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Prairie Islands

By the banks of the Missouri River, Pleistocene winds sculpted a landscape unmatched in America.

By Sam Hooper Samuels

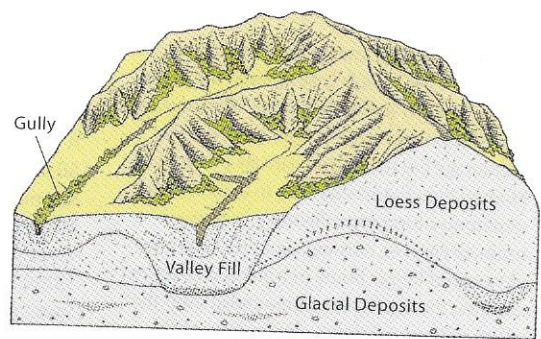
IT'S A FINE DAY FOR A PRAIRIE FIRE. Wind is steady at 10 to 15 miles per hour from the southeast, and the humidity hovers around 50 percent. For early August in Iowa the weather is cool and won't overheat the crew. Kevin Pape, a ranger for Stone State Park, attired in a flame-resistant Nomex suit and broad-brimmed fire hat, exudes quiet confidence as he passes among the workers. He's handing out aerial photographs marked with letters and boundary lines of the next unit to be burned, a 13-acre parcel of prairie just four miles from downtown Sioux City. Across Talbot Road, today's firebreak, the last unit still smolders, blackened earth gently crackling, wisps of smoke still rising.

Pape and his crew are preserving prairie in the Loess Hills of Iowa by torching it.

These are some of Iowa's last and most ecologically diverse prairies, and they're disappearing like drops of water on a hot skillet. Of the vast prairie that once blanketed the Hawkeye State, less than one-tenth of one percent survives. Of that tiny remnant, more than half is here in the Loess Hills, a long band of steep peaks, some jutting up to 400 feet, hugging the Missouri River valley along the western edge of the state. The hills are Iowa's secret treasure, a 650,000-acre miniature mountain range that punctuates the famous flatness of the Midwest with sharp slopes and cool, sheltering hollows.

I came here by air, and so did the hills. They were blown in, particle by particle, on the winds. The Loess Hills get their name from the dirt they're made of. It's a German word, *Löss*. It rhymes with "fuss" and means dust, literally "loose." Loess is fine yellowish mineral stuff, rock pulverized by glaciers over the 150 millennia of the last ice age and carried south by rivers. When the rivers dried, they left tons of this silt-like powder to be picked up by winds and scattered across the heartland.

Under the rich topsoil of its green croplands, most of Iowa is cov-



▲ Unique Loess geology.

