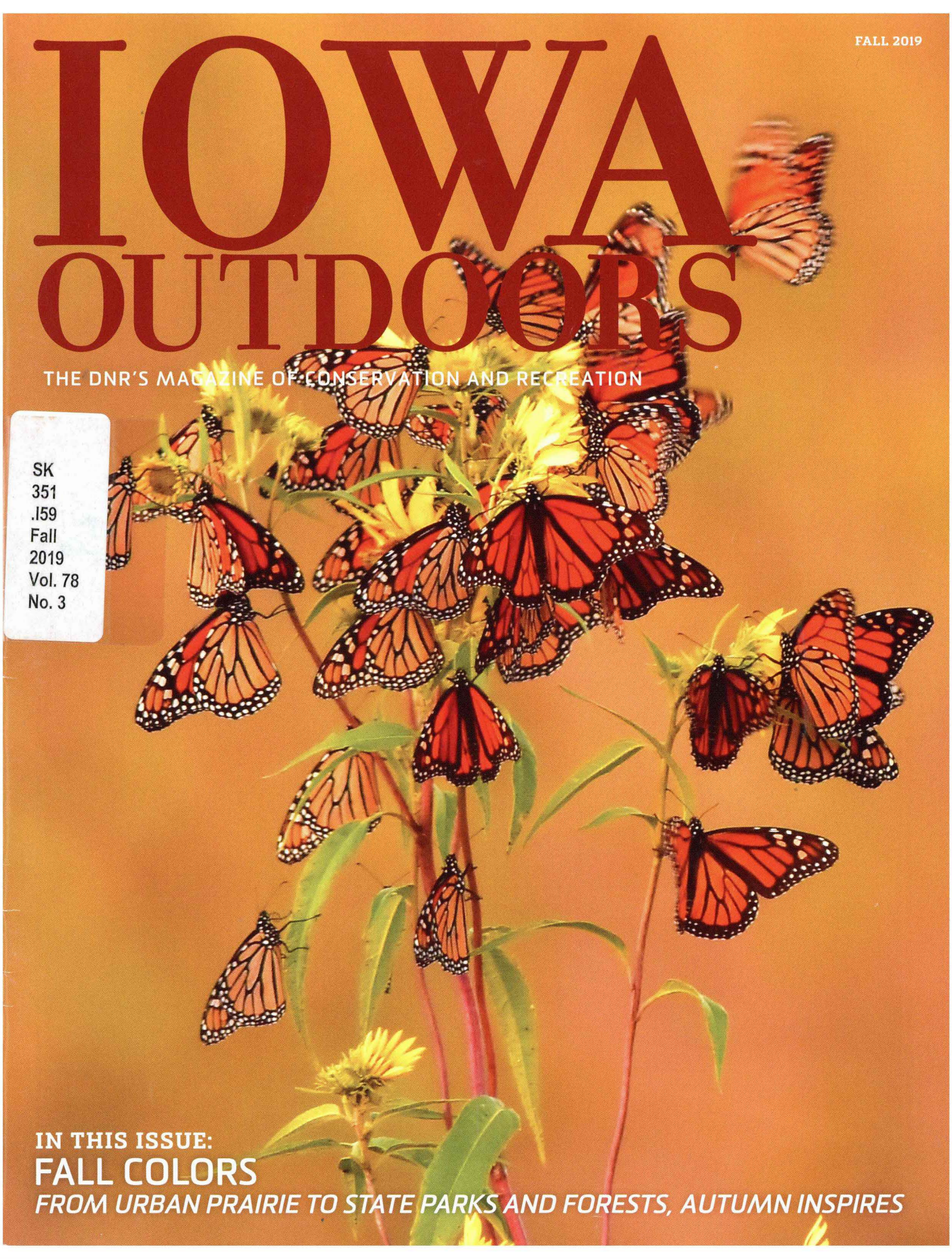
FALL 2019

IOWA OUTDOORS

THE DNR'S MAGAZINE OF CONSERVATION AND RECREATION



IN THIS ISSUE:

FALL COLORS

FROM URBAN PRAIRIE TO STATE PARKS AND FORESTS, AUTUMN INSPIRES

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Contents

FALL 2019

DEPARTMENTS

FEATURES

ABOUT THE COVER

This kaleidoscope of migratory monarchs gather on tall prairie flowers for an overnight stay as the sun sets. With restoration of native prairie at the Neal Smith Wildlife Refuge, it's the perfect oasis for their long journey ahead. By planting native plants around yards and flower beds, homeowners can also create beautiful butterfly habitat, too.

PHOTO BY *ERIC BURSON*

ABOUT THIS PHOTO

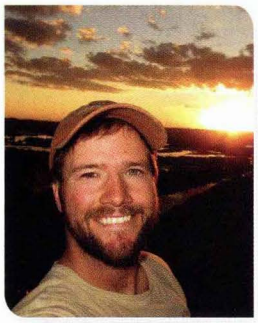
Hike to Founders Pond overlook at Effigy Mounds National Monument in Allamakee County for picture perfect memories. In 1955, the Founders Garden Club of Des Moines donated this 40 acres, which included two mound sites and the pond. Follow the wondrous progression of changing leaves and find autumn colors at their peak at *iowadnr.gov/fallcolor*, or call the fall color hotline at *515-233-4110*.

PHOTO BY *BRIAN GIBBS*

Contributors

DAVID GLANDON is a Cedar Rapids based landscape and portrait photographer and holds a fine art degree from Mount Mercy University. Married for 24 years to wife Buffey, they have a son Colin. They camp wherever in Iowa they can tow their travel trailer. "I grew up in Iowa and find there is more to our landscape than barns, corn fields and dirt roads. I try to share that with works I produce." See images of Palisade-Kepler State Park, Water Series #1 and more at *david-glandon.squarespace.com*.

ERIC BURSON of Des Moines grew up in Red Oak where exploring piqued his nature interests. As a boy, his grandparents gave him a film camera. After graduating from Simpson College, he focused on documenting Iowa's birds similar to what John James Audubon did with drawings. "I use photography as a vehicle for conservation to help connect audiences to nature," he says, which marries his passions for photography and conservation. "One of my most influential drivers was my late grandmother's final wish … to have my photographs given to my grandfather for his birthday before her passing a month later. It's a constant reminder when photos aren't going as well as hoped, she always believed in me."



Former Clayton County naturalist **BRIAN GIBBS** has been addicted to wild places ever since his father first took him trout fishing in Yellow River State Forest. His passion for teaching others about enjoying and conserving natural beauty led him to work in such scenic places as Glacier National Park and Effigy Mounds National Monument. He is program director for the University of Wisconsin-Stevens Point Treehaven Field Station. *briangibbs2671@gmail.com*

IOWA OUTDOORS

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DNR MISSION

To conserve and enhance our natural resources in cooperation with individuals and organizations to improve the quality of life in Iowa and ensure a legacy for future generations.

EDITORIAL MISSION

We strive to open the door to the beauty and uniqueness of Iowa's natural resources, inspire people to get outside and experience Iowa and to motivate outdoor-minded citizens to understand and care for our natural resources.

MAKE A DIFFERENCE

DNR volunteer programs help Iowans give back to lands, waters and skies. *515-725-8261* or *iowadnr.gov/volunteer*

HOW TO DONATE

Charitable giving of land, funds, goods and services greatly enhances Iowa's outdoors. Call Kim Rasler at *515-725-8440.*

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Meet the Director

Dear valued *Iowa Outdoors* reader:

Kayla Lyon is the eighth DNR director and began her duties in July.

Growing up in rural Winneshiek County, near Decorah, I was surrounded by some of Iowa's most notable natural resources. Whether it was the famous trout streams or the beautiful fall foliage and the rolling hills of the driftless region, it was easy to have an affinity for northeast Iowa. I spent countless hours hiking, fishing, horseback riding and paddling the river. My family is no stranger to the outdoors.

Now living in rural Ames, with my husband and two daughters, we strive to instill that appreciation for the outdoors in our girls. It gives me great pride to watch our four-year-old daughter casting her line into a pond or to watch her light up when she spots a deer shed.

In my first several weeks on the job as the DNR director, I've met so many passionate and dedicated professionals caring for our natural resources. Not only do they spend their workdays and work weeks focused on protecting our land, water and air, but they live it 24/7. On the evenings and weekends, these are the folks spending their free time enjoying these same resources that they know and protect. It's their way of life.

We know how important it is to have high quality, abundant natural resources at the fingertips of those who chose to live in or visit Iowa. And, these recreational opportunities assist our businesses in recruiting and retaining talent because they can see Iowa as a place where they want to raise their families. Iowa's economy depends on it and so do the citizens of our state. We will continue to work together in building both public and private partnerships to preserve our precious natural resources for generations to come.

I had the opportunity to help pass SF512, an act relating to water quality, while serving for Governor Reynolds. Enhancing Iowa's water quality is a top priority of our department and something you expect. SF512 is not the end, it's just the beginning, it is a starting point to get the key stakeholders to the table and recognizing the issues and addressing them.

It is my honor to serve as the eighth director of the DNR. I look forward to working side-by-side with you to protect and enhance our natural resources and ensure a legacy for future generations to enjoy.

Kayla Lyon

-Kayla Lyon, Director, Iowa DNR

Outdoor Skills

BY *BRIAN BUTTON*

TIPS, TRICKS AND **MUST-KNOWS** TO ENHANCE YOUR OUTDOOR FUN

Fall Photography Tips

Avoid full, direct sunlight, which can wash out colors. Early and late sun yields dramatic side lighting.Overcast days are best with soft and even light that contrasts nicely against the saturated colors of fall. Use streams, ponds and rivers to reflect colors for mirror images. Backlit scenes make translucent colors in leaves even more luminous. Extend the season after leaf drop by shooting them afloat on water or carpeting the ground. Get fall color reports at *IowaDNR.gov* or call *515-233-4110*.

Stay Toasty and Safer

With cold weather and falling water temps coming, add a floatation jacket to your gear list. It's a jacket filled with buoyant material that replaces a personal flotation device. Waterfowl hunters, boaters, anglers and ice anglers especially benefit as flotation jackets guard against harsh weather and retain more heat in the water to provide greater hypothermia protection. Flotation jackets come in camo and specialty versions for anglers and hunters with extra features and pockets. Hip-length for warmth, concealed hoods, storm collars and comfortable soft buoyancy material make them ideal for extended wear times. Make sure to check for correct fit and U.S. Coast Guard approved labels.

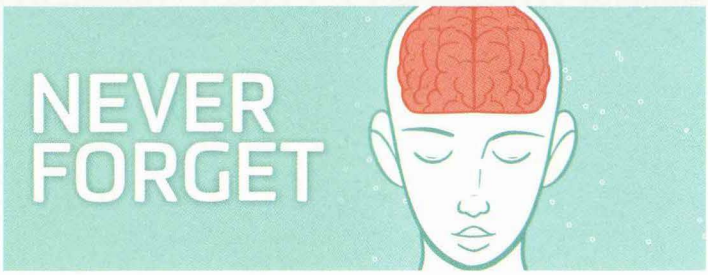
Tips for First Time or Rusty Campers

Start with an overnighter—not a long trip—and camp close to home so you can bail if something goes awry. To save money, borrow or rent costly items such as tents and sleeping bags. Bring appropriate clothes for cool nights and rain and plenty of food as fresh air and activity increases appetites.

Practice setting up the tent at home. Daylight is shorter in fall, so set your tent, bag and pad up early. (Make sure it's a quality sleeping pad for comfort and to insulate you from the colder ground.) Beat the dark with a flashlight, but a headlamp is better to free both hands for camp chores.

Headlamps can also loop around an empty or water-filled gallon jug with the light facing inward to make a DIY lantern. Raccoons are skilled looters, so don't leave food, coolers or garbage unattended or out overnight. Seal everything and lock in your vehicle. Search pinterest.com/iowadnr for a checklist of essentials for clothes, cooking and hygiene to help prepare. And make sure to reserve campsites online at *IowaDNR.gov*.

FLOATATION JACKET PHOTO BY BRIAN BUTTON



Several months ago when working on this article, I was perusing recent studies on physical activity, parks, health and, as usual, was blown away by all the benefits of physical activity.

But culturally, something else was afoot. I dub this era the memory month. During this period, James Holzhauer won 32 consecutive *Jeopardy* matches and the Scripps National Spelling Bee crowned eight champions when they literally ran out of words to stump contestants. Over the previous 91 years they had co-champions just five times.

I too am a "Jeopardy Champion." I keep tab of correct answers I blurt out before those on TV buzz in, place bets on the final question and have won more than 200 times. (Sorry, I haven't kept track of losses!) On the other hand, I can't remember how to spell "mnemonic" or recall who the heck Roy G. Biv is.

All of this led to a question: How much memory is the human brain capable of storing? My first estimate was way too conservative. If I had recalled that a 24-year-old Chinese student (Chao Lu) had memorized 67,980 digits of Pi in 2005, I may have estimated higher. As I read the literature, I learned many computational neuroscientists estimate brain storage capacity between 10 terabytes and 100 terabytes. Some even go as high as 2.5 petabytes, whatever that is.

These memory feats melded nicely with some research I read on memory retention. Work at the University of British Columbia found regular aerobic exercise, the kind that gets heart and sweat glands pumping, appears to boost hippocampus size—the brain area involved in verbal memory and learning.

Other studies cited Dr. Scott McGinnis, a neurologist at Brigham and Women's Hospital and instructor at Harvard Medical School. This good doctor states" engaging in a program of regular exercise of moderate intensity over six months or a year is associated with an increase in the volume of selected brain regions." Given that every 4 seconds a new case of dementia is detected worldwide, this is not just vital for individuals, but the global health and economy.

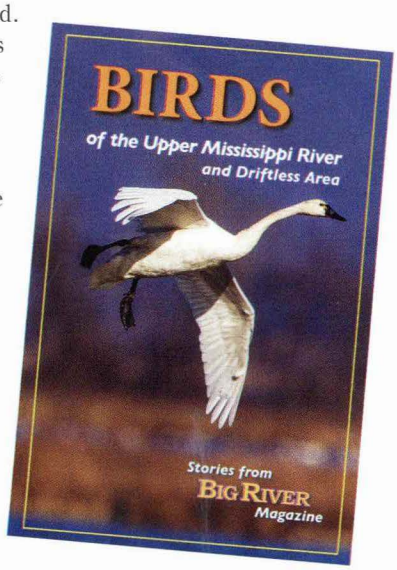
Exercise is like a one-two punch, providing both direct and indirect impacts. Direct benefits come from reducing insulin resistance and inflammation, stimulating the brain's chemistry, new blood vessels and even the abundance and survival of new brain cells. Indirect benefits include improved sleep, better mood and less stress that can lead to cognitive impairment.

In an enjoyable coincidence, I used the Iowa DOT northbound rest area north of Ankeny recently. After wondering about human brain capacity, there, next to the water fountain, was a fount of information on brain capacity. So not only take in Iowa parks to make new memories and get active to better recall old memories...but stop at an Iowa rest area on the way—it's amazing what you can learn.

TIM LANE is a nationally-recognized authority on public health and physical activity. He is past president of the Iowa Association for Health, Physical Education, Recreation and Dance.

Enjoyable New Book:
Birds of the Upper Mississippi River and Driftless Area

There's more to birds than a checkmark in a guidebook or an entry on a life list. Birds have skills and weaknesses. Some species are in decline; others are on the rebound. Green herons make lures to catch fish. Kingfishers dig long tunnels into streambanks. Blackbirds migrate in flocks that stretch for miles over the Mississippi River valley.



Some of the most interesting birds in the world live in the Upper Midwest, and *Birds of the Upper Mississippi River and Driftless Area* is packed with fascinating stories and beautiful photographs.

