important tool for manipulating good grassland-bird habitat," says Chris Wilson, director of Audubon's Conservation Ranching Program. Across the Great Plains, conservationists are working with ranchers to shore up these strongholds and safeguard birds' survival.

**"GRAZING IS PROBABLY THE MOST IMPORTANT TOOL FOR MANIPULATING GRASSLAND-BIRD HABITAT."**



## BAIRD'S SPARROW

This songbird eludes predators by hiding in wetter mixed grass or tallgrass near prairie potholes, so keeping northern prairies intact is critical. Its entire breeding range will be lost if carbon emissions aren't curbed sharply.



**📷** Sand Ranch cattle graze near a pothole wetland. Cody and Deanna Sand (right) have found that helping grasslands recover benefits cows and birds. "It's a win-win," Cody says.

PHOTOGRAPH BY KRISTINA BAKER; ILLUSTRATION BY DAVID ALLEN SIBLEY

## A NEW TAKE ON AN OLD TRADITION

**For Cody and Deanna Sand, ranching is a tradition.** When they took over Deanna's family ranch in North Dakota in 1999, they observed practices inherited from their grandparents. They ran cattle across their 2,300 acres, bred cows in summer, fed them hay and grain in winter, and calved in frigid March. "That's all we knew," Cody says.

A decade later, the couple was tens of thousands of dollars in debt. They were reluctant to sell to mega-farms, which would plow under the fertile mixed-grass prairie and its seasonal wetlands, or "potholes," that supply plant and invertebrate food for breeding waterfowl, shorebirds, and grassland birds. Desperate, they took a course through the North Dakota Grazing Lands Coalition. The instructor offered a new perspective: Manage their grass, not their cows.

The Sands soon instituted rotational grazing: corralling one large herd through a series of small pastures, moving the animals before they overgraze to give grasses time to rest and recover. A \$300,000 farm bill grant covered the up-front costs of fencing 64 paddocks and supplying water to each. After two years, the Sands had tripled their grass per acre, cultivating enough to graze cattle through the winter and reduce the costs of supplemental grain. They also shifted their calving schedule to early summer, saving money on heaters, windbreaks, and veterinarians. Within a few years, their debts were paid.

Today native grasses, forbs, wildflowers, pollinators, spiders, dung beetles, and numerous birds flourish on their ranch, which has earned Audubon's bird-friendly designation (see "Recipe for Success," p. 42). "I didn't give two shits about a butterfly or a duck 10 years ago," Cody says. Now he keeps an eye on three Sharp-tailed Grouse leks on the property, and Deanna is a budding birder.





📷 Bison, practically extirpated from the Great Plains by 1900, now roam once again some 30 miles north of Fort Collins at Soapstone Prairie Natural Area.



# GIANT GRAZERS WITH AN IMMENSE BENEFIT

The first time Mark Sears visited Soapstone Prairie, he was only an hour north of Fort Collins, Colorado, but he could have sworn he was in the Serengeti. Grazing in the wide expanse of mixed prairie were herds of pronghorn, elk, and deer, which support predators like black bears and mountain lions. Prairie dogs guarded entrances to underground burrows, and the property had a complete suite of grassland birds, including Burrowing Owls, McCown's Longspurs, and Lark Buntings (the state bird).

Soapstone Prairie's 22,500 acres are also home to Lindenmeier, one of the nation's most important archaeological digs. In the 1930s excavators uncovered a spear point embedded in a vertebra of *Bison antiquus*, a seven-foot-tall extinct ancestor of modern bison. The find offered definitive proof that humans inhabited North America 11,000 years ago—and earned the site designation as a national historic landmark.

As natural areas manager for Fort Collins, Sears's job is to conserve land for wildlife first and public recreation second. So when Soapstone Prairie went up for sale in 2003, he moved fast: "We knew we had a once-in-a-lifetime opportunity." Colorado is one of the fastest-growing states in the nation, which places its grassland patches on a crash course with development, especially near expanding cities like Fort Collins. He tapped conservation funds generated by county and city sales taxes, and drummed up additional dollars, to obtain the nearly \$15 million needed to purchase the property in 2004.