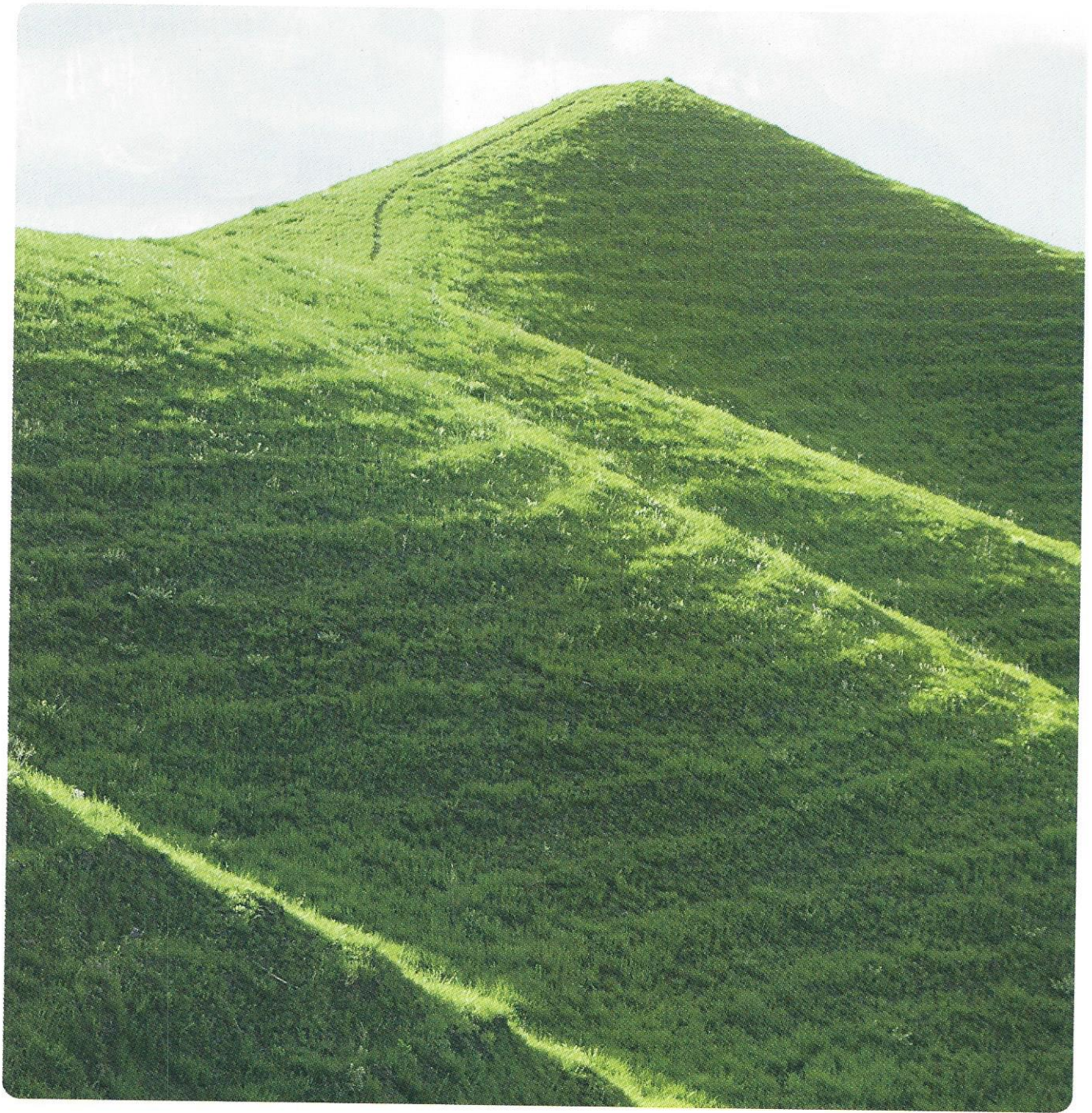
ered in a 50-foot-deep blanket of loess. Only here, though, where the winds from the west met the Missouri's eastern shore, was the loess dumped in great heaps. The only other landform like it is along the banks of China's Yellow River, named for its loess-clouded waters.

Fragile Giants is what scientific historian Cornelia Mutel titled her 1989 book, the best natural history yet of the hills. Fragile indeed. Where the loess is exposed, you can break it off in chunks and crumble it to a powder that disappears almost before it hits the ground. Occasionally a farmer carves "fragile giants" into a field of corn, a message to airplane passengers that this is not just flyover country but has a name, an identity.

From the ground, the topography calls to mind

▶ The Loess Hills' terraces, called "catsteps" (above right), probably formed because of the soil's tendency to shear off in vertical planes. Controlled burns kill off invasive plants, making way for native beauties like the pasqueflower (right).

PATRICIA J. LOHMANN; ADAPTED FROM LANDFORMS OF IOWA



CLOCKWISE FROM TOP: TOM HOBSBURG, RANDY BEACHAM, BILL WITT



▲ The American kestrel gets a good view of its prey in the open spaces of the Loess Hills. The prairie rattlesnake is so rare in Iowa that it's illegal to kill one.

the intricate, pleated patterns of sand dunes. Long, meandering ridges are like spines with rows of smaller ridges projecting out like ribs, and even smaller spur ridges projecting from these in turn. Natural terraces follow the hills' contours because of the mineral soil's peculiar inclination to compact into straight vertical walls. These "catsteps"—unmistakable signatures of loess terrain—create a complex network of ridges, a hiker's dream of hilltop mazes with nonstop prairie vistas.