These stories cover a lot of ground, from how birds evolved from dinosaurs to what it's like to care for a vulture. Most of the stories cover birds' life cycles, as well as things that set them apart, such as sledding crows and macho kestrels. Stories also chronicle birds that have recovered from near elimination—bald eagles, pelicans, peregrines—and others on the decline—nighthawks and red-headed woodpeckers.

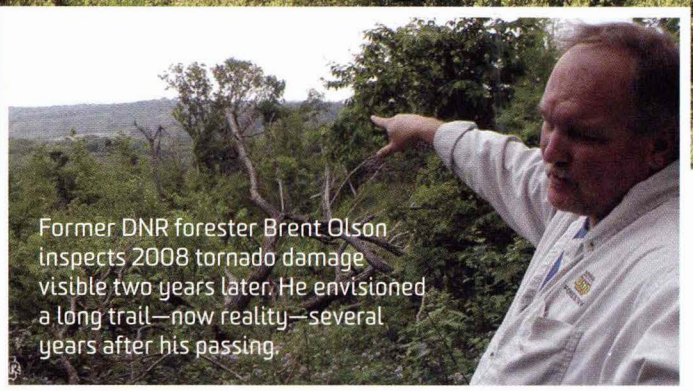
Most of the stories also give advice for spotting subjects, and "Paddling for Birds on the Mississippi" and "Favorite Fall Birding Spots on the Upper Mississippi" offer general advice on birding in the Driftless Area.

All stories are written from a regional perspective, focusing on bird behavior, and the changes and challenges they face in the Upper Midwest.

The 39 stories in this anthology appeared in *Big River Magazine* over a 22-year period. The 69 photographs by Alan Stankevitz have not appeared in the magazine.

Editors Pamela Eyden, Molly McGuire and Reggie McLeod,BigRiver, Winona, Minn., 204 pages, soft cover, $19.95. ISBN 978-0-9653950-8-3. Order online at *BigRiverMagazine.com* or *800-303-8201*.

Hike Iowa's Newest Long Trail



Former DNR forester Brent Olson inspects 2008 tornado damage visible two years later. He envisioned a long trail—now reality—several years after his passing.

Brent's Trail covers 8 miles in Harrison County, connecting Murray Hill Scenic Overlook, Loess Hills State Forest, and Gleason-Hubel Wildlife Area. The hiking trail is named after area DNR forester Brent Olson, who passed away in 2016 at age 53, who envisioned a long trail through the Loess Hills.

Opening last June, this is a serious hike that climbs and descends steep slopes and deep valleys, highlighting diverse Loess Hills landscapes with views unique to Iowa, as these rugged hills were formed by loess—windblown soil—thousands of years ago.

A round-trip hike is 16 miles. Hikers should wear sturdy footwear, bring plenty of water, snacks, and insect and sunscreen protection.

The trail crosses forest, prairie, savannas and hardwood stands of bur and red oak, black walnut, hickories, basswood, elms, ashes, Kentucky coffee tree, cottonwood, ironwood and red cedar. Typical are bur oak due to its ability to grow on dry sites and withstand fire. Find many natural prairie ridge areas holding 100 to 350 plant species—big and little bluestem, Indiangrass, sideoats grama, yucca, pasque flower, biscuitroot, lead plant, several colorful milkweed species, as well as snow-on-the-mountain, prairie larkspur, fringed puccoon, dotted blazing star, locoweed and western purple coneflower.

Two toads, unique to western Iowa, include Woodhouse's toad and Great Plains toad, plus distinctive reptiles, such as the six-lined racerunner. After heavy summer rains, listen for the loud quacking call of a most unique amphibian, the plains spadefoot.

Located along the Missouri River flyway, this is a birder's heaven. Bird diversity is exceptional, with 249 species identified, including 80 Iowa Species of Greatest Conservation Need. Currently, 111 species are known to nest here. Special birds include wood thrush, Bell's vireo, whip-poor-will, redheaded woodpecker, grasshopper and field sparrows, blue-winged warbler and both meadowlark species. The western Iowa location makes it a good place to see western bird species less often seen in most of Iowa, such as western kingbird, Townsend's solitaire, and perhaps lazuli bunting.

Brent's Trail is a partnership between Harrison County Conservation Board and the Iowa DNR. Other partners include Friends of the Loess Hills State Forest and Preparation Canyon State Park, Loess Hills Missouri River Region, Golden Hills Resource Conservation and Development and Loess Hills Alliance.

Find a trail map at *goldenhillsrcd.org*.

MAKE A DIFFERENCE FOR STATE PARKS

Join an expected 1,000 volunteers for Iowa State Parks' Volunteer Day, Sept. 28

Help make your park a better place on Saturday, Sept. 28 as more than 40 state parks participate in the DNR's third annual statewide Volunteer Day.

Activities may include invasive species removal, litter pick-up, painting shelters and benches, flowerbed work, brush removal, pruning, clearing trails, seed collection and more.

"State parks are important places that people enjoy for natural beauty and outdoor fun," says Todd Coffelt, parks bureau chief. "Iowans want to help care for them, and this is a great opportunity to lend a hand."

Learn more about the opportunities and find times, locations and details at *iowadnr.gov/volunteer*.

Together

Must Have Nature Tech Makes Species Identification a Snap

Stumble across an interesting insect, flower, fungi, bird, reptile, plant or animal and have no idea what it is? Use either the iNaturalist webpage or mobile app to quickly identify the species. Take a photo in the field, upload it and either a naturalist, citizen scientist or artificial intelligence will list the species for you.

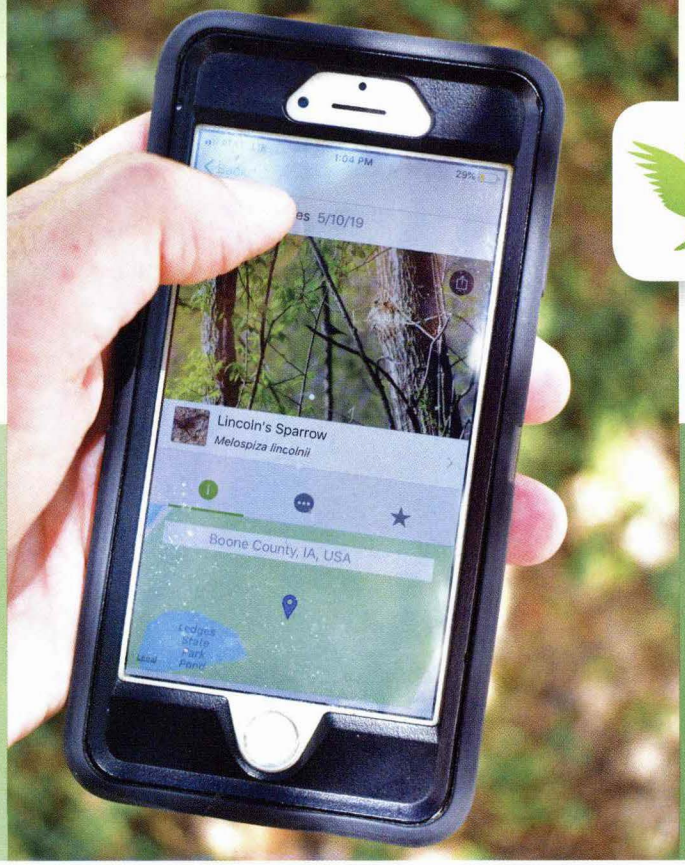
Users can also hit the explore tab to browse maps to see what others have identified in your neighborhood or wherever you are in Iowa or worldwide.

A joint initiative of the California Academy of Sciences and the National Geographic Society, this is one of the world's most popular nature apps and websites.

iNaturalist helps users not only identify plants and animals, but to connect with a community of over 400,000 scientists and naturalists who can help you learn more about nature. What's more, by recording and sharing observations, you'll create research quality data for scientists working to better understand and protect nature.

A sister app, Seek by iNaturalist, designed for children and families, requires no online registration and observations may remain private. This is a great app for families who want to spend more time exploring nature together. Automated species identification is included in both apps. Seek incorporates game features such as providing a list of nearby organisms to find and encourages the collection of badges by doing so.

Over 26 million nature observations made and 215,290 species identified worldwide in 240-plus countries. Over 1.5 million users. For Android and iOS systems. Google Play Editor's Choice and rates 4.7 of five stars for iOS on App store. Free downloads and no user fees.



KEY FEATURES

- Discover species new to you both near and far. Record your own observations and share them with the community.
- Receive suggestions and crowdsourced identifications of what you've seen.
- Discuss and help others identify what they've seen.
- Follow projects comprised of smaller communities and fellow citizen scientists passionate about a particular place and/or species.

For more info and free downloads visit *inaturalist.org*

PROVIDING A NEW HOME

WAUBONSIE CAMP HOSTS AND VOLUNTEERS HELP HAMBURG FLOOD VICTIMS —BY MADISON KOETTING

Campground hosts Deb and Dave White have volunteered at Waubonsie State Park for five years, and when flooding from the Missouri River took over their town of Hamburg, they didn't hesitate to start their duties a little earlier than usual. Waubonsie State Park opened its campground for free to families whose homes were displaced by the flood in March 2019, but in no way was this experience close to the park's typical camping season. Flood victims "didn't come up here to camp, they came to survive," says Dave. No longer were families coming to enjoy a relaxing, get-away weekend outdoors. Local residents were using Waubonsie as their safe haven amidst a disastrous flood season.

For several weeks after the Missouri River flood, Waubonsie's campground was full, with more than 50 people sharing showers, restrooms and other park facilities and resources. Cleaning restrooms and shower buildings throughout the day, serving community meals and making sure state park policies were being met are just a few of the many responsibilities the couple fulfilled as camp hosts.

Staying at Waubonsie wasn't as much an option as it was a necessity, and living in close quarters certainly brought its difficulties. "Not everyone was a happy camper," explains Deb, but this didn't stop the community from stepping up to help one another after a disastrous flood season. When the weather was nice, families were able to form bonds with one another, and Deb and Dave made sure to stop by each campsite to talk to families when they could. Residents from around the community donated snacks, toiletries and even a washer for the entire campground to use—illustrating the perfect picture of how communities can come together despite natural disasters. While Deb and Dave White were camp hosts from March to May, dozens of volunteers also helped families staying at Waubonsie throughout 2019.

MOVE OVER, GRAY. CLINTON IS GOING GREEN —BY JESSIE BROWN

The City of Clinton, located along the Mississippi River, has been working over the past decades to separate their combined sewer system, where both treated wastewater from the sanitary sewer and the untreated stormwater runoff combine. Separating the two will reduce the amount of untreated water discharging directly to the river.Clinton uses the Clean Water State Revolving Fund (CWSRF) to finance the project, and an additional award helped them take stormwater efforts a notch higher.

"With the help of a CWSRF Water Resource Restoration Sponsored Project, Clinton has used a green stormwater infrastructure approach to address urban stormwater quality and quantity associated with combined sewer overflows," says Lee Wagner, SRF Non-Point Source Program Planner with the DNR.

Instead of using traditional infrastructure, with a lower initial cost, the city chose greener practices in making streetscape improvements to a historic district. To help soak up rain and snowmelt into the ground rather than it running off into storm sewers, the city installed permeable pavers in parking bays and alley ways—a big improvement for residents over the rough gravel alleys.

A Silva Cell brand system for tree planters provided not only beautified sidewalks with permeable brick pavers, but the 4-foot chamber below filled with topsoil and sand allows tree roots to stretch out and water to soak in, not run off. A bioretention cell with native prairie plantings adds color and drinks up runoff. A city park lawn had a soil quality restoration to loosen up the soil and allow it to take on more rainwater. The practices also filter out pollutants and avoid overloading the separated sewer system.

Having funds available from the SRF sponsored project allowed the project to go green, says Jason Craft, Clinton City Engineer. "This allowed us to focus on proactive stormwater management and treatment and filtration, rather than just standard storm sewer installation. The money made available by SRF allowed a cleaner and greener project to be constructed."

Residents took notice and learned about water quality along the way. "The public really enjoys the attractiveness of the permeable pavers, and it is always interesting to them to hear the stormwater quality aspects of the project," says Craft. "Green infrastructure instead of grey is so much more satisfying to the public.While it may cost a small percentage more, the environmental and aesthetic value of the project is something that cannot be measured."

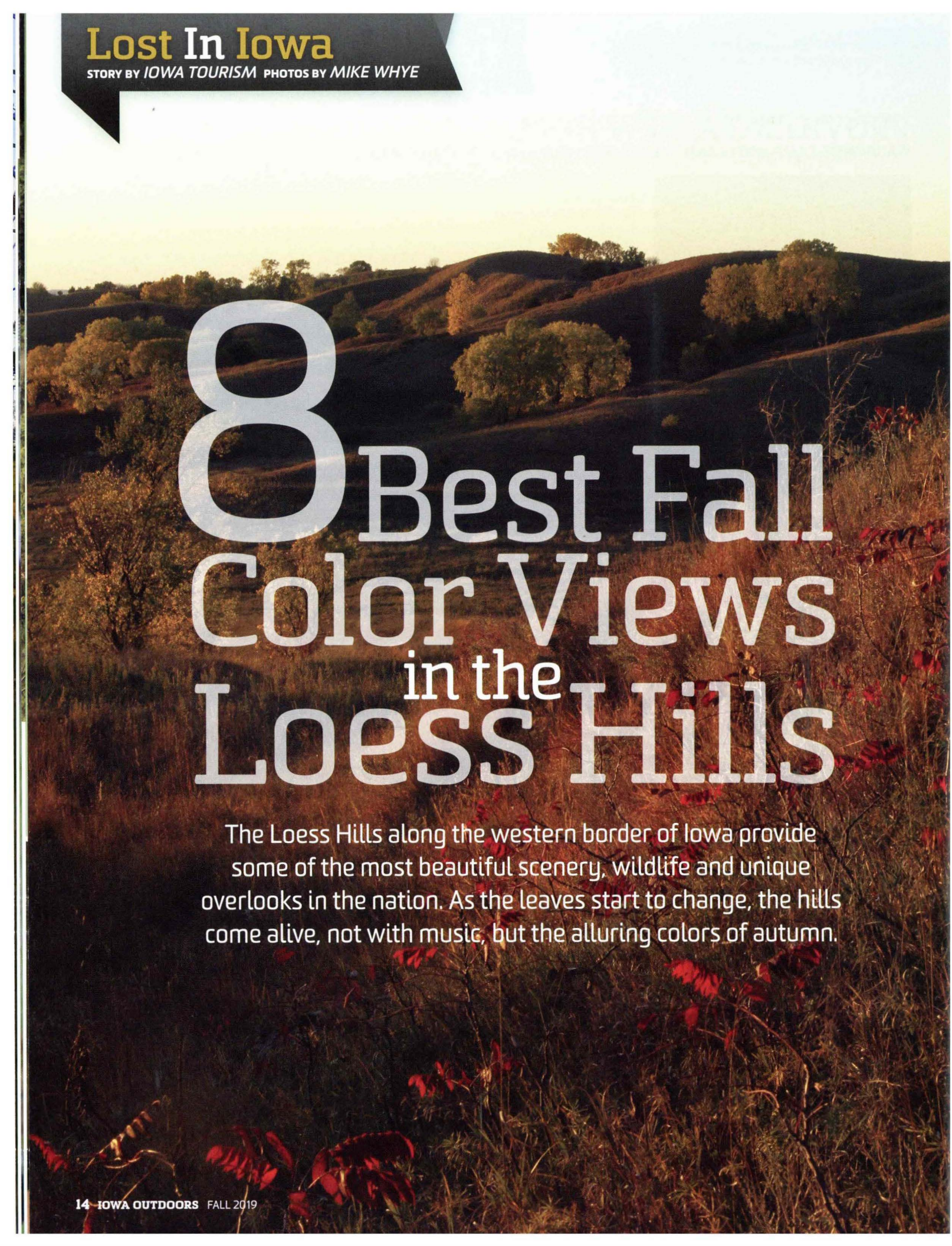
In addition, the Iowa League of Cities named Clinton an All-Star Community, and Craft received an Iowa Stormwater Award for the project. "With Clinton being situated on the banks of the Mississippi, we realize its importance as a natural resource which is vital to our community. We want to do our part to reduce the nutrient pollution from our

drainageways," Craft says. They're not done yet, either. Another sewer separation project a block north of this project will include about 2 acres of permeable pavers.

