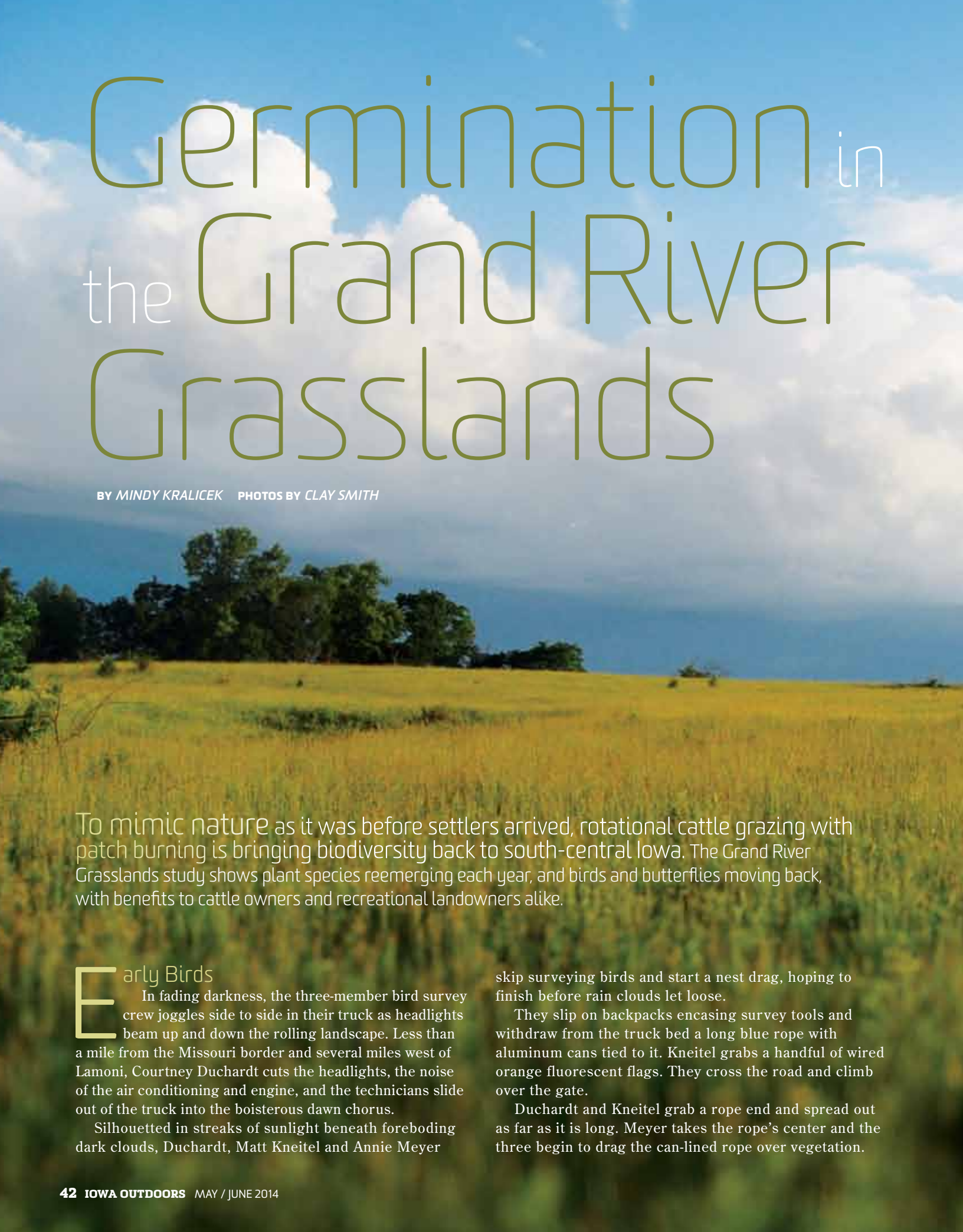
Germination in the Grand River Grasslands

BY *MINDY KRALICEK* PHOTOS BY *CLAY SMITH*



To mimic nature as it was before settlers arrived, rotational cattle grazing with patch burning is bringing biodiversity back to south-central Iowa. The Grand River Grasslands study shows plant species reemerging each year, and birds and butterflies moving back, with benefits to cattle owners and recreational landowners alike.

Early Birds

In fading darkness, the three-member bird survey crew joggles side to side in their truck as headlights beam up and down the rolling landscape. Less than a mile from the Missouri border and several miles west of Lamoni, Courtney Duchardt cuts the headlights, the noise of the air conditioning and engine, and the technicians slide out of the truck into the boisterous dawn chorus.