Most of Iowa's prairie long ago fell victim to the plow or the pavement. But because the Loess Hills are often too steep for row crops, pockets of high-quality virgin prairie remain. Big bluestem, little bluestem, sideoats grama, prairie clovers, lead plant, and dozens of other grasses, sedges, and flowering plants mottle the hills. Once fodder for long-vanished herds of bison, elk, and pronghorn, they still offer a rich harvest to wild turkeys, pheasant, and bobwhites, and refuge for foxes, mink, and badgers. Herons and ducks shelter in the creeks and ponds. By day, birds of prey wheel overhead, vultures and many breeds of hawks. By night, great horned and barred owls take over. The hills are also home to some animals more common in the far West. In places, the parching winds from the western plains and the intense heat of the afternoon sun create a desert-like environment for plains pocket mice, ornate box turtles, Great Plains skinks, and prairie rattlesnakes.

Cattle have overgrazed some areas. Developers mine for fill dirt. Road construction leaves exposed cuts prone to erosion. Affluent homeowners fleeing the sprawl of Omaha, Council Bluffs, and Sioux

City set up ten-acre ranchettes, "landscaping" their rural getaways with invasive trees and fragmenting habitat with new roads. All this settlement brings perhaps the most powerful threat to the survival of the prairie: fire suppression. Without the occasional blaze, prairie quickly becomes overgrown with trees, which can't hold the fragile loess soil the way prairie vegetation does.

When Lewis and Clark passed within a few miles of this spot 200 years ago, it was largely a treeless landscape. Back then, fire would scorch any given patch of prairie every four to seven years. In autumn, the dry plants could fuel towering flames and intense heat. In 1832, the painter George Catlin described one as a "Hell of fires." These conflagrations could advance faster than a man on horseback could flee, but they were as vital to the survival of a prairie as water itself. Prairie plants evolved root systems up to 15 feet deep to survive the flames.

To bring fire back, Pape and his crew are part of a network of prescribed-burn fire-setters called the Stewardship Committee. Of the hills' 650,000 acres, only about 18,000—a patchwork

ABOVE: TOM & PAT LEESON (2)

Prairie Natives

Three of the dozens of wildflowers on the prairie's palette: The land begins to show its colors in early April, and continues right through the dog days of August.

▼ Purple Prairie Clover



▼ Cowboy's Delight



▼ Hoary Puccoon



BELOW LEFT & RIGHT: TY SMEDES
BELOW CENTER: TOM ROSSBURG

of state, county, and privately owned parklands—are under any sort of conservation management. The committee does its best to burn those areas as regularly as nature once did. It's a sort of latter-day ecological posse, a band of professionals trained in fire management that convenes whenever and wherever conditions are right to incinerate bad guys like overgrown sumac, dogwood, eastern red cedar, and the invasive Siberian elm. Members are a varied bunch: a Nature Conservancy land manager here, a county conservation worker there. No one has the equipment or staff to burn their individual acreage. But together, through an informal barter system, they form a roving prairie fire.

Pape's ignition crew pushes chest-deep into the grass, which is dense and stiff and pushes right back. Drip torches upended, they sprinkle liquid fire onto the vegetation as they walk. The wind picks up, and soon a solid line of flame sweeps down the hill and up the next. To control it, some of the crew become walking fire hydrants, strapping bladder bags of water on their backs or wielding long poles with large rubber flappers on the ends to smother stray fires.

It takes less than an hour to transform the patch of lush prairie into a smoking black blanket. All around, the scorched skeletons of hundreds of young sumac trees stand, still vertical but ready to disintegrate into ashes. In a few weeks, this area will be green again.

THE PERIPATETIC PYROTECHNICIANS aren't the only ones dedicated to greening the prairie. Love of the hills has also grown in natives like David Zahrt, who has changed over his lifetime from third-generation cattleman to ardent defender of the prairie. "People ask me where I'm from," he says, "I say I'm from the West Coast. Of Iowa."