Sears then took steps to make the grassland healthier. He instituted prescribed burns to replenish the soil and vegetation, for instance, and leased the land back to the previous owners, a grazing association, with the understanding that they would continue grazing sustainably and rotate herds and rest pastures more frequently.

If cattle aren't moved regularly, they'll chew grasses down to the ground and even extract the roots, killing the plants and eroding soil. Overgrazing ultimately upsets the complex ecology that builds rich soils, providing ample nutrients for diverse grasses, which then support insects and birds. It also eliminates the taller, denser patches of grass where birds nest and hide. And once overgrazed, prairie habitat is difficult, if not impossible, to fully restore.

The practice imitates the historical movements of bison, when enormous herds of hundreds of thousands of animals roved the

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Great Plains. They ate as they went, mowing the grass down to the sheath and fertilizing the soil. Then they moved on, sometimes not returning for many years, allowing grasses to recover and send up new shoots.

Fort Collins had been managing Soapstone for about a decade when Sears hit upon the idea of bringing bison back, to the delight of visitors. In November 2015 the city introduced one bull and a dozen or so cows related to the Yellowstone National Park herd, with a plan to manage them carefully to replicate their ancestral grazing behavior.

Before releasing the animals, Sears's team partnered with Colorado State University's animal reproduction lab to ensure the animals were free of brucellosis, a bacterium that induces abortion and can infect cattle and people. It worked: "The bison herd is growing, perhaps a little faster than we had anticipated," Sears says. Managers have tripled the pasture size to accommodate the 70 shaggy behemoths and may offer some to other bison restoration efforts.

As wild as Soapstone looked when Sears first saw it, it's even more so now. Last summer Baird's Sparrows—the grassland birds most vulnerable to climate change, according to Audubon's report—were recorded nesting at Soapstone, a first for the state.

Audubon scientists identified future strongholds that are likely to persist through projected climate and land-use changes. These areas primarily occur in the wetland-dotted mixed prairies of the northern Great Plains and the already-arid grasslands in the south.



**LARK BUNTING**  
In short- and mixed-grass prairies, male buntings perform an elegant mating flight, singing while slowly descending on fluttering wings. If temperatures rise by 3 degrees Celsius, this grassland endemic will lose the majority of its breeding range.

PHOTOGRAPH BY DAVE SHOWALTER. DATA: AUDUBON NORTH AMERICAN GRASSLANDS & BIRDS REPORT. JOANNA GRAND. MAP BY DANIEL P. HUFFMAN. ILLUSTRATION BY DAVID ALLEN SIBLEY.



# A MASTER PLAN FOR A SHORTGRASS PRAIRIE

In 2002 Nancy Ranney was working as an environmental designer and raising her family in California when she left that life to take the reins of her parents' ranch in central New Mexico. She viewed the opportunity as a grand challenge: to manage the land more in line with the ecological principles she'd observed during her landscape-planning career.

Ranney took the ranch's 21 herds, which each grazed continuously on its own pasture, and ultimately combined them into one that was frequently moved through 34 pastures of varying sizes. Melvin Johnson, the ranch's longtime manager, was skeptical. "He was sure we'd be back to the old style in a couple of years," Ranney says.

They weren't. Within three years, Ranney Ranch's blue grama grass monoculture had transformed into a mosaic of 35 different species of shortgrasses; these drought-tolerant varieties maintain 90 percent of their biomass beneath the surface. "There was seed bank in the ground that never had the opportunity to emerge before with constant, year-round grazing," Ranney says. Today an estimated 50 grass species thrive, and the land supports nearly 300 cows and eight bulls. "No seeding, no fertilizing—just the cows," she says. "We need them."

A look across the fence line makes that clear. Some neighboring grasslands have not burned or been grazed for years. Whereas grass covers roughly 80 percent of Ranney's pasture, the other land is barren or

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dominated by brush. Her property supports the rare Montezuma Quail, a secretive bird not usually found on a conventional ranch due to its need for dense grass cover.