For more on SRF projects, visit iowasrf.com or contact Lee Wagner at *(515)725-0992, lee.wagner@dnr.iowa.gov*

TOP PHOTO BY MATT MOLES; BRICK PHOTO COURTESY CITY OF CLINTON

STORY BY *IOWA TOURISM* PHOTOS BY *MIKE WHYE*



8 Best Fall Color Views in the Loess Hills

The Loess Hills along the western border of Iowa provide some of the most beautiful scenery, wildlife and unique overlooks in the nation. As the leaves start to change, the hills come alive, not with music, but the alluring colors of autumn.

A winding road leads to the Murray Hill Scenic Overlook in Harrison County. LEFT: Broken Kettle Grasslands sits jusst 15 miles north of Sioux City.

1. Broken Kettle Grassland

View not only miles of brightly colored hills and valleys near Westfield, just north of Sioux City, but take in a vast grassland that is Iowa's largest preserve, largest remaining prairie and home to nearly 200 roaming bison that help play a role in prairie conservation. Protected by the Nature Conservancy—learn more at *nature.org*.

2. Stone State Park

Venture to Woodbury County for views of three states from the Dakota Point and Elk Point overlooks. The 1,069-acre state park is filled with prairie-topped ridges and densely forested valleys. If you don't have time for hiking, drive the Stone Park Loop, a three-mile paved route that twists and turns through the park. *Iowadnr.gov* or *712-255-4698*.

3. Dorothy Pecaut Nature Center

Nestled deep in the trees just south of Stone State Park, Dorothy Pecaut Nature Center features live reptile and fish displays, a butterfly garden and an exhibit of life underneath the prairie. *Woodburyparks.org* or *712-258-0838*.

4. Preparation Canyon State Park

Preparation Canyon State Park near Moorhead in Monona County allows hikers to get out and stretch their legs, or even backpack into the hills to spend a quiet night. The observation deck in the Loess Hills State Forest, just west of Preparation Canyon, provides some of the best views of the hills and is wheelchair accessible. The views in the canyon go on for miles as the tree line reaches high into the western Iowa sky. *Iowadnr.gov* or *712-456-2924*.

Guide to Trees and Color

Ash: Green ash turn yellow, but white ash has a purplish cast. Leaves fall after those of walnut trees, but earlier than oaks and maples.

Elms: Turn various shades of yellow with some turning brown before falling, others fall while yellow.

Hickory: Leaves turn yellow, then brown before falling.

Maple (Soft): The leaves of silver maples turn yellow, but do not turn brown before falling.

Maple (Hard): Brilliant flame red hues are the signature of hard maple leaves. The red pigmentation of some leaves breaks down before falling.

Bur Oak: Buff to yellow colors predominate with leaves remaining on the tree and turning brown before falling.

Oak (Red): Red oaks have brilliant red leaves in fall though the color is not as intense as some hard maples.

Oak (White): Have a subdued purple leaf color. The leaves then turn brown and often stay on the tree until new leaves begin to grow in the spring.

Lost In Iowa

5. Lewis & Clark State Park and Visitors Center

Explore the hills of Monona County just like the famed explorers did when they camped here in 1804. Take in the park visitor center in Onawa, then practice your skills in sailing, oaring and using a towline. You can even set sail on a keelboat, replicated from the ones Lewis and Clark used to sail up the Missouri River. *Iowadnr.gov* or *712-423-2829*.

6. Murray Hill Scenic Overlook

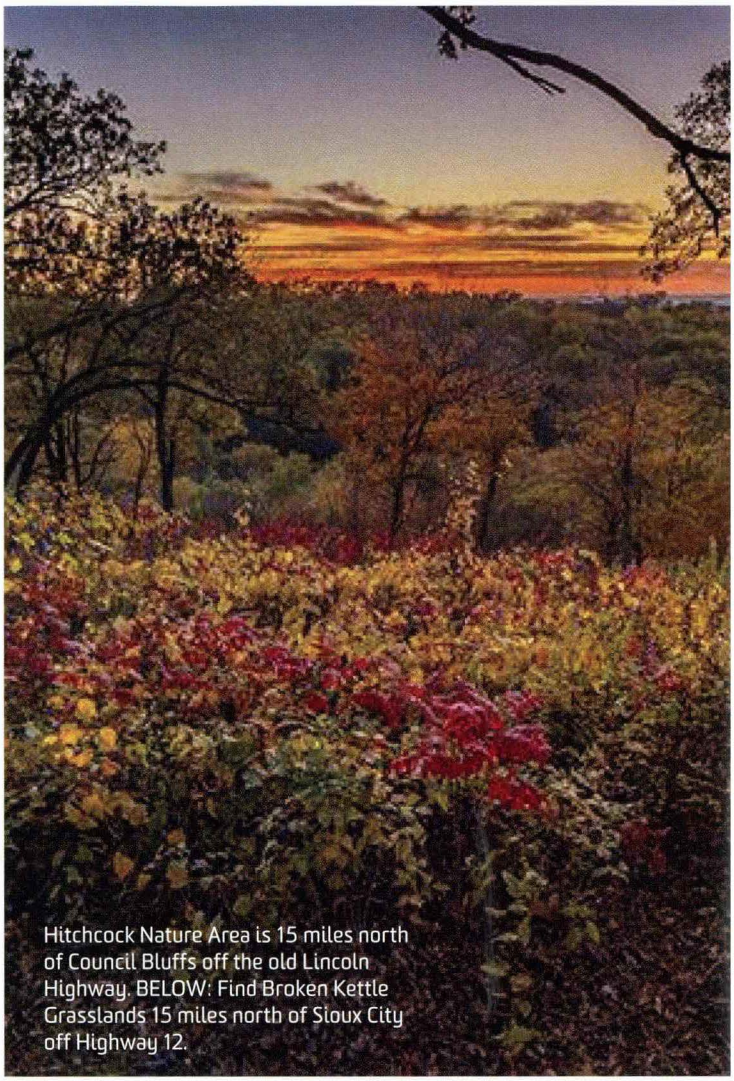
Near the hamlet of Little Sioux, Murray Hill Scenic Overlook in Harrison County is one of the best views in the Loess Hills, but you'll need to hike to get up to it. Interpretive panels help lead trekkers to the lookout, and once you get there, the views are wonderful. See miles and miles of hills and valleys and watch the prairie grass go from summer green to autumn gold. Search *Mycountyparks.com* for Harrison County or call *712-647-2785*. The hill is 2.5 miles northeast of Little Sioux on Easton Trail/F-20.

7. Hitchcock Nature Center

Find the center 15 miles north of Council Bluffs in Pottawattamie County on a 1,300-acre preserve. Get a bird's eye view of the Loess Hills from the 45-foot observation tower with views of colorful trees in every direction. See native prairie and woodland on 13 miles of hiking trails. *Pottcoconservation.com* or *712-545-3283*.

8. Waubonsie State Park

Just outside Hamburg, this area shows off some of Iowa's most beautiful fall colors. If your legs are tired from hiking, try horseback riding the state park trails. Walk or ride up to one of the overlooks and see the true beauty of the Loess Hills in Fremont County. *Iowadnr.gov* or *712-381-2786*.



Hitchcock Nature Area is 15 miles north of Council Bluffs off the old Lincoln Highway. BELOW: Find Broken Kettle Grasslands 15 miles north of Sioux City off Highway 12.

TIPS FOR FINDING COLOR

No matter your destination to view Iowa's fall color, stay up to date as colors sweep across the state at differing times from north to south.

The northern third of Iowa peaks, depending on weather, the weekend closest to Oct. 10. The center third peaks the first to third weeks of October and the southern third peaks the second through fourth weeks of October.

Visit *iowadnr.gov* for fall color updates, to receive email updates or call the DNR fall color hotline at *515-233-4100*. Increase fall color in your area by planting trees this fall. Order high quality, Iowa genetic nursery stock at *iowadnr.gov*.

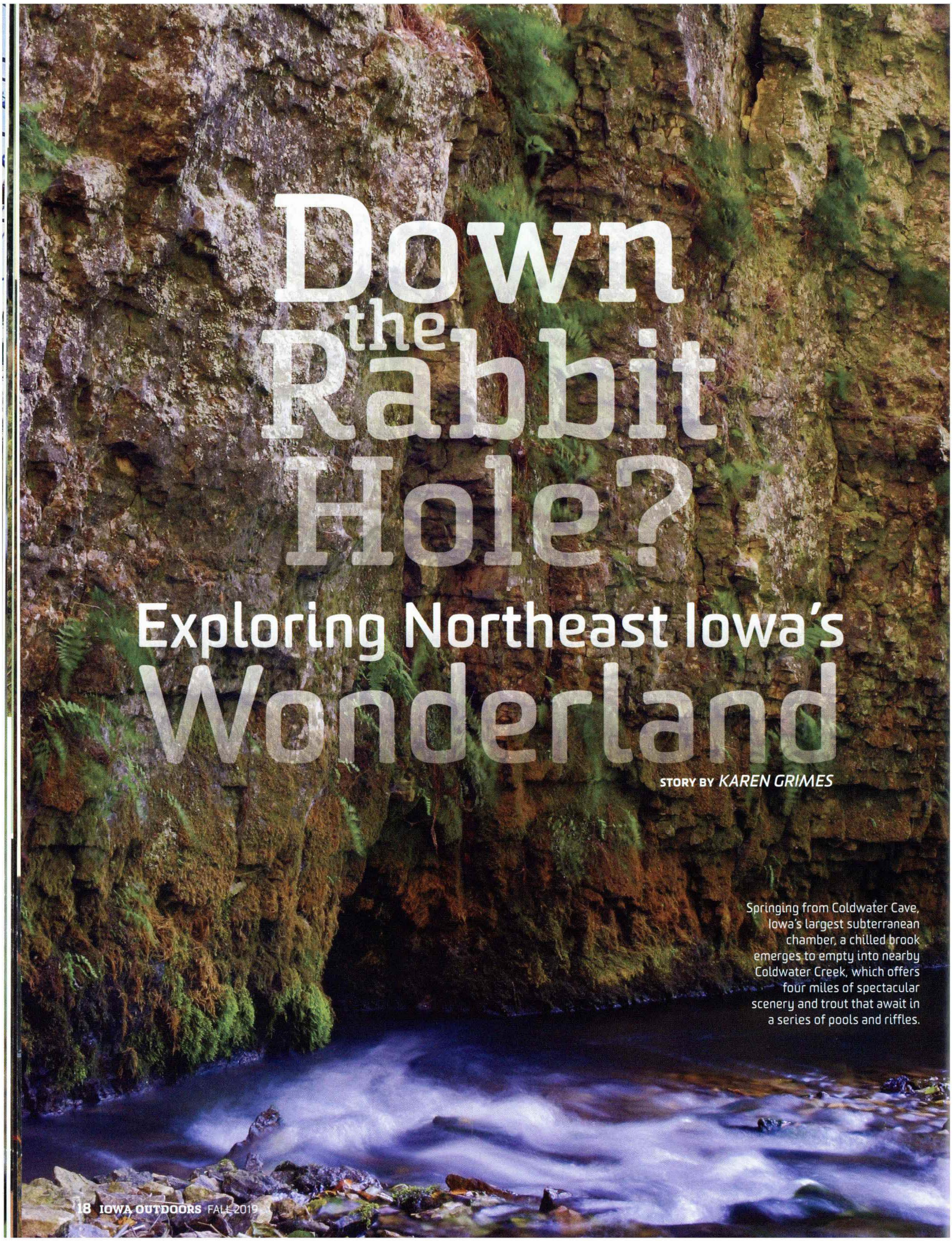
After a hike, the view from atop Murray Hill Scenic Overlook never disappoints. Find the trailhead at 1634 Easton Trail, Little Sioux, IA.

HITCHCOCK PHOTO BY PETER CARBONELL

Down the Rabbit Hole?

Exploring Northeast Iowa's Wonderland

STORY BY *KAREN GRIMES*



Springing from Coldwater Cave, Iowa's largest subterranean chamber, a chilled brook emerges to empty into nearby Coldwater Creek, which offers four miles of spectacular scenery and trout that await in a series of pools and riffles.

"Alice started to her feet, for it flashed across her mind that she had never before seen a rabbit with either a waistcoat-pocket, or a watch to take out of it, and burning with curiosity, she ran across the field ... just in time to see it pop down a large rabbit-hole.

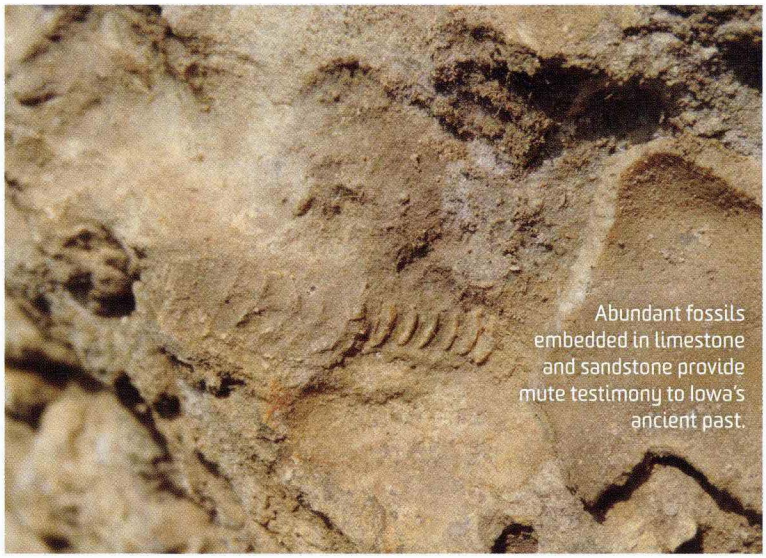
Either the well was very deep, or she fell very slowly, for she had plenty of time as she went down to look about her and to wonder what was going to happen next."

—LEWIS CARROLL,
Alice's Adventures in Wonderland, 1865

When Alice fell down the rabbit hole, she entered a fantasy land full of odd creatures, nonsensical dialogue and strange phenomena.

Northeast Iowa is such a mysterious Wonderland. Hidden away near the Minnesota border and bounded by the Mississippi River, visitors come for its spectacular scenery, trout fishing or the Decorah eagles. Abundant parks, nature centers, trails, campgrounds, museums and streams complete the draw.

The first thing you notice is the roads aren't straight. They wind and curve go up and down steep hills. They follow ridges, dipping into valleys to visit a river town or cross a stream. They wind through not just corn and soybean fields; but oat fields, alfalfa, hay, pasture, forests and dramatic views. It's Iowa's dairyland.



Abundant fossils embedded in limestone and sandstone provide mute testimony to Iowa's ancient past.

It's a unique landscape—dotted with abundant rock outcroppings, high bluffs, deep valleys and unusual geology. It's no accident five of Iowa's 14 Scenic Byways are here.

Floating the Upper Iowa River is a journey through time with glimpses of underground geology that irresistibly draws tourists, campers, trout anglers and scientists.

When DNR geologists and water quality staff tour these hills, their adventure entails delving deep into why northeast Iowa is different.

Those bluffs look solid. Rock steady and durable. But if you take a trip down the rabbit hole, you'll understand it's an illusion. Called karst, the bluffs lining the river are lightly glaciated bedrock layers that make northeast Iowa extraordinary. But they are not solid. They dissolve.

The standard geology tour starts along Chicken Ridge, halfway between Strawberry Point and Elkader. "This is typical karst, fractured limestone or dolomite where slightly acidic rain, snow and ice percolate through cracks in the bedrock, slowly dissolving away the calcium carbonate," says Bob Libra, retired DNR State Geologist who has led many field trips. This is the stuff produced by the calcified remains of trillions of small snails, shellfish and corals, compressed and fossilized under the seas some 415 million years ago.

Look carefully at the bluffs as you tube or kayak the Upper Iowa. Signs of dissolution are obvious. Deep vertical cracks transect the layers. Watch for groundwater seeping through cracks, dripping down the bluff.

"As limestone dissolves, moving water creates larger pathways, following vertical fractures and horizontal

WATER PHOTO BY BRIAN BUTTON

bedding planes, enlarging openings, eventually creating caves and underground streams," he adds. These weird and wonderful features include caves, coldwater springs, seeps, ice caves, sinkholes and endangered plant and animal holdovers from the Ice Ages.

A seep may someday become a spring, with cold water tumbling from the rock. Malanaphy Springs is a spectacular example north of Decorah—where chilly groundwater flows from rock and cascades down a rock-strewn hillside into the Upper Iowa. Or, visit the 200-foot waterfall at Dunning's Spring Park just off Ice Cave Road in Decorah. And, yes, stop in at the Ice Cave—just bring a flashlight and shoes with traction.

Some call karst "Swiss cheese," because underneath charming towns and picturesque landscape lie unexpected voids—or caves. Created as bedrock slowly dissolves, Coldwater Cave, the largest cave system in the state, meanders for miles northwest of Decorah. A chilly brook emerges from it to reach Coldwater Stream, a trout stream. To delve into karst, visit the commercially-run underground boat tours at Spook Cave in Clayton County. Be sure to bring a sweater. Another cold water trout stream, Bloody Run, flows from it.

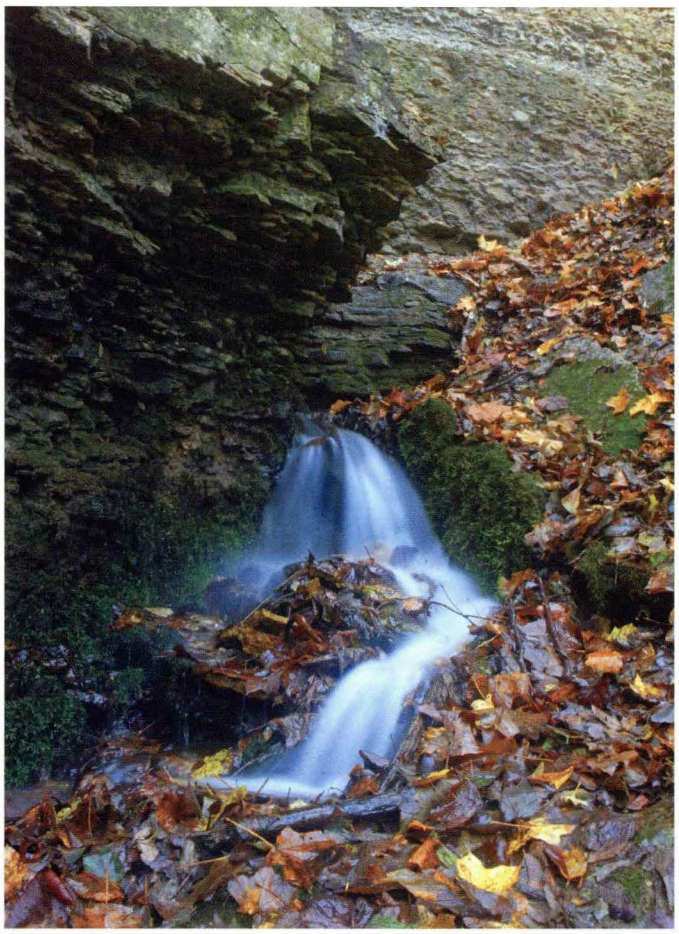
Occasionally, the roof of a cave suddenly collapses creating a sinkhole and a direct path for runoff to the groundwater underneath. Tales abound of farmers losing equipment down newly developed sinkholes. At last count, some 33,729 sinkholes have been mapped in Iowa. Most are in southwest Allamakee County, south Clayton County and near the Cedar River in Floyd and Mitchell counties.

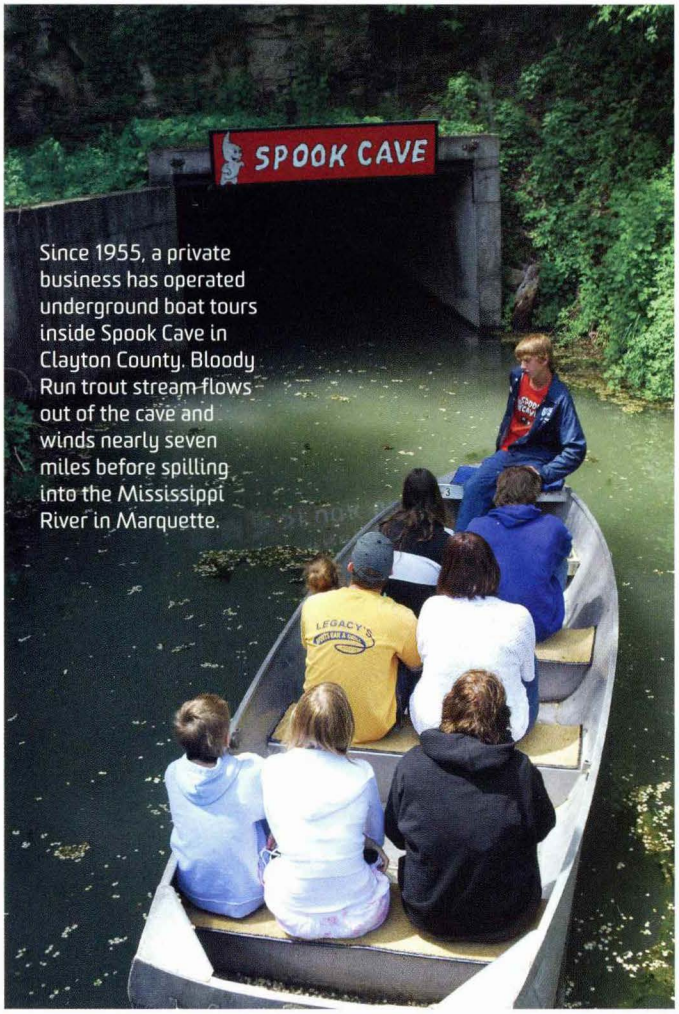
If you visit a quarry, you are stepping into the middle of karst. Most of Iowa is capped with heavy deposits of sand, gravel, rocks and wind-borne loess—left by retreating glaciers, often hundreds of feet thick. Touched by only one of four major glaciations—and hundreds of millions of years ago versus glaciers 12,000 years ago that flattened central Iowa—northeast Iowa is called the Driftless Area. Here only 5 or 6 feet of soil cap the limestone—leaving ancient bedrock layers lightly covered or exposed on the surface.

With shallow soils, sinkholes and abundant springs, nowhere else in Iowa is the interconnection between streams and groundwater so apparent.

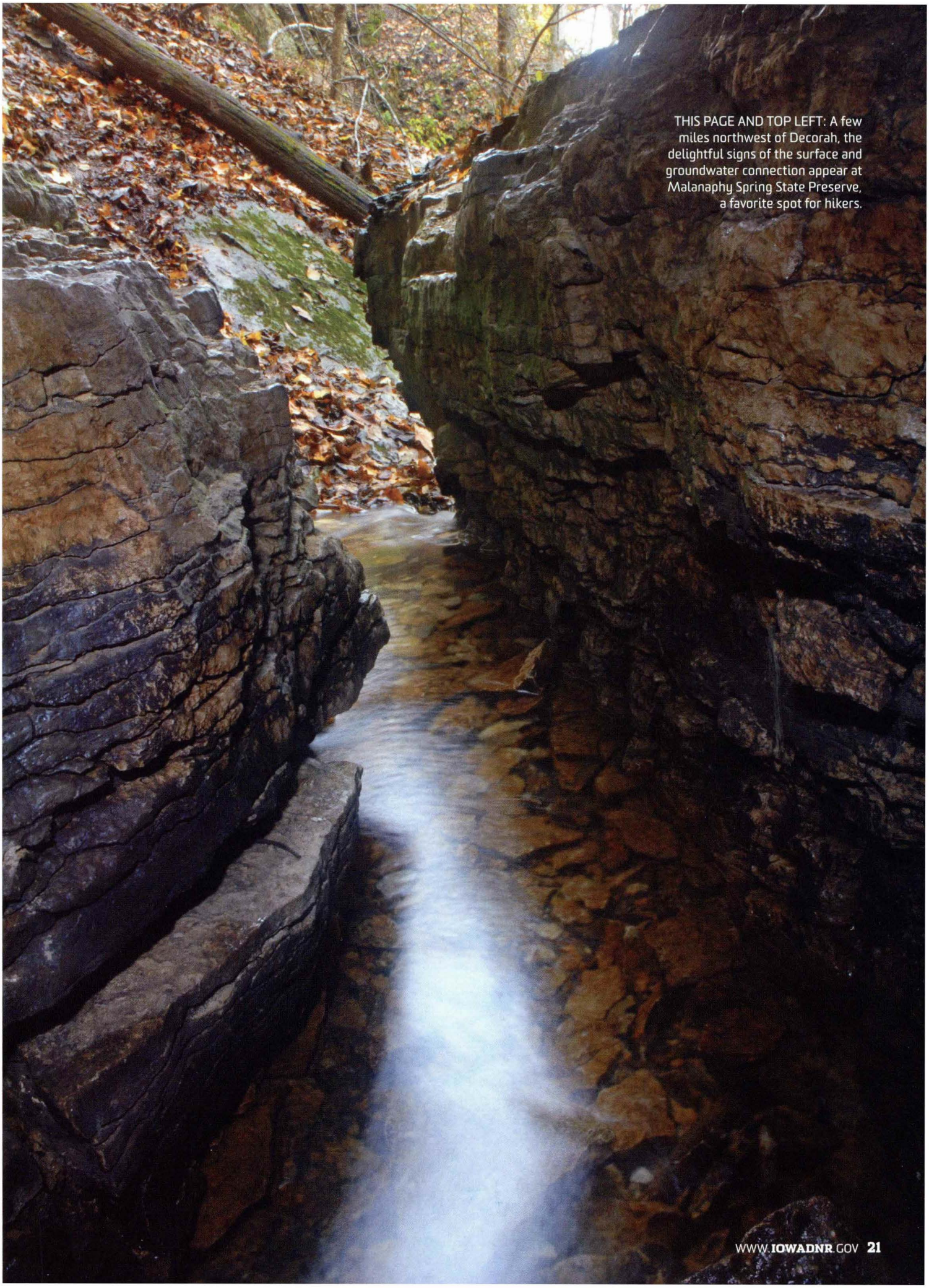
So what is groundwater? It's water that fills underground spaces between particles of sediment (soil, sand and gravel) and cracks in rock. Think about pores in a sponge. When a sponge is saturated, that's akin to groundwater. Gravity causes it to move downward, but it can hit a confining layer, maybe shale, to move laterally and emerge as a spring.

While the Upper Iowa is known for great smallmouth bass fishing, many a trout stream flows into it. Straddling the Howard-Winneshiek County line, Bigalk Creek is the first trout stream you encounter on an Upper Iowa canoe trip. Spring-fed, with well-oxygenated cold water, it's just what trout need. It's also an opportunity to fill your creel with 10- to 12-inch brook and rainbow trout, stocked weekly.





Since 1955, a private business has operated underground boat tours inside Spook Cave in Clayton County. Bloody Run trout stream flows out of the cave and winds nearly seven miles before spilling into the Mississippi River in Marquette.



THIS PAGE AND TOP LEFT: A few miles northwest of Decorah, the delightful signs of the surface and groundwater connection appear at Malanaphy Spring State Preserve, a favorite spot for hikers.

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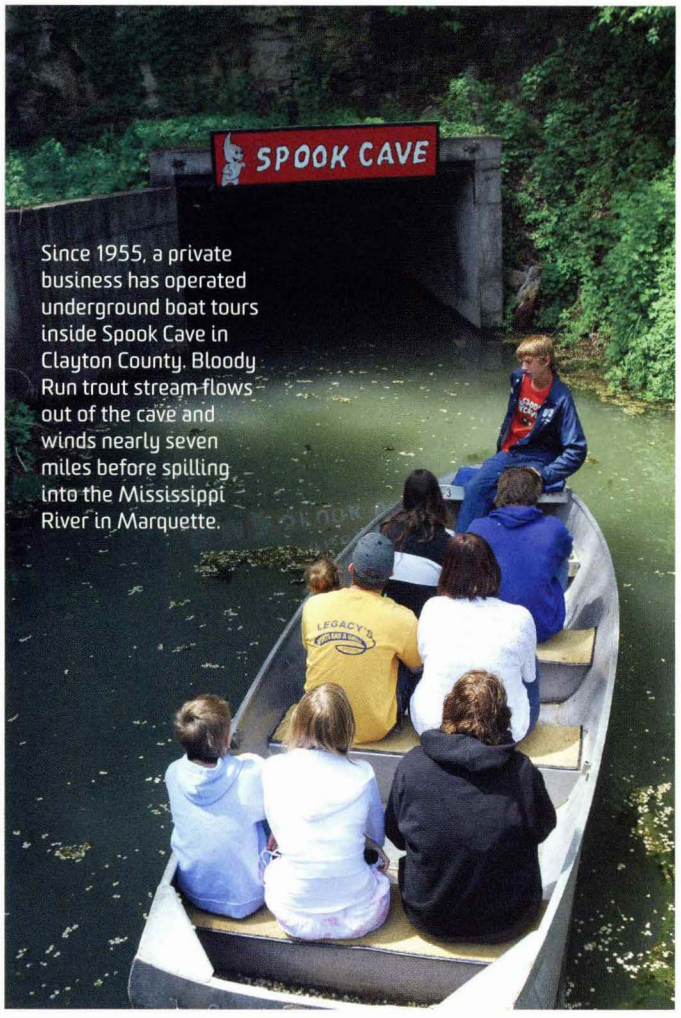

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Why do trout fare well in northeast Iowa? While soil temperatures vary throughout the year, temperatures deep underground remain constant at roughly 45 to 50 degrees. As water percolates down through bedrock, it cools naturally.

And, therein, lies the secret of trout streams. As it springs from its underground refrigerator, chilled water enters small streams. Thus, trout streams maintain a constant 50 to 55 degrees—whether it's a 100-degree day or the midst of winter. Voila. Welcome to winter stream fishing, while the rest of Iowa waters are encased in ice.

The same process creates ice caves and a rare phenomenon called algific talus slopes. Algific (cold-producing) plus talus (a collection of broken rock that has fallen down a slope).

In summer, air is pulled down into bedrock and chills underground. This cold air exits karst through cracks and cave openings. When it escapes at the base of a cooler, north-facing bluff, it creates an ideal microclimate for rare plants and animals. Bixby State Preserve, Malanaphy Springs and many other locations are home to plants—including ferns, mosses, liverworts, Canada yew and balsam fir—more likely to be found in upper Minnesota or Canada. Once known only from fossils and thought extinct, the tiny endangered Iowa Pleistocene snail was discovered on such a slope in 1955.

Congress created the 1,190-acre Driftless Area National Wildlife Refuge in 1989 to protect these rare communities. Don't expect to visit it, however. It's an array of widely scattered parcels, many amidst private lands, leaving it—by intention—the least visited refuge in the lower 48 states.

You can visit Bluffton Fir Stand State Preserve, a 94-acre site on the south side of the Upper Iowa River, to see the largest stand of balsam firs in Iowa, growing on algific talus slopes. Canada yew and Canada mayflower, along with more than 340 native plants are also found here.

While these plants and animals are rare, even odder happenings occur in northeast Iowa: losing and gaining streams. This is truly Wonderland, where streams flow quietly along their beds, then—like the white rabbit in Alice in Wonderland—in dry years, they suddenly disappear beneath the surface only to reappear somewhere else. The explanation is simple, sort of. There's a sinkhole in the bed of the stream where water falls into Wonderland to enter groundwater or magically reappear in neighboring valleys miles away in a spring.

Perhaps the oddest part is that they don't always disappear and reappear in the same place. Depending upon

Bixby State Preserve in Clayton county is known for its ice cave, cold air seeps, algific talus slopes and may contain the highest diversity of plants of any Iowa woodland, with over 380 native species.

Sinkholes dot the Clayton County landscape, indicating fractured limestone and resulting groundwater flow. The karst region of northeast Iowa is highly vulnerable to water pollutants which enter sinkholes to move rapidly underground, entering shallow aquifers.

SINKHOLE PHOTO BY GARY HIGHTSHOE, IOWA STATE UNIVERSITY; BIXBY PHOTO BY BRIAN BUTTON

the year and rainfall, underground flows change. While it's easy to define watershed boundaries above ground—just look for the highest ridges—it's more difficult underground, especially when subterranean flows change depending upon rainfall. That erratic underground behavior makes it difficult to predict where water will resurface.

To further complicate challenges, close ties between surface and groundwater leaves water here more vulnerable to pollution. The intimate connection that yields abundant springs, seeps and clear, coldwater streams also creates exceptional challenges to protecting water quality in the 10-county region. Water can flow miles underground in just a few days. Runoff, chemical spills, manure and sediment entering fractured bedrock or a sinkhole may rematerialize in a spring miles away. Or a spill into a losing river with its hidden sinkhole to reappear in a different watershed.

Fractured bedrock, permeable limestone and sinkholes directly and quickly affect groundwater quality underneath. A major pollutant is sediment. If you visit a state trout hatchery after a heavy rain, you'll see springs running brown as chocolate milk with sediment—illustrating how quickly rainfall permeates bedrock and emerges from springs. Sediment has been a problem throughout 144 years of trout stocking efforts.

In the 1930s Iowa's trout stocking policy changed—"to stock only streams with water temperature and water quality sufficient to sustain trout year-round," according to DNR's Trout Management Plan.

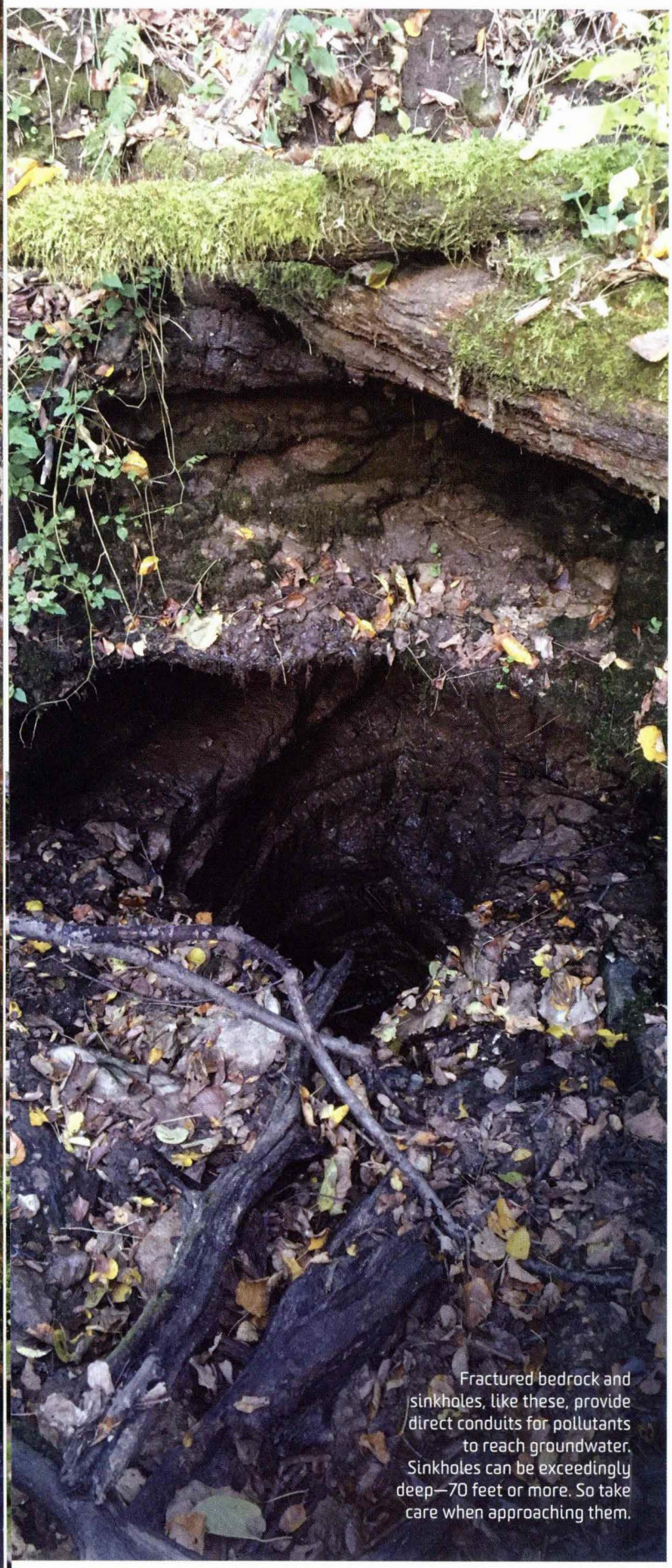
In the mid-1900s, Daryl Landsgaard, who no-tills the family farm near Big Springs Hatchery, watched ag practices change from many small livestock, pasture and mixed grain farms to more intensive corn and soybean row cropping. He remembers growing up with a dairy farm on every 160 acres. "Now, a whole 160-acre farm is one field."

When small dairy farms dotted the hills, a mix of crops and grasslands helped combat soil erosion. But other problems existed. "I don't have any sinkholes on my farm, but I remember when I was a kid in the '60s, people used to put all kinds of things down sinkholes—herbicide containers, waste oil, trash," Landsgaard said. "I think people were naïve. Like me, they couldn't see the link between water going in and the water coming out.

"People quit doing that years ago—about the time of the environmental movement in the '70s when the Clean Water Act passed," he adds.

Still, poor water quality "...due to extensive soil erosion" limited natural reproduction of trout, during the '50s to the '80s. "Wild populations were rare just 25 years ago despite extensive fingerling and adult trout stocking for more than 100 years," report DNR fisheries managers.

By the mid-1970s, Iowa's Geological Survey began to hear concerns about nitrate concentrations here in aquifers—natural underground water storehouses. While state efforts to investigate Iowa's geology began in 1892, nitrate concerns led to one of the most intensive water quality monitoring efforts conducted in karst topography probably in the nation,



Fractured bedrock and sinkholes, like these, provide direct conduits for pollutants to reach groundwater. Sinkholes can be exceedingly deep—70 feet or more. So take care when approaching them.

according to Libra. And Iowa's landmark Groundwater Protection Act in 1987.

In the 1950s and '60s, nitrate levels at the Big Spring Hatchery averaged 2.7 milligrams per liter. By the mid-1980s they were around 9. That threefold increase led to intensive monitoring in the Big Springs watershed. Eventually it led to ag demonstration projects to inform landowners how to protect water quality. Many farmers in the watershed reduced fertilizer rates while generally increasing yields. However as land uses changed, acres receiving fertilizer increased significantly. In response, nitrate levels bounced up to 12 mg/L, the average for the last three decades.

Concerted efforts by landowners, state agencies and non-profits like Trout Unlimited and Hawkeye Fly Fishing Association reduced sediment. Landowners put in buffer strips, reduced streambank erosion, fenced livestock from streams and developed habitat to keep streams cleaner. No-till farming and cover crops increased, but more needs to be done.

DNR trout managers concentrated on installing in-stream habitat improvements from 2002 to 2009, working to stabilize banks to reduce erosion, add bank hides, boulders and other habitat structures along nearly 13 miles of trout streams. Clearer water provides a sandy or gravelly substrate for spawning, and good views of insects that trout eat.

As such, trout have made an amazing comeback. Despite more than 100 years of stocking, by 1980, only six streams supported naturally reproducing trout. Today, trout spawn in 75 streams, and more than 50 streams have self-sustaining wild populations with no need for stocking. Why? Cleaner water and better in-stream habitat, plus improved wild-trout genetics, says Mike Steuck, DNR fisheries supervisor in Decorah.

When trout thrive, fishing improves, drawing thousands of anglers. In 2016, licensed trout anglers fished an estimated 489,455 days, making 720,611 trips. And that helps

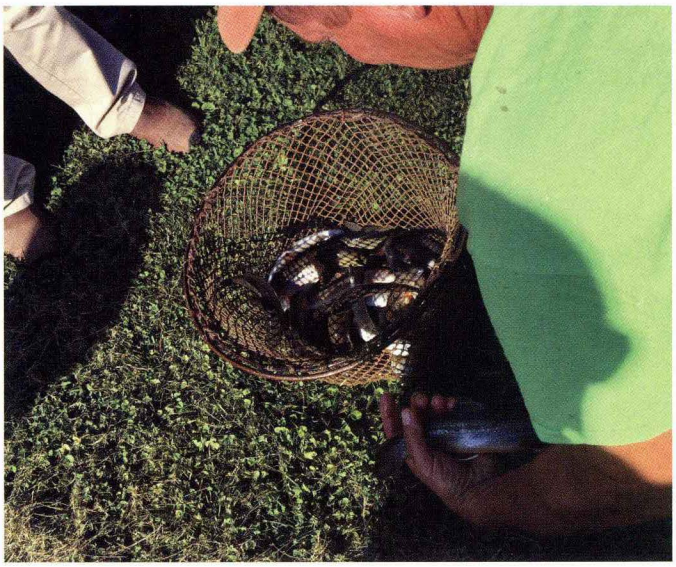
Visit one of Iowa's three trout hatcheries to feed young trout and learn how DNR fisheries experts raise catchable-size fish. Better yet, explore hundreds of miles of coldwater trout streams, perhaps to catch a brown, rainbow or brook trout on your travels. Learn more at *iowadnr.gov*.

local business flourish with anglers spending about $46 per trip—$33 million-plus for small town Iowa, just to trout fish.

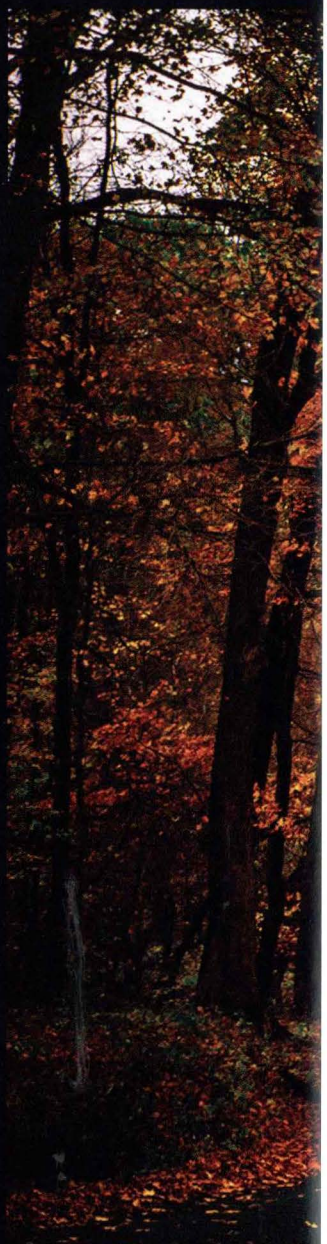
Geology tours nearly always culminate at Big Spring Fish Hatchery upstream from Elkader, where Iowa's largest coldwater spring supplies water to about 150,000 trout raised from 2- to 3-inches to a catchable 10- to 12-inches. Here the link between surface, karst, losing streams and sinkholes is apparent as 20,000 to 30,000 gallons of water gush from the ground. Every minute. Much of it pours to the adjacent Turkey River. Some flows into runs filled with hungry young trout. The Big Spring, river, trout pond, a kids' fishing pond and chances to feed trout in the runways are part of the attraction. Anglers require a license with a trout privilege.

After a heavy rain, the flow may surge to 150,000 gallons per minute, changing from clear to chocolate from surface erosion perhaps miles away. Despite concerted soil conservation efforts, heavy rains still fill the raceways with mud.

Geologists' studies give us a glimpse of the world beneath the surface, an appreciation of geologic time and some understanding of the surface to subterranean connections. "It's a huge interconnected system with sinkholes providing an open conduit to groundwater," Libra says.



Alice found Wonderland chaotic, beautiful and a little frightening. Today's scientists are challenged to understand the complexities and unpredictable nature of karst—as sinkholes and streams appear unexpectedly, then disappear and reappear. Welcome to the adventure of Wonderland.



A Photographer's Eye for Palisades-Kepler State Park

For this photographer, sometimes even fall color deserves a black and white photo

STORY AND PHOTOS BY *DAVID F. GLANDON*

For many years, my wife and I spent late summer camping in Palisades-Kepler State Park adjacent the Cedar River in Linn County. It has been the highlight of my stay to explore the variety of trails that wind through the woods. I felt I had a good sense of what to expect when it came to the fall season. I had sections of the park plotted out in my mind where the most color would be and the places to avoid. But that all changed once the autumn progressed.

As a photographer, the images I create are predominately black and white, but once the fall colors arrived, so did the colors in my photography. Each fall I go out to wherever the colors seem best and start creating images. This worked for a while because color was the subject. However, in the fall of 2017, things were going to be different. For me, focusing on the idea of making the place the subject of the image, rather than the color, was more important. We can all appreciate fall colors around us, but it's the places we know very well where the reds, oranges and yellows have the greatest emotional effects on us.

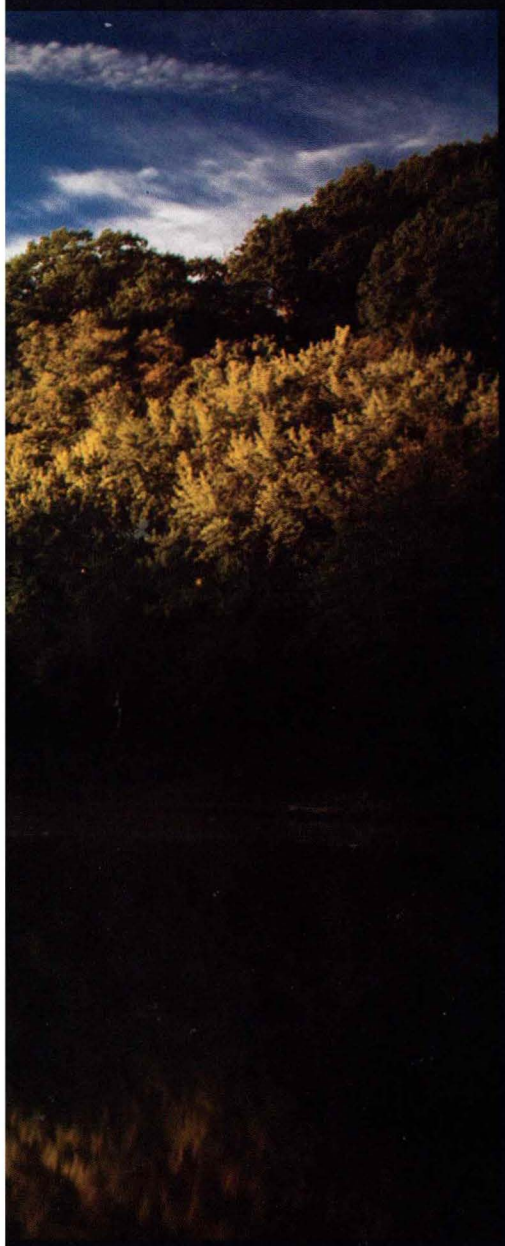
I believe that to create great images you need to know the subject well. Starting in mid- to late-September would give me that chance to see the park evolving through the color and light as the season progressed. I started simply by

heading out about an hour before sunrise to watch light fill the park. I wanted to get an idea of when the light was best and where it fell in the early part of the morning. When I wasn't watching light, I was walking park trails looking for photographic possibilities that aren't well known.

On one such exploratory walk along the exposed banks of the Cedar River, I came across a tree that had bent and curled in such a way that it resembled a rolling wave. The bare branches formed the scaffolding for the rushing flow of leaves atop, washing over the structure, and falling back into the grass. Looking at the grass surrounding this wave frozen in motion, one could see the grass as the white capped water feeding back into the wave. When I saw this natural sculpture of something that would never appear anywhere but the ocean, I had to capture it and bring out what I saw in a photograph. Although I was trying to capture my subject in color, this was one case where black and white was the better choice.

The Cedar River not only runs along the border of the park, but is the centerpiece that draws people to play on its beaches and walk its trails. This year found the river to be running low, opening the shores to push closer to the tall bluffs, thus giving me opportunities to create images of reflections of the landscape on the opposite side. One such image I created was the treeline, bathed in morning sunlight, dotted with trees in the beginnings of fall color, framed with the reflection of the wispy cloud blue sky on a still river. I believe if you look at this image long enough you will be able to hear the Canada geese trumpeting overhead, echoing off the walls of the limestone bluff.

Driving into the park, you get the feeling that you are moving through the forest. The black asphalt road is lined with trees that shade and provide a sense of expectations of the adventures to be had that day. In the fall, the trees become towers of blazing colors of red, yellow and orange lit by the sun as it moves across the sky. This display of



AN AREA WITH RICH HISTORY

Across the river from Palisades-Kepler State Park is Palisades-Dows State Preserve, a 330-acre rugged forested area with cliffs above the Cedar River. In 1869, James Sherman Minott, a Civil War veteran, found an 8 x 8 foot cave in Blow Out Hollow, where he created a small place to live. It later became known as Minott's Cave.

In the late 1890s, he acquired 160 acres of timberland across the Cedar River and built a spacious inn for visitors in the present day park. He also established a boat rental and sold lots for the building of summer cottages. His great knowledge of local plants and animals helped foster tourism. Afternoon outings on the Cedar River, capped by a quiet dinner at the combined log cabin restaurant, general store and hotel, were common in the early 1900s. Noted poet Carl Sandburg was a yearly visitor to the "Palisades" during the 1920s and 1930s.

In 1922, Palisades-Kepler State Park was established. Much of Minott's original land was acquired and the State Board of Conservation took special notice of the unique bold cliffs and proclaimed "these palisades lining the Cedar River are quite special." In 1928, the Board of Conservation accepted the gift of property from the estate of Louis H. Kepler, doubling the size of the park. Since that time, almost 700 acres have been added.

A PLACE INHABITED FOR MILLENNIA

Since prehistoric times, Native Americans lived in the area. Across the river from the park in Palisades-Dows State Preserve, some of the largest ravines are among the best Woodland period sites in Iowa (800 BC to the year 1250).

In 1941, several workers, building a cottage near Blow Out Hollow, found prehistoric artifacts. Dr. Charles Keyes (1871-1951), a well-known Cornell College and Harvard-educated archaeologist from nearby Mount Vernon, began exploring the area and found other rock shelters. Many sites in these shelters date from the Early to Late Woodland periods.

PALISADES-KEPLER STATE PARK

Palisades-Kepler State Park lies along the beautiful Cedar River in Linn County just 12 miles east of Cedar Rapids and Marion. The 840-acre park has dramatic river bluffs, deep ravines, majestic hardwood trees, a large variety of wildflowers and an abundance of wildlife. Palisades-Kepler State Park is also important for its prehistoric past. A molar tooth of a mammoth found here and the exposed rocks along the Cedar River are laden with fossils of millions of years of history. The presence of 1,000-year-old mounds shows this was a favorite haunt of Native Americans hundreds of years ago. More recently, the park was established in 1922. In July 1934, a Civilian Conservation Corps company was established at Palisades-Kepler. Three barracks and a mess hall were built; then, work started on the building of many park facilities. The roads, hiking trails, entry portals, lodge and other timber and stone structures remain to give the park much of its rustic character. The CCC camp of 200 young men closed in 1941 after the start of World War II.

deciduous plant life metamorphosing from a monochromic green to a trichromatic siren's call, draws in not only the land and portraits, but outdoor enthusiasts alike.

Palisades-Kepler State Park is also important for its prehistoric past. A molar tooth of a mammoth found here and the exposed rocks along the Cedar River are laden with fossils of millions of years of history. The presence of mounds shows this was a favorite haunt of Native Americans over 1,000 years ago. More recently, the park was established in 1922. In July 1934, a Civilian Conservation Corps company was established at Palisades-Kepler. Three barracks and a mess hall were built; then, work started on the building of many park facilities. The roads, hiking trails, entry portals, lodge and other timber and stone structures remain to give the park much of its rustic character. The CCC camp of 200 young men closed in 1941 after the start of World War II.

A CAMPING AND CABIN OASIS

The fully modern campground and four family cabins at Palisades-Kepler make a fine place for a weekend outing or a longer vacation. One fourth of the 26 campsites are available on a first-come, first-served basis. Reservations can be made for this park and others in the state park system online at iowastateparks.reserveamerica.com or *1-877-427-2757*. Palisades-Kepler State Park, 700 Kepler Drive, Mount Vernon, IA 52314. *319-895-6039 Palisades_Kepler@dnr.iowa.gov*

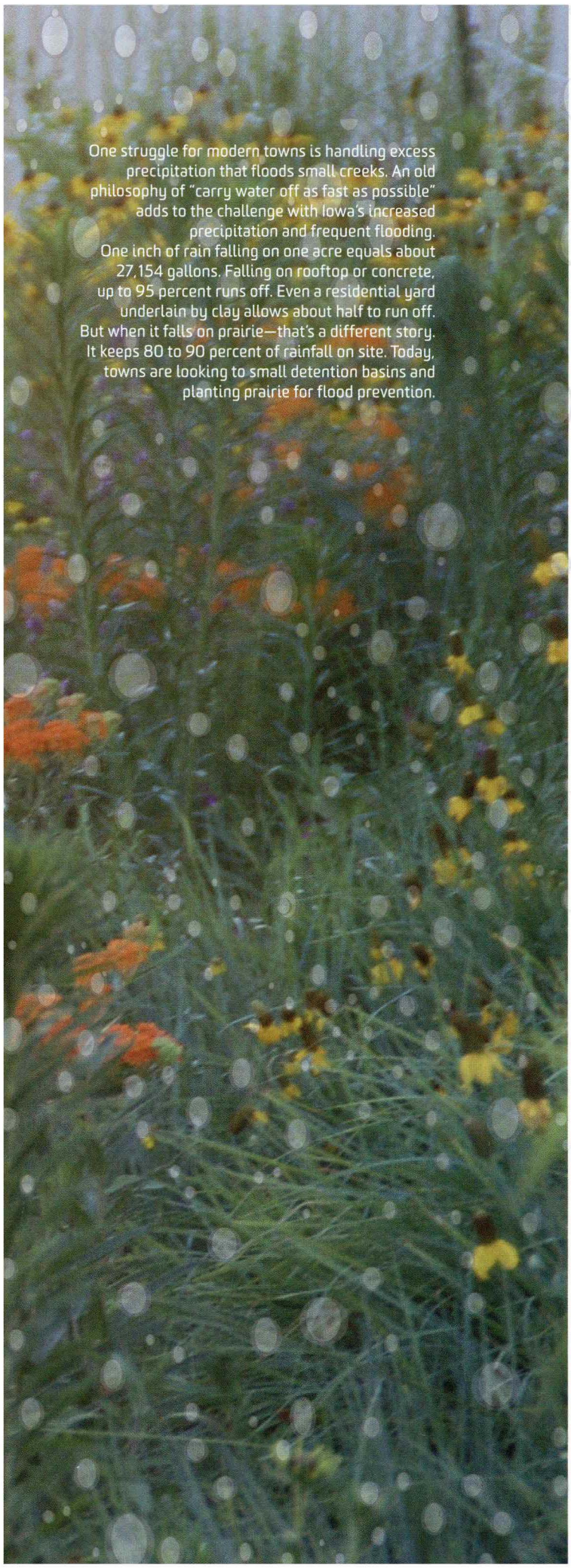
Some Things Come FULL CIRCLE

STORY AND PHOTOS BY *KAREN GRIMES*

Some areas are adding splendid prairie not only for beauty, but to help reduce flooding impacts, absorb runoff and for the ease of maintenance these hardy plants offer versus lawns.

"The sun, moving as it does ... and by its agency the finest and sweetest water is every day carried up and is dissolved into vapour and rises to the upper region, where it is condensed again by the cold and so returns to the earth. This ... is the regular course of nature."

—Aristotle in Meteorology, 350 B.C.



One struggle for modern towns is handling excess precipitation that floods small creeks. An old philosophy of "carry water off as fast as possible" adds to the challenge with Iowa's increased precipitation and frequent flooding. One inch of rain falling on one acre equals about 27,154 gallons. Falling on rooftop or concrete, up to 95 percent runs off. Even a residential yard underlain by clay allows about half to run off. But when it falls on prairie—that's a different story. It keeps 80 to 90 percent of rainfall on site. Today, towns are looking to small detention basins and planting prairie for flood prevention.

From frost-kissed leaves to dazzling hues through morning mists, the searing yellows of late season sunflowers shining in the evening haze. That's prairie. The heady scents of mint and licorice and fresh-mown meadow waft up into an exotic spicy mix. The scream of a hawk or whoo-whoo call of a mourning dove, buzz of bees and hum of insects interspersed with viewers' admiring sighs. That's prairie.

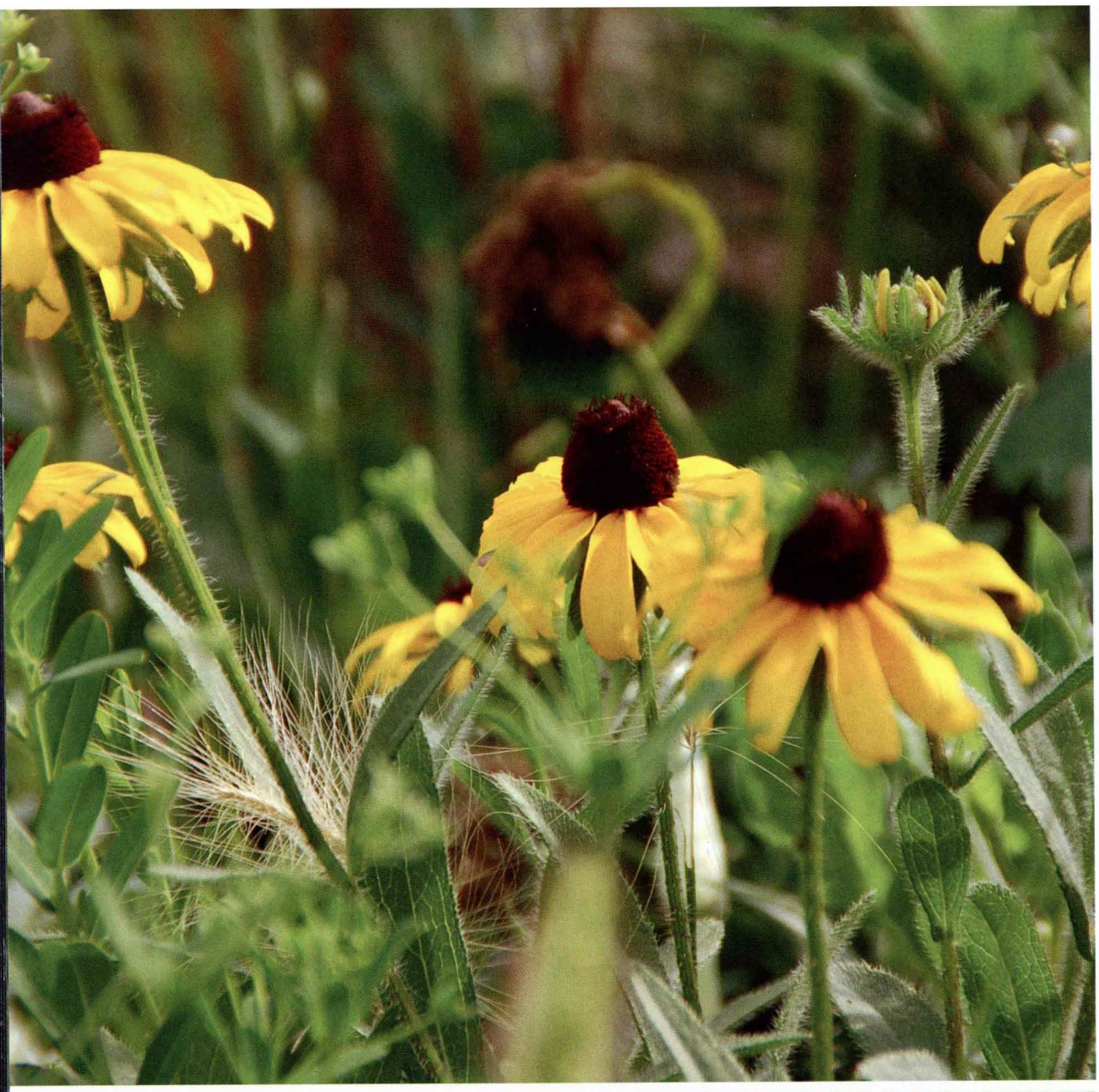
A year-long euphony of sounds greets working folks, hikers and bikers who traverse the bike trail by Hickman Road along North Walnut Creek in Windsor Heights, a suburb of Des Moines. Winter winds whine through dead forbs, bending tattered seed heads to the ground. By February, the reverberating honk of Canada geese descends as these large aviators course north. Ground hogs emerge from winter dens. The quack of mallards joins the Canada pair who like to nest on the rooftop of this commercial building. By April indigo buntings add flashes of brilliant blue and a two-toned chirp to the song. In July, the American goldfinch's husky "po-ta-to chip" call and up-and-down flight dominate the prairie.

And when it rains the rumbling gush of thousands of gallons of water thunders off the 2-acre roof, storms through downspouts and spews onto the prairie.

It hasn't always been this way. For many years, only the hum of lawnmowers broke the quiet. Turf surrounded the building and parking lot—blue grass needing periodic re-establishment after the creek flooded. Rainfall ran across the grass into the creek.

What drives prairie establishment on a commercial property? Commercial value. Jack Sullivan, building manager and co-owner of BP Real Estate, saw a profusion of prairie blooms in his Johnston subdivision, Green Meadows West. Impressed by its beauty, he was intrigued by reduced maintenance—native plants don't have to be mowed weekly, irrigated, sprayed for pests and weeds, fertilized and constantly babied. And the right plants will survive flooding from the adjacent creek.

Prairie plants give back to nature. They grow, die and decay to nurture the soil—which over thousands of years, created the nutrient-rich foundation for Iowa's agriculture. Unlike turf, native plants resist disease, tolerate drought, self-seed and thrive on neglect—at least after establishment. Their deep roots—some 12 to 15 feet long compared with bluegrass' puny 3 to 4 inches—penetrate the soil, hold it in place and help water infiltrate.



A bee visits purple penstemon (*Penstemon grandiflorus*). Pollinators are increasingly at risk. Pests, diseases, pesticide use and declining habitat contribute to their loss. Just as native plants are better adapted to local areas, many native pollinators depend upon specific native plants.

An Iowa woodland native plant, the beautiful Eastern red columbine (*Aquilegia canadensis*) is well known for its showy flowers and does well in part shade as well as open areas. Only long-tongued insects and ruby-throated hummigbirds can reach the nectar hidden inside the flowers, which appear in spring and early summer. The plant is host to the columbine duskywing butterfly—its larvae only feed on columbine.

Take Water

Infiltration is a plus when trying to meet Windsor Heights' goals to reduce flash floods and resulting damage—another reason Sullivan planted prairie along North Walnut Creek. The city's aim: restore healthy soils and reduce surface runoff by 50 percent during small storms. Sullivan's 1.8-acre scrap of a prairie slows runoff and helps the soil absorb water from roughly 7 acres of impermeable surface (5 acres of parking lot and 2 acres of rooftop).

Conventional wisdom said, "Get water off land, houses, streets and parking lots as quickly as possible." So roofs route rainfall to downspouts and—on commercial property—often underground through pipes into the nearest stream.

But just as water changes from clouds to rain, our thoughts on storm water change. Quickly routing rainfall to streams is a huge problem, becoming more evident with Iowa's trend of increased precipitation.

One inch of rain falling on one acre equals about 27,154 gallons and weighs about 113 tons. Falling on rooftop or concrete, up to 95 percent runs off. Even a residential yard underlain by clay allows about half to run off, says Joe Griffin, lead for DNR's storm water program.

Ahhh, but when it falls on prairie—that's a different story. It keeps 80 to 90 percent of rainfall on site.

When cities channel rainfall into streams, peak flows are higher and occur faster. Unfortunately, residents and businesses pay the price. The shallow neighborhood creek you could step across is suddenly an 8-foot high raging torrent. On July 1, 2018, severe storms dumped 5 to 9 inches of rain on the Des Moines metro. Numerous creeks overflowed, closed major intersections and flooded homes and businesses without mercy—leaving motorists stranded and cars ruined. A drowning death occurred.

Where does floodwater come from? In this 9,000-acre watershed, look upstream to mostly built-up urban areas with about 46 percent of the land highly developed. Another 42 percent lies in semi-absorbent crop fields. The most absorbent land (grassland, timber and hay) makes up only about 9 percent of the watershed.

"The whole prairie was under water with fast running current," from the creek Sullivan says. "All the deer were up high by the west side of the building. Does and bucks. They'd start down into the water, then feel the current and turn around and come back."

Except for most of the west parking lot, "all rainfall coming off the building and parking lots goes into the prairie and basins," Sullivan says. "We have different types of plant materials that really wick up water."

In the old days, bluegrass would need replanting after a flood. "The prairie did very well during the record flooding on Walnut Creek," Sullivan says. "Prairie plants laid down and bounced right back up." Silt deposited on the prairie might leave a few weed seeds, but won't hurt it.

Today engineers and hydrologists look for a better way—often trying to mimic how nature handles storm water. From Houston, Tex., recovering from Hurricane Harvey, to communities like Windsor Heights, planners are looking to native vegetation and wetlands as preventive strategies to protect urban areas.

Take People

For an existing commercial building in an established

Prairies are the great soil-building machines, recycling their annual biomass into water-absorbing fertile earth. But they require periodic disturbance from fire—nature's method of keeping trees from taking hold.

suburb, replacing lawn with prairie is a reasonable solution. Beauty and reduced maintenance costs are a bonus. For Sullivan, adding two small storm water detention basins (think dry ponds) mimics pre-settlement days when tall grass prairie and potholes dominated. Deep roots and year-round heavy vegetation work hard to hold roof and parking lot runoff and let it soak in.

Establishing prairie takes expertise. In 2015, Sullivan hired Inger Lamb, owner of Prairie Landscapes of Iowa, to replace lawn with absorbent plants. The return to natives had to fit in the 1.8-acre lawn between parking lots, bike trail and creek. Once built, the designed prairie should damp down peak loads of water that pour off the roof and parking lot, reducing the rush of runoff to Walnut Creek—and serve as a model for those upstream.

Or, as Lamb puts it, "Deep-rooted plants turn the soil into a sponge."

She hasn't always been a prairie convert. Originally passionate about dahlias, Lamb put her Ph.D. in plant science to good use. Her focus changed as she volunteered at Shaw Nature Reserve, part of the Missouri Botanical Garden near St. Louis. After helping plant and care for native landscapes, the freedom from the constant care of flowerbeds changed her to a native plant enthusiast. Moving to Iowa, Lamb became a prairie advocate. Her business helps design, establish and maintain small and large native plantings and prairie in urban and rural areas for homes and businesses.

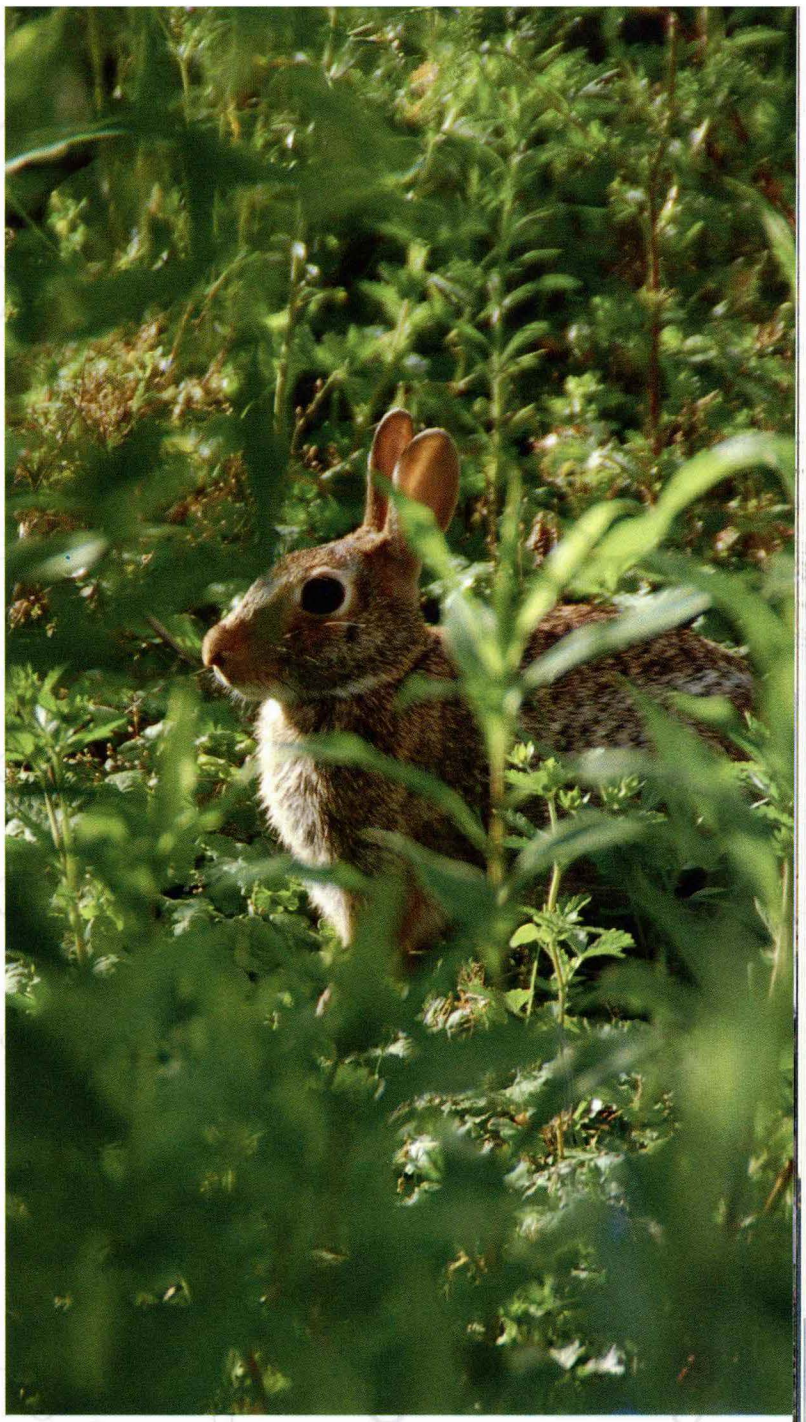
Nature's Cycles of Interdependence

For many it's the other benefits of prairie that win out. Tree frogs sing at prairie's edge; songbirds and insects find a home in grasslands. For those concerned about the fate of bees and other pollinators, including monarchs, "Native plants are pollinator gardens," says Lamb.

In early spring, plants emerge from bare ground between the dry, brown stems of last year's splendor. Gradually growing and greening—rattlesnake master, golden Alexander, arrowhead and spiderwort— plants that grew here in the 1850s—sprout, mature and flower. By late April, this miniscule prairie establishment becomes a yellow and purple showcase with dots of golden Alexander covering the lowland area and tall purple penstemon's snapdragon-like blooms dominating drier upland slopes.

Early bloomers attract pollinators—bees, butterflies, moths, wasps, flies, beetles and hummingbirds—providing food when blossoms are scarce. Increasingly at risk, many pollinators depend upon native plants. Providing a season-long array of blooms assures they have a food supply early spring to late fall. In turn, pollinators ensure fertilization of nearly a third of the food we eat—apples, blueberries, nuts, pumpkins and other fruits and vegetables. These insects nourish wildlife, especially young birds which need high protein foods.

For those who work in the building, the prairie provides a relaxing break from the office and seasonal cycles of beauty. "You never know what's coming through," says worker Tracey

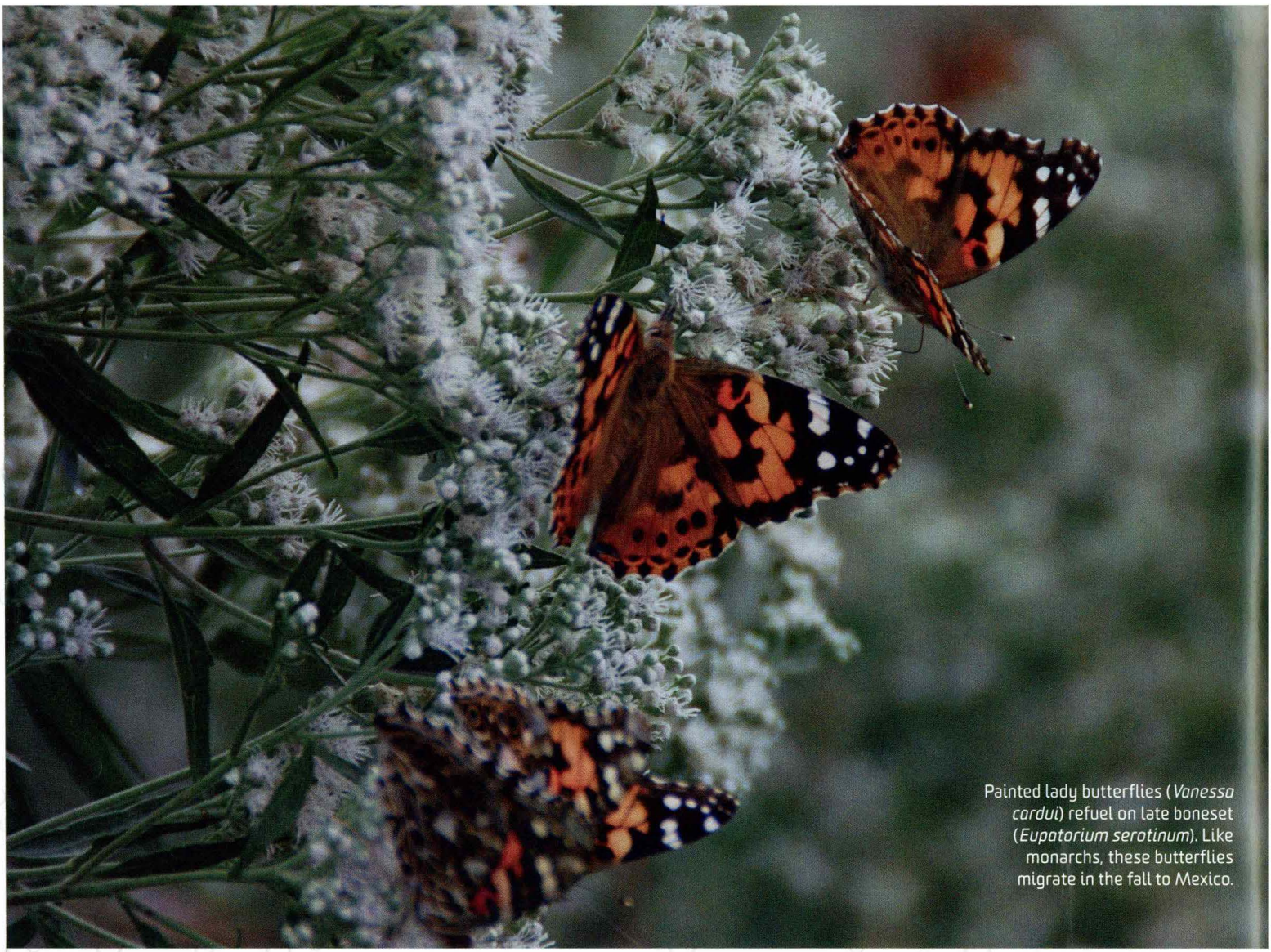


Lantz. "The butterflies. The flowers. It's different every year. One year there's columbine coming up where it wasn't planted. That's prairie."

As spring warms, the hum of insects grows, keeping pace with the growth of developing forbs and grasses. A symphony with the chorus of insects, frogs and songbirds underlying the ever-changing melody of flowers.

Brilliant blue indigo buntings cling to grass stems, feeding on seeds, berries, buds and insects. The blue jewel male belts out his repetitive songs. The female builds her nest about a yard off the ground, weaving natural materials together and wrapping stems, leaves and grasses in spider web.

By early June, purple spiderwort is gone and most penstemon goes to seed, replaced by assorted yellows: brown-eyed Susans, gray-headed coneflowers, coreopsis, compass plant, sawtooth sunflower and more.



Painted lady butterflies (*Vanessa cardui*) refuel on late boneset (*Eupatorium serotinum*). Like monarchs, these butterflies migrate in the fall to Mexico.

Summer on the prairie. The bright yellow and black male American goldfinch dart through, dining on sunflower, thistle and aster seeds, with grass and tree seed chasers.

Thistles get a bad rap, making Iowa's noxious weed list. But the State Bird of Iowa breeds later than most, waiting until June or July so she can line her 3-inch nest with silky thistle and milkweed down. Goldfinch depend upon native thistles, which—not to be confused with invasive musk (*Carduus nutans*), bull (*Cirsium vulgare*) and Canada (*Cirsium arvense*) thistles—are rarely invasive. Unlike most songbirds, goldfinch are strict vegetarians. Regurgitated thistle seeds—not insects—are the premier protein for nestlings.

How do you tell a native thistle from an invasive? The leaf underside is often covered in white hairs, so thick it looks white.

By fall, plants have produced seeds and begin browning. Remaining sunflowers and goldenrods turn intense yellow. Birds flock together, prepping for migratory flights. American goldfinch molt, turning gold to brown. They may move south, but like cardinals, some winter here.

Winter completes the cycle, with dead stems, leaf litter and galls protecting next year's insects. Overwintering birds seek dry seed heads, while the ground hog retreats into a long tunnel to hibernate winter's cold.

Take Butterflies

Few know, though many are learning, native plants host a plethora of insects. Female monarchs lay eggs only on milkweeds. The adult monarch also needs food from nectar-producing flowers throughout the bloom season.

For swallowtail butterflies, look at golden Alexander here the first week of June for a voracious yellow and black striped caterpillar munching tattered leaves.

Like prairies, butterflies have gone from a pre-settlement era of abundance to one of scarcity. "We are presently in a situation where the survival of up to half our butterflies depends on the intentional activities of humans," recognized the authors of *The Butterflies of Iowa* a decade ago.

Butterflies are found only where their life cycle needs can be met. Some forage a wide range of habitats. Others must have specific, sometimes rare, habitats and plants.

Many butterflies prefer or require tallgrass prairie. Only there's not just one tallgrass prairie. There are dry, mesic and wet prairies, and the accompanying host of plants and butterflies associated with each. The little prairie along North Walnut Creek reflects this diversity, with a steep, dry south-facing slope, a normal moisture area (mesic), and wet prairie near detention basins.

"The best flower garden is a prairie. If you want to create a home for butterflies, get native plants," Lamb says. Take the painted lady (*Vanessa cardui*). Find it laying eggs on field pussytoes in dry areas. This wooly, dusky ground cover blooms early and thrives in gritty, rocky, dry soils; but flounders in moist, fertile soils. Thistles and burdock also host the caterpillar. Migrating from Mexico to Canada, the lady appears in profusion for a week or two fall and spring—along North Walnut Creek prairie.

"Insects are good botanists and they know native plants," says Lamb. Just as prairie plants have moisture preferences, each of about 120 native Iowa butterfly species has plant preferences, often linked to specific moisture regimes. Look for the common wood-nymph, Delaware skipper and regal fritillary in dry to mesic prairies. You're more apt to find meadow fritillary, two-spotted skipper, and bronze copper in wet-mesic to wet prairies and marshes.

Our Circle

Scientists say we are in the midst of the sixth mass age of extinction, losing more species since the dinosaurs 65 million years ago. That's a rather frightening thought, especially as it's attributable to human-made environmental changes. One thing is clear: our actions make a difference.

Adding a rain barrel or porous pavement can reduce runoff. Converting turf grass to a diverse mix of plants helps ensure ecosystem resilience, protecting plants and animals while increasing water absorption to reduce flooding.

Be aware that going native takes knowledge and planning. First decide what style of garden you want. Are you happiest with a more formal flower garden? Or, do you want to establish a self-seeding prairie or cottage garden?

Whether you do the designing or hire someone, site prep is key. Allow for differences in sunlight, slope, soil and moisture. Lamb says most failures are because people did not plan well enough or select the right plants for the location. Without thoroughly removing existing vegetation and seed bank before introducing prairie species, correct species selection, and follow-up maintenance there is little chance of success.

Many prairie species tend to be tall and need lots of room. For a long-season garden, consider color and blooming times. Seed or plant sources are crucial, as some pre-packaged meadow mixes look great initially but become weedy later as largely non-native (but showy) species die. Many prairie enthusiasts are purists about planting "local eco-types." Using local seed means the plant is adapted to nearby growing conditions: insect and plant pests, rainfall, winter chills and summer heat.

Once planted, even prairie needs management, especially the first three years. Careful monitoring, weeding, watering (if needed) and adjusting for site conditions leads to success. Later labor is much less than a lawn, but still essential.

During the first year or two, prairie plants do not make much of a showing. Their energy goes into extensive root systems—so they can survive dry weather, herbivores and fires that kept prairies from turning into woodland. Keep weeding non-natives. By year three, most prairie plants flourish and annual weeds greatly diminish.

"It's not inexpensive to establish a prairie. The cost during the first three to five years is comparable with turf," says Sullivan.

"Once prairie is established your maintenance costs are less," he says. The plants are so hardy and dense they choke out other plants."

Putting in prairie and small detention basins is a "reasonable solution to managing water on a building that was built 50 years ago," Sullivan says.

It's also a return to nature's way of dealing with rainfall. "The audacity of man is that we know so much, when we really don't. You have to live more in harmony with nature."

The beauty, low-maintenance and water-absorbing properties of prairie in this Johnston neighborhood inspired converting turf to prairie on a commercial property in Windsor Heights.

Discovering Peace and Solitude at Effigy Mounds

National Monument South Unit

STORY AND PHOTOS BY *BRIAN GIBBS*

Two significant places in this country lure me back time after time—the mountains of northwest Montana and bluffs of northeast Iowa. As an artist, I make yearly pilgrimages to both to find creative inspiration.

Whereas the craggy, glaciated mountains of Montana are more liable to knock your socks off, unglaciated sandstone and limestone bluffs of Iowa are more likely to leave you wondering if you're still in the state. Montana's ruggedness makes it easy to step out of your car to photograph and write about; the subtleness of northeast Iowa's rolling landscape requires more careful attention and devotion. One of Iowa's best public places to dedicate a day exploring is the south unit of Effigy Mounds National Monument.

On an early fall day, I visit, hopeful a quiet hike will clear a powerful stretch of writer's block. During my adventure in the less visited south unit, I plan to see several Native American mounds including the extensive compound mound group and the Marching Bear Group.

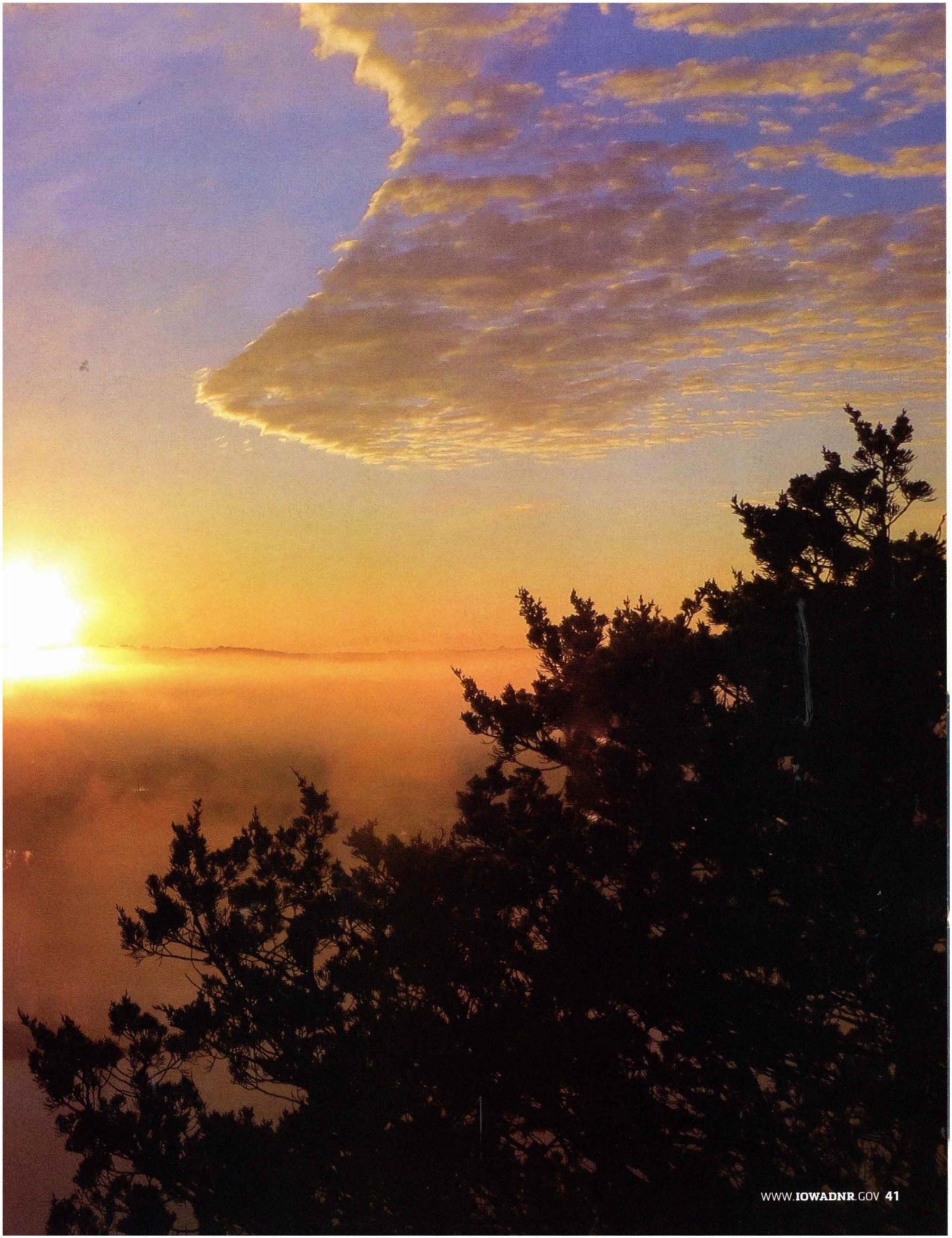
The hike begins from the parking lot. From the first footstep, I am on revered ground. Native Americans camped, hunted and fished here at the confluence of the Yellow and Mississippi rivers for thousands of years.

EFFIGY MOUNDS NATIONAL MONUMENT

Effigy Mounds National Monument rests in the heart of the 240,000 acre Upper Mississippi River National Wildlife and Fish Refuge which protects one of the most diverse ecosystems in the lower 48—home to 305 bird species, 57 species of mammals, 45 species of amphibians and reptiles and 134 species of fish. This incredible variety of life along the river has been a significant draw for people for millennia.

At just more than 2,500 acres, Effigy Mounds National Monument protects and preserves one of the greatest concentrations of Native American ceremonial and burial mounds in North America. There are 207 mounds, 31 in animal shapes, including water spirits, bears, birds and other mammals. A diverse group of Native Americans made common pilgrimages here during the Woodland time period from 2,500 to 850 years ago to build mounds, reunite with kin, bury dead and practice other ceremonial rituals together in peace.

Mound building was an incredibly labor-intensive process that included digging up earth with mussel shells and hauling



The bench overlooking Founder's pond provides visitors a respite from a long climb.

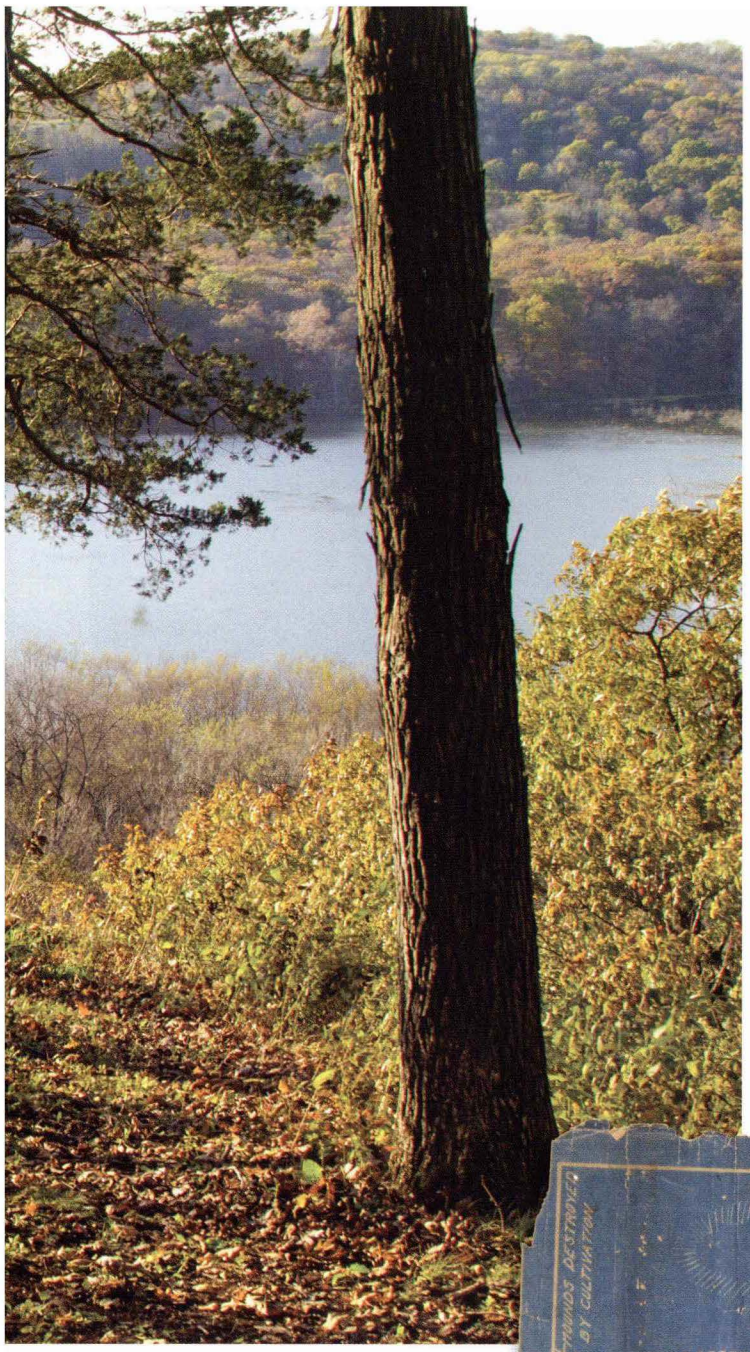
hundreds, sometimes thousands, of tons of soil. Soil samples show that occasionally soil was collected nearby and other times was carried up from the river valley, more than 300 feet below. Why was so much effort to build mounds and what are their meanings? Archeologists still don't have exact answers and can only offer theories on what the mounds mean.

Luther College archeologist Clark Mallam, who has spent countless hours studying here, proposes the mounds are a "manifestation of a sophisticated mound building culture composed of several cultural systems that allowed inhabitants to maintain a balance with the natural environment." He adds that it took social organization to harness labor, spiritual expression, widespread trade networks and horticulture and early agriculture to invest the time necessary to build mounds. Regardless of modern theories, it is evident from the sheer number and location of mounds that the ancient landscape of northeast Iowa played a critical role in creating mound sites.

Deciphering The Driftless

The monument rests in what geologists call the "Driftless Area," an incredibly rugged landscape that missed most of the glaciation that occurred in much of Iowa between 2.5 million years to 11.5 thousand years ago. The absence of a nearly mile thick glacier bulldozing here allowed powerful erosional processes of valley downcutting and weathering to take place on the underlying limestone and sandstone bluffs. Repeated thawing and melting of glaciers north of the Driftless sent massive torrents of water downstream, eventually creating today's Mississippi River Valley.

Jumbled together, the landscape contains many nooks and crannies that support microhabitats, including bottomland forests, rock outcrops, upland prairies and more. Pollen samples cored from 26 feet of sediment in Founders Pond at Effigy Mounds reveal the area was historically much more open than today. Oak savanna would have been the prevalent habitat type with black bear, elk and deer common



residents. Extensive berry patches were present alongside seasonal masts of acorns and hickory nuts. All this land diversity, combined with river resources, provided the Woodland people an abundance of natural resources for their daily subsistence.