Silhouetted in streaks of sunlight beneath foreboding dark clouds, Duchardt, Matt Kneitel and Annie Meyer skip surveying birds and start a nest drag, hoping to finish before rain clouds let loose.

They slip on backpacks encasing survey tools and withdraw from the truck bed a long blue rope with aluminum cans tied to it. Kneitel grabs a handful of wired orange fluorescent flags. They cross the road and climb over the gate.

Duchardt and Kneitel grab a rope end and spread out as far as it is long. Meyer takes the rope's center and the three begin to drag the can-lined rope over vegetation.

Over grazing pastures suppresses the number of plant species that grow, the variety of insects that feed upon the plants and the variety of birds that feed on the insects. But changing land management practices has created a more diverse habitat, and insect and wildlife diversity are gradually returning to the Grand River Grasslands with rotational grazing and patchy use of fire.

The cans make noise and weigh down the rope, but do not harm nests. "When a bird flushes, we fully search the area to find its nest," explains crew leader Duchardt. When found, the nest's GPS coordinates are recorded and the number of eggs, nestlings and cowbirds are noted, she says.

Brown-headed cowbirds are a nest parasite. Rather than build their own, they lay their eggs in other birds' nests, sometimes even pushing out the host's eggs.

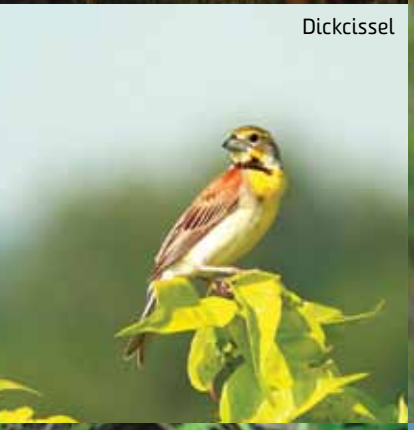
"We 'candle the eggs,' hold them up to the sunlight—to see their contents to determine the age and estimate a hatch date," Duchardt says.

They have found 75 grasshopper sparrow nests and 35 meadowlark nests, and will find more next month, she says. A handful of dickcissel, bobolink, Henslow's sparrow, sedge wren and upland sandpiper nests, and one vesper sparrow nest, were found too.

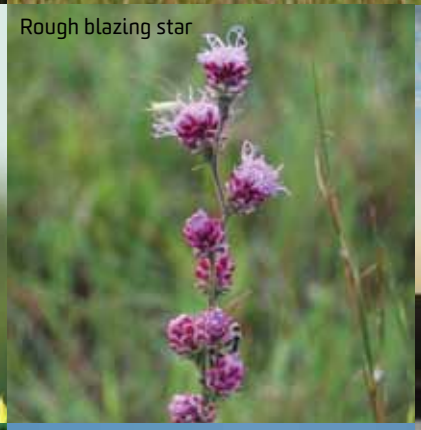
Red-winged blackbirds are technically grassland birds and they are here, but they also nest in shrubby swamps and cattails in ditches along roadsides and farm ponds.

An orange flag marks a searched area, just as a small

Dickcissel

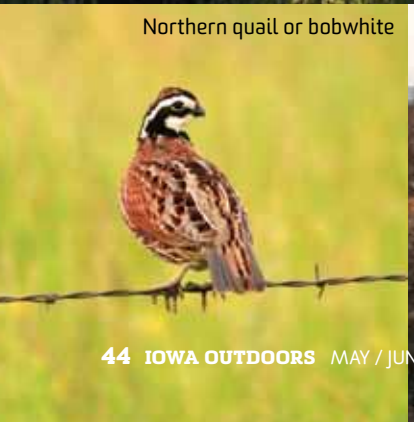


Rough blazing star



ABOVE: A meadowlark nest is discovered. Bird survey leader Courtney Duchardt "candles" an egg to estimate its hatch date. Bird surveyists Annie Meyer and Matt Kneitel drag cans over vegetation to flush birds to determine bird species diversity and reproduction. **AT TOP OF PAGE:** Cattle grazing encourages plant diversity if the number of cattle per acre is limited and a grazing rotation plan is implemented. **BELOW:** Grand River Grasslands are burned every three years (some land is burned in a three-year rotation) during the last two weeks of March to stop redcedar encroachment, promote regrowth of high protein forage and encourage dormant seeds to germinate.

Northern quail or bobwhite



rain cloud passes through. Because the rain looks brief and the crew is at the back of the pasture, they decide to wait it out.

"Generally we make sure we're not scaring adults off the nests, exposing eggs or nestlings to the elements," explains Duchardt.