Before Europeans colonized North America, wildfire burned across millions of acres, maintaining the dry shortgrass prairies of the Southwest. "These systems evolved under frequent fire and grazing," says Jon Hayes, executive director of Audubon New Mexico. "We don't see that anymore." Settlements, roads, and fire suppression now limit natural blazes, which, like overgrazing and lack of grazing, prevent native grasses from regenerating. As a result, other types of plants overtake grassland habitat.

The encroaching vegetation—typically woody shrubs or invasive grasses—varies by region. Here, it's mesquite, old-world blue-stems, and lovegrasses. To the northeast, native juniper tends to invade undisturbed grassland. Farther north, in Colorado and Wyoming, the problem is cheatgrass. No matter the species, they have the same effect: "They crowd out the native grasses," Hayes says, which drives out the grassland birds like McCown's Longspurs, Sprague's Pipits, and Mountain Plovers that require sparse cover.

Energy development is another threat to the state's remaining grasslands. In the southeast is the Permian Basin, now the world's highest-producing oilfield. The infrastructure required to move that oil—well pads, roads, outbuildings, pipelines—transforms grassland habitat into an industrial zone inhospitable to birds.

Conserving this region's extensive shortgrass prairie will be particularly important as the climate grows warmer and drier. Wet tallgrass prairies, like those in the eastern Great Plains, are projected to look more like mixed- and shortgrass prairies as their typical 40–50 inches of annual rainfall decreases, Hayes says, while the Southwest's shortgrass prairies, which are accustomed to as little as 15 inches of rain annually, are more tolerant of drought. "Some of these places could be the last best place for some of these grassland birds," he says, "because they're already arid grasslands."

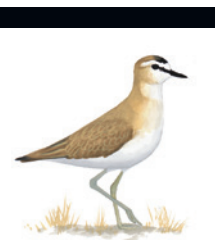
The key is maintaining the right amount of grass; neither overgrazed bare soil nor undergrazed shrubland will support grassland birds. And as Ranney has proved, there's a middle ground that benefits ranchers, too.



## RECIPE FOR SUCCESS

Cows might not be an obvious solution for saving grassland birds, but they work. Audubon's Conservation Ranching Program collaborates with ranchers to practice rotational grazing, manage invasive species, and protect streams to enhance plant, insect, and bird diversity. A third party then certifies the property as bird-friendly. "We love cows and we love what we do, but we're not good marketers," says North Dakota rancher Cody Sand. He proudly affixes the label on his grass-fed beef, which Audubon staff help place in specialty markets.

Today more than 40 retailers in seven states and 11 online companies carry meat with the Audubon label (visit [audubon.org/meat](http://audubon.org/meat)). Some 1.8 million acres are enrolled on 63 ranches across 11 states, and program director Chris Wilson aims to add 1.5 million acres by 2021. He's eager to find participants in the strongholds identified in the Audubon report, protecting vital grassland bird habitat for decades to come. —H.W.



## MOUNTAIN PLOVER

Despite its name, the plover nests in patchy shortgrass, where it scans for predators and insects. Already declining, most of its breeding range will contract with only 2 degrees of global warming, according to Audubon's report.

PHOTOGRAPHY BY MINESH BACRANIA. ILLUSTRATION BY DAVID ALLEN SIBLEY.



A fence line bordering the property of rancher Nancy Ranney (left) shows how rotational grazing spurs native grasses and wildflowers, while ungrazed land boasts far less diversity.



📷 A nest platform on Enrique Pérez Carrillo and Carolina Muñoz Cervantes's (right) ranch is designed to entice endangered Aplomado Falcons. Five dozen of the structures have been erected on ranchlands in the Chihuahuan Desert.



## A WARM WELCOME ON WINTERING GROUNDS

Arvind Panjabi had been conducting grassland-bird surveys in the Chihuahuan Desert for nearly a decade when he heard, in 2006, the first alarming reports: Field crews returning to study sites, most on ranches, discovered crop fields instead. “It happened multiple years in a row,” says Panjabi, conservation scientist at the nonprofit Bird Conservancy of the Rockies. “We’d come back and more sites would be gone.”

Panjabi found this particularly disturbing because he was just beginning to document which birds use these desert grasslands, and how. Grasslands make up 15 percent of the Chihuahuan Desert’s 140,000 square miles, and every fall, 9 out of 10 migratory bird species from the Great Plains funnel here. As the main wintering ground for grassland birds, the Chihuahuan Desert is already a conservation hotspot, and Audubon’s report finds that large swaths will remain grassland even as the climate warms.