Having spent a good part of his 67 years out-

doors, Zahrt is mindful of the sun and stops for a smear of sunblock on his arms and face before stepping off the back porch and heading up into the hills about 45 miles south of Sioux City. His family acreage in the Loess Hills is now a bed and breakfast, where the price of an overnight stay often includes a guided prairie hike. Every ridge, every plant prompts a story.

"This is lead plant," Zahrt says, pulling at the seeds of a plant with tiny rows of dull blue leaves. "It appears as if it's already flowered." From here on, Zahrt grasps at lead plants left and right, raking the seeds off between his thumb and fingers and dumping them in a plastic jug hanging from his belt.

It's impossible to take in the beauty of a healthy prairie on a single day, not when it contains as many as 150 different species of plants, each with its own moment of glory in the passage of the year. "The procession starts way back in April," Zahrt says. "You get the pasqueflower, then the ground plum. Then you get the hoary puccoon, then the prairie ragwort and the prairie violet, and it's just one procession after another." Some of these plants fill a hillside with color, some hide down among the grasses. Like a good pointillist painting, a healthy prairie needs to be appreciated both up close and from afar. When the flowers fade in

"People ask me where I'm from. I say I'm from the West Coast. Of Iowa."

autumn, the grasses take over, exhibiting rich russet tones. Even early winter has its display, as seed heads dry into intricate and pleasing shapes.

At the top of a particularly steep ridge, Zahrt spots an ecological oddity of the Loess Hills. It's yucca, a desert plant usually found a time zone or two west of here.

"Are you familiar with the yucca seed?" Zahrt asks, and scurries down a nearly vertical bluff better suited to a goat than to a potential AARP member. A few minutes later, he bounces up with his reward, a well-formed yucca seedpod. "This is what it looks like when it's all through, see." He splits the pod to reveal a tight stack of flat black seeds. "There's a moth that has symbiosis with this plant," Zahrt says. "It depends on the yucca or it's not going to live. And the yucca depends on the moth for pollination." Unlike insects that pollinate a variety of flowers, the *Pronuba* moth seems designed to no end other than yucca propagation. It gathers pollen from one yucca's stamen, stows it in a special appendage, and deposits it on another yucca's pistil. Then the female buries her eggs in a seedpod, where her larvae will feast on yucca seeds. Not too many seeds, though: The moth leaves enough pods egg-

Prairie Invaders

Invasive plants threaten the biological integrity of the Loess Hills prairie. Red cedar has moved in from farther east in the United States. The tree of heaven from China and the Eurasian leafy spurge have been spreading for more than 100 years.

▼ Red Cedar



▼ Tree of Heaven



▼ Leafy Spurge



free to keep the plants coming. Sustainable agriculture, arthropod style. The next pod Zahrt splits open reveals no seeds, but a sodden mass of brown mush. "The moth takes his price, see?"

Later, back at the house, Zahrt shows off his prized player piano. From a red cardboard box, he extracts a paper roll, Cole Porter's "Don't Fence Me In."

"I claim that Cole Porter wrote this about the hills," Zahrt says. "In the chorus, it says, 'I want to ride to the ridge where the West commences.' You find the yucca naturally along this ridge. You find the yucca in New Mexico. So there's botanical evidence that this is the ridge where the West commences." We sing.

And sing. Cole Porter gives way to the music of Sylvan Runkel, Iowa's late, revered state naturalist, a champion of prairies, and a friend of David Zahrt's. The piano is mute as Zahrt's smooth back-porch baritone rises into a rendition of Runkel's "Ode to the Loess Hills."

Away, away then I must go.

Up into these hills where the prairies grow.

*And nature speaks to let us know
the wisdom in a flower.*

Partway through, the leathery Iowa guy pauses to hold back the tears.