After 10 minutes, sunshine prevails and the crew continues.

They may also find northern bobwhite, killdeer, loggerhead shrike, common yellowthroat, eastern kingbird, eastern bluebird and field sparrow nests.

"Most of these species utilize both shrub land and grassland," she says. "Our crew tracks grassland bird nests to see if they are successful, but we don't routinely track how long fledglings survive after they leave the nest. That requires transmitters to be attached to the fledglings."

They have also seen increased numbers of meadowlark nests recently.

"Meadowlarks typically have five young, sometimes six. As they near fledging stage, you may see the baby birds piled on top of each other, barely fitting in the nest. It's probably because there are cowbird nestlings in the nest," says Duchardt. "It's wild to see."

"When the meadowlarks fledge, you have to watch where you step," says Kneitel. "You're walking along and then suddenly there is a flurry of feathers and little birds are popping up above the grass all around. You're standing there with one foot in the air, afraid to put it down for fear of stepping on a bird."

Rain begins in earnest and the crew beelines to the truck.

Bringing Back Biodiversity

Here, on one of several pastures in a scientific study to examine the effectiveness of fire and grazing as management tools, researchers gauge the response of plants, butterflies and grassland birds.

The Grand River Grasslands project team represents several fields of study and includes faculty from three universities, professional staff and graduate and undergraduate students.

Intensive grazing that uses forage produced each year can change habitat structure and suppress the number of plant species. Fewer species reduce the variety of insects that feed upon the plants. Fewer insect varieties may attract fewer bird species.

"The result might be well-fed cattle, but there is little diversity of plants, animals and insects," explains Diane Debinski of Iowa State University, one of a team of scientists testing alternative grassland management.

Prairie plants can remain in the pastures decades after abusive grazing, albeit suppressed and hidden. The study will show if the plants are out there and will grow, and if changing traditional grazing practices to improve grassland biodiversity will benefit cattlemen and recreational land owners.

Land Management Practices

"The study pastures in Grand River Grasslands are owned by private landowners, the state and The Nature Conservancy," says Debinski. They use three different land management practices of grazing and burning: some fields left idle and burned every three years; others grazed every year and burned once every three years; and lastly, patch-burn grazing that closely mimics the grazing of bison and natural burning that occurred before settlers arrived in the mid-1800s. The land is grazed, and different thirds of the pasture are burned each year.

Cattle Superfood

"When given a choice between dense dried grass, dead grass with some fresh grass growing underneath and a field of newly emerged grass, cattle head straight for the new green supple stuff every time," says Shannon Rusk, in charge of daily operations and working with landowners.

"We have a short burning season—roughly the last two weeks of March. Grazing begins May 1. The cattle definitely go after the new stuff, no matter what it is.

"I've seen a number of landscape changes in our pastures since this began in 2007. Overgrazed lands are still recovering, but in other areas we're seeing Indiangrass, big bluestem, little bluestem, switchgrass and prairie cordgrass," says Rusk. "Among the wildflowers are butterfly milkweed, rattlesnake master, black-eyed Susans and purple coneflowers—those species like fire. Later in the season, mint, prairie purple clover, blazing star, cream gentian, ironweed and goldenrod appear.

"On land we burn and do not graze…we've seen an abundance of sawtooth sunflowers and compass plant. That land also has a patch of wild plum and sumac where there is a lot of bird activity." A spring-fed pond brings in dragonflies that feed on insects.

With plant diversity and productivity increasing each year, scientists have identified more than 200 plant species growing on the study sites. But are unburned grassland pastures more nutritious than patch-burned grazed grasslands?

"Not necessarily," says Dr. Dave Engle of Oklahoma State University, another project scientist. He says research elsewhere shows plant maturity is the most important factor shaping crude protein content—a measure of forage quality. Succulent plant regrowth, after fire, is very high in crude protein, but declines rapidly in mature plants. Therefore, burned patches embedded within unburned grassland offer higher quality forage than unburned grasslands.

Invaders

Non-native tall fescue is a deep-rooted plant that forms a dense sod. It exists in each study parcel, but abundance differs.

The data did not indicate if tall fescue abundance increased or decreased under the three management

BIRD PHOTOS BY TORRE HOLWICK

A rainstorm sweeps through the Grand River Grasslands located in Ringgold County, Iowa, and Harrison County, Mo.

practices, says Devan McGranahan, who as a doctoral student with Dave Engle, researched the effect of grazing and burning on tall fescue. "But it has negatively affected the performance of grassland native species where it dominates.