To determine the loss so far, Panjabi examined satellite imagery from 2006 to 2011. He found that 270 square miles of corn and cotton had materialized in Valles Centrales, a 2,600-square-mile grassland considered a conservation priority area by Mexico, the United States, and Canada. “We estimated that 350,000 grassland birds had been displaced by that habitat loss in just five years,” he says. “That spurred us to action.”

The first step was figuring out what was happening on the ground. He learned that a recent expansion of the area’s electric grid now allowed farmers to drill down 700 feet into deep-water aquifers to irrigate fields; previously lack of water made the land non-arable. At the same time, narcoviolence was getting heated. “That created a lot of insecurity in the rural areas,” Panjabi says. All at once Mexican ranchers wanted to flee drug-fueled violence and their land was more valuable to farmers, many of whom are Canadian Mennonites who immigrated to the area.

Enrique Pérez Carrillo knows firsthand the challenges of desert ranching. He has managed Rancho Tres Papalotes, his family’s nearly 40,000-acre property, for eight years and seen rainfall, which averages 10 inches annually, become unpredictable; it doesn’t always come when the grass needs it. “We hear ranchers complaining about the rain, that ranching is not a good business anymore,” he says. “If we are not making money and someone comes here to ask, most ranchers will just sell.”

Pérez Carrillo is one of 20 ranchers working with Panjabi to find ways to stay

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profitable and keep hold of their property. He started in 2011 by subdividing his eight pastures to let the land rest after grazing; he currently rotates 500 cows through 40 paddocks and aims to ultimately have at least 80 paddocks, adding more as he finds the funds to install infrastructure to pump groundwater to each pasture.

Already, Pérez Carrillo has seen the growth of more shortgrass in some areas and an increase in wildlife, including the return of mountain lions. Panjabi’s staff, meanwhile, monitor wintering birds on the ranch, including Baird’s Sparrows and Chestnut-collared Longspurs. They also keep hopeful watch for Aplomado Falcons. In 2012 Panjabi found only three breeding pairs of the endangered raptor within 24 historic territories in the Chihuahuan Desert. When grassland and shrubland are cleared for agriculture, Aplomados lose their prey base—including grassland birds—as well as elevated nest sites.

Pérez Carrillo’s open shortgrass ranch with scattered trees and shrubs is seemingly ideal falcon habitat, so Panjabi’s crew has installed a nest platform on his property and at other ranches in the area. The approach seems to be helping: In 2018, 11 pairs nested across the Chihuahuan Desert, the most since 2012, and fledged 10 young, half of which hatched on nest platforms. Their presence serves as a sentinel for the health of grassland birds generally, from resident desert-dwellers to seasonal visitors from the prairie potholes and beyond. **A**



### CHESTNUT-COLLARED LONGSPUR

These colorful birds historically lived alongside bison and are most successful nesting in grazed prairie. They are vulnerable to climate change in the northern prairies where they breed as well as in the Chihuahuan Desert where they spend the winter.

### A GLOBAL CRISIS

Grasslands cover a quarter of the Earth’s land surface and stretch across every continent except Antarctica—but only a small percentage are formally protected. Conservationists are racing to change that. Agriculture and development have destroyed nearly half of South America’s grasslands, which once covered 13 percent of the continent. Green groups and ranchers have formed a coalition to implement sustainable grazing and create a market for bird-friendly beef.

Little of the Eurasian Steppe, the world’s largest grassland, remains in Europe. But large, intact stretches persist in Central Asia, where governments are working with nonprofits to protect remaining steppe from being plowed under or overgrazed.

Africa is home to the Serengeti, an immense savannah that supports big cats, roving ungulate herds, and 500-plus bird species. Urban expansion and agriculture are a threat outside protected areas, but inside national parks and game reserves grasslands are kept healthy by grazing mammals and natural wildfires.

—Jillian Mock

PHOTOGRAPHY BY PAUL RATJE. ILLUSTRATION BY DAVID ALLEN SIBLEY.