PROTECTING THE LOESS HILLS, and Iowa generally, presents special challenges. By many standards, Iowa is already the most altered state in the union, with more road surface per square mile than any other state. Most of the hills are in private hands, a dense mosaic of residential and agricultural ownership. Few outside of Iowa have even heard of the Loess Hills. Even many Iowans don't know about them. Until recently, there were farmers who lived their whole lives in the

Loess Hills and never heard the name.

The best hope for the Loess Hills is to work with the people who live there, to encourage a heightened appreciation of prairie, and to help them conserve their own land. A herd of cows managed the conventional way can suck the nutrients out of a prairie pasture and leave behind bare earth torn up by hooves. Some innovative cattlemen are experimenting with smaller herds, rotating them to fresh pastures frequently to imitate a roving herd of bison.

In 2001, the National Park Service sponsored a study of the Loess Hills. It was a ray of hope, a shot at a national park or at least some kind of federal protected status. The study called the hills a resource of national significance that would make "a suitable addition to the National Park System." But it concluded that the problem of multiple owners made a park impractical. Instead, the agency recommended the formation of a broad-based local organization. This group, which came to be known as the Loess Hills Alliance, was to create a comprehensive land-management plan that would allow people to make a living on the land without destroying prairie. Eventually, an act of Congress could create a national reserve, offering some of the protections of a national park, but on private land. The state chipped in some money for a salaried director, and for a while the Loess Hills Alliance looked to become a power. Then

Recent years have witnessed a blossoming awareness of the beauty of the hills.



▲ Eight-foot-high big bluestem means true prairie (above left). New appreciation of plants like the prairie dandelion (bottom left) encourages a growing trade in native seeds (right).

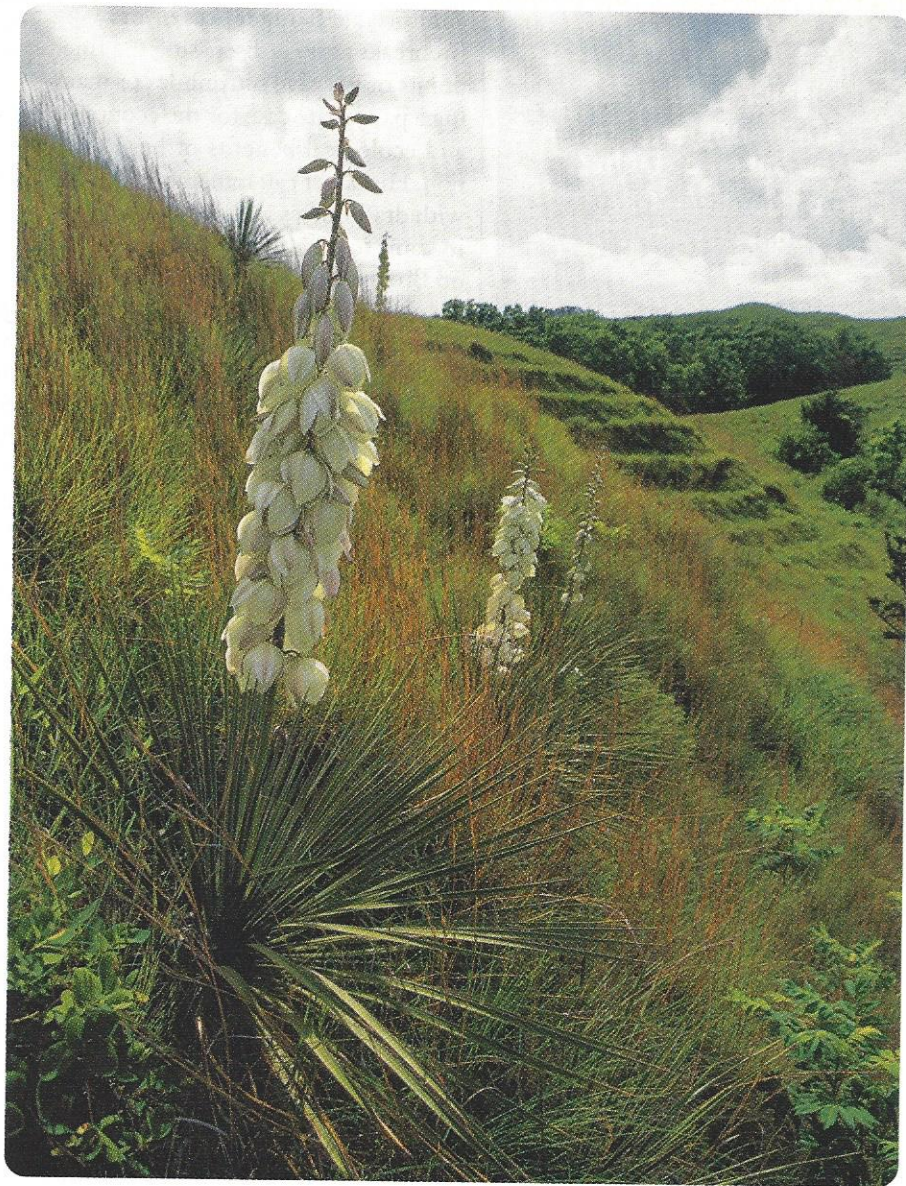
CLOCKWISE FROM ABOVE LEFT: TOM ROSBURG, TOM & PAT LEESON, DON POGGENSIE

Iowa, like many states, hit hard times and cut off the alliance's funding. The organization now plods along with a volunteer director and limited influence and support.

In Coralville, 200 miles east, plans are under way for the Iowa Environmental Project, an ecological Disneyland under a gigantic clear bubble with a 4.5-acre indoor tropical rainforest and a million-gallon aquarium. Iowa senator Chuck Grassley (R) championed the boondoggle and helped lasso 50 million federal dollars to build it. That sum might have kept the Loess Hills Alliance staffed for a couple hundred years, preserving the actual Iowa environment.

LOVERS OF PRAIRIE look with envy to the north Loess Hills, where woody invaders have made the least progress. At the northern terminus of the landform is Broken Kettle Grassland, a 7,000-acre expanse nearly unbroken by trees. It's owned by the Nature Conservancy, which recently named the Loess Hills one of its "Last Great Places." Scott Moats is the naturalist in charge.

The musical *Oklahoma!* has a song that begins, "The farmer and the cowman should be friends." In Iowa, add the conservationist. Moats has been all three, which well qualifies him to manage prairie and to teach others to do the same. Big and solidly built, Moats is part farm boy, part environmental policy wonk, as



▲ Growing on dry, sunny slopes is yucca, which leads prairie enthusiasts to claim the American West actually commences in Iowa's Loess Hills.

Loess, Lewis, & Clark

LEWIS AND CLARK FEVER RUNS HIGH in the towns along the Missouri River. Sioux City has a \$4 million Lewis and Clark Interpretive Center where school kids learn about the expedition through flip books and dioramas. In the gift shop, you can buy a complete set of Gary Moulton's finely edited *The Definitive Journals of Lewis and Clark* in 13 volumes, or a cuddly plush toy of Seaman, the expedition's Newfoundland dog. (Last summer, all over Sioux City and the surrounding areas statues of Seaman dubbed Discovery Dogs cropped up on street corners, decorated in fanciful themes. There was even a dog dressed like Thomas Jefferson, who commissioned the Lewis and Clark expedition, right down to his frilly shirtfront and powdered wig.)

In the Loess Hills, which stretch in a narrow band for 200 miles along



the western edge of Iowa, and in other states explored by the Corps of Discovery on its trek to the Pacific, the Sierra Club wants the party to last. Mary Kiesau, the coordinator of the Club's Lewis and Clark Wild America Campaign, would like to see a million acres in Lewis and Clark states set aside and preserved in perpetuity. "That's a pretty small ask," Kiesau says. "It would be a small token to give as a legacy to the Corps of Discovery." Protection for the Loess Hills is challenging because much of the land is privately owned and stakeholders have to be involved in planning its conservation. But even public lands are not necessarily safe, especially as the Bush administration attempts to dismantle protections against logging and mining.

For more information, visit www.sierraclub.org/lewisandclark. To help protect the Loess Hills, contact iowa.chapter@sierraclub.org or call (515) 277-8868.

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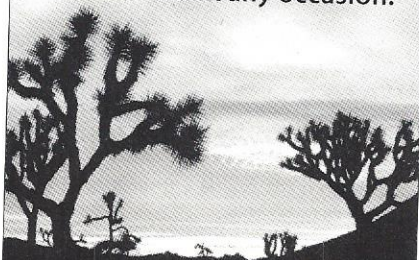
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comfortable fixing fences or mowing firebreaks as he is discussing the finer points of invasive nitrophiles or making a passionate case for the economic and ecological benefits of herd rotation. His father can remember farming with draft horses and the day electricity came to their farm. Moats lives right on Broken Kettle, just a few steps from a well-documented prairie rattlesnake hibernaculum, a fact that gives me pause when I watch his daughter toddling around the swings and toy horsies outside the house.

"When I first moved out here, everybody thought the Nature Conservancy was a fern-feeling, tree-hugging, granola-flake organization," Moats says. "I think we're a lot closer now, with the environmentalists and the agriculturists meeting in the middle. Our objectives may not be the same, but the end result will be."

Fire here, like the blazes down at Stone State Park, is crucial. As we ride through Broken Kettle in his pickup, Moats examines every hillside, evaluating the success of his last fire.

"Here's a response from a spring fire," Moats says, pointing out an expanse of big bluestem about as tall as he is. Before the fire, the area had become overgrown with non-natives like sweet clover and buckthorn, a European tree that's particularly hard to eradicate.

As the prairie plants thrive again at Broken Kettle, neighbors take notice and catch on to conservation. Elsewhere, prescribed prairie fires often meet with public resistance because of smoke and the perceived danger. Around Broken Kettle, the neighbors accept and even welcome fires.

"That house that sits up on top of Butcher Road, we use their lawn as a firebreak," Moats says. "They usually sit out on lawn chairs, drink beer, and watch the fire go by."

Moats has converted some neighboring farmers from skeptics to conservationists. They've seen excellent forage grow after a fire, seen calves get fat on native vegetation and take prizes at auction. Some now come to Moats for advice on managing their prairies.

Even at 7,000 acres, Broken Kettle is

a fragment. Moats is acutely aware that outside this privileged zone, preserving the Loess Hills is a race against time. "It'd be kind of interesting to see how much time we have left—if somebody would model out exactly how many years we have left," Moats says. "I'd guess it'd be 15."

On the other hand, a lot can happen in the next 15 years. The past 15 have witnessed a blossoming awareness of the beauty and ecological importance of the hills. The Loess Hills Hospitality Association has brought in thousands of tourists. A designated national scenic byway runs the entire length of the hills. The Loess Hills Prairie Seminar attracts 250 to 300 participants each June for a weekend of hiking and learning. Despite its funding woes, the Loess Hills Alliance continues to meet, with representation from seven counties in the landform. The Sierra Club's Jim Redmond is lobbying to reinvigorate the alliance to enable it to prepare the management plan necessary for the creation of a Loess Hills National Reserve.

Prairie has a way of surprising us with its resilience. When Moats was a boy, his father handed him a package of prairie seeds, which he accidentally dropped in a pile on the ground. Native prairie seeds are expensive; some retailers sell the rarer varieties for as much as \$1,200 per pound. It was a tense moment for father and son, Moats recalls. "His reaction was, 'What'd you just do? You know how precious those seeds are?'" All that money, all those good intentions wasted.

"Then suddenly, 13 years later, boom," Moats says. "Whatever condition they needed, it happened and they grew." ■

SAM HOOPER SAMUELS lives in Vermont, and teaches in the Iowa Summer Writing Festival. He has written for Smithsonian, the New York Times, and Discover.

► **ON THE WEB** To plan a trip to the hills, see www.loesshillstours.com. For more about the Loess Hills Prairie Seminar, a weekend of outdoor education and hiking in June, see www.aca12.k12.ia.us/services/loesshillsseminar.