"Grasslands with more native plants will have more vertical structure and will stand taller, especially later in the season. Native plants keep growing into October, and change appearance as different wildflowers take turns blooming. The grand finale, before the plants go dormant, is when the tall grasses turn purplish-reddish-brown."


Mountain mint with common eastern bumble bee

Burning Stops Eastern Redcedar Encroachment

"Some woody plants are well adapted to fire…and some are intolerant," says Ryan Harr, project manager for the research team through 2012. "Eastern redcedar is intolerant… However, a large redcedar can be a tough tree to burn. When redcedar burns, it is actually more of a chemical-driven fire, because the cedar oils must be volatilized. Conditions have to be right to get the tree to ignite completely and kill it."

Although some woody plants resprout from roots, eastern redcedar does not.

"The key is to get a good fuel bed underneath the redcedar so fire can climb into the lower branches and generate an ignition reaction. A warm, dry day with a good wind is needed," says Harr. "Once a redcedar gets too big, the fuel bed underneath can be too thin to effectively start the ignition reaction. A big cedar on fire can be dangerous to work around and manage. Thus it's best to use fire every few years to keep seedlings from getting too big."

Fire does not destroy most plants. They may be suppressed while others grow with new vigor. Fire changes the state of a habitat. Habitats may be hurt more without periodic fire. Although "escape cover" may be lost temporarily for some species, the habitat can be an important hunting place for hawks and other birds of prey.

"Fresh regrowth following a fire is a boon for wildlife such as white-tailed deer and turkeys, just as it is for cattle," says Harr. Some species, such as the prairie chicken, rely on fire and grazing to create different grassland habitats. Using patch-burned grazing allows a manager or landowner to create a mosaic of habitats in different states of succession with benefits to many species on one property.

Host Plant Diversity Attracts More Diverse Insects

Butterflies are counted in transects just as birds are, but plants must be identified too, so host plants are known for each butterfly species.

"Each year we're finding more rare wildflowers coming up in the areas that have a burn cycle," says Ray Moranz, a researcher on his sixth rotation with a butterfly crew on Grand River Grasslands. Reducing the number of cattle per acre helps too, especially at sites overgrazed for decades, he says.

The return of butterfly milkweed is a boon for many butterfly species. The Edwards' Hairstreak is a species of greatest conservation need and uses only butterfly milkweed as an adult. The rare regal fritillary must find violets to survive as a caterpillar, but as an adult, it feeds on milkweed, bergamot and dogbane.

Adult regals will not leave prairie. If they get carried in the wind to a cornfield, they will turn around and fly back to the prairie. "We've see it happen," says Moranz.

Other rare butterflies here include the two-spotted skipper, wild indigo duskywing, zabulon skipper and byssus skipper.

"More common butterflies, like the great spangled fritillary and common wood nymph are increasing 300 to 400 percent," says Moranz. "Interestingly, the butterflies that like weedy plant species, such as sulphurs and cabbage whites, have declined in numbers or remained stable."

Changing Pasture Management

"There is a different dynamic in southern Iowa versus other parts of the state where row crops are the norm," asserts Lois Wright Morton, sociology professor at ISU who leads a survey of landowners and community leaders in the Grand River Grasslands. "The cattle industry is the main economic system here. There is little animosity toward non-local landowners who own land for recreation. We see potential for cooperative grazing of hunting land by cattle producers, which will benefit the habitat for deer and turkey hunting."

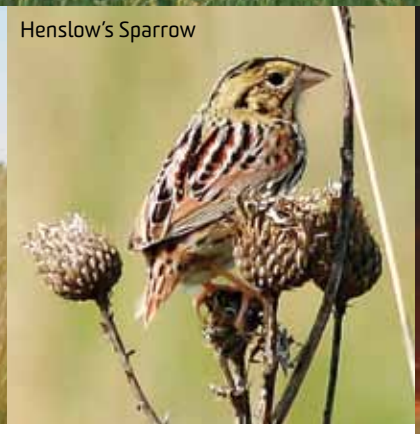
There is also excitement among conservationists: the potential that some species of greatest conservation need may find a large space to thrive that also serves people and livestock.

"The more we learn about the long-term effects of these practices, the more helpful the information will be to landowners as they contemplate the benefits of managing their land as a part of this larger grassland ecosystem," says Debinski. "Just imagine the possibilities if this could happen."

BIRD PHOTOS BY TORRE HOLVICK

Bobolink

Shannon Rusk



Henslow's Sparrow

TOP: Views of rotated burned and grazed acres and rolling hills of Grand River Grasslands. Shannon Rush is responsible for day-to-day operations for the Grand River Glasslands project. More than 200 species of plants have been identified so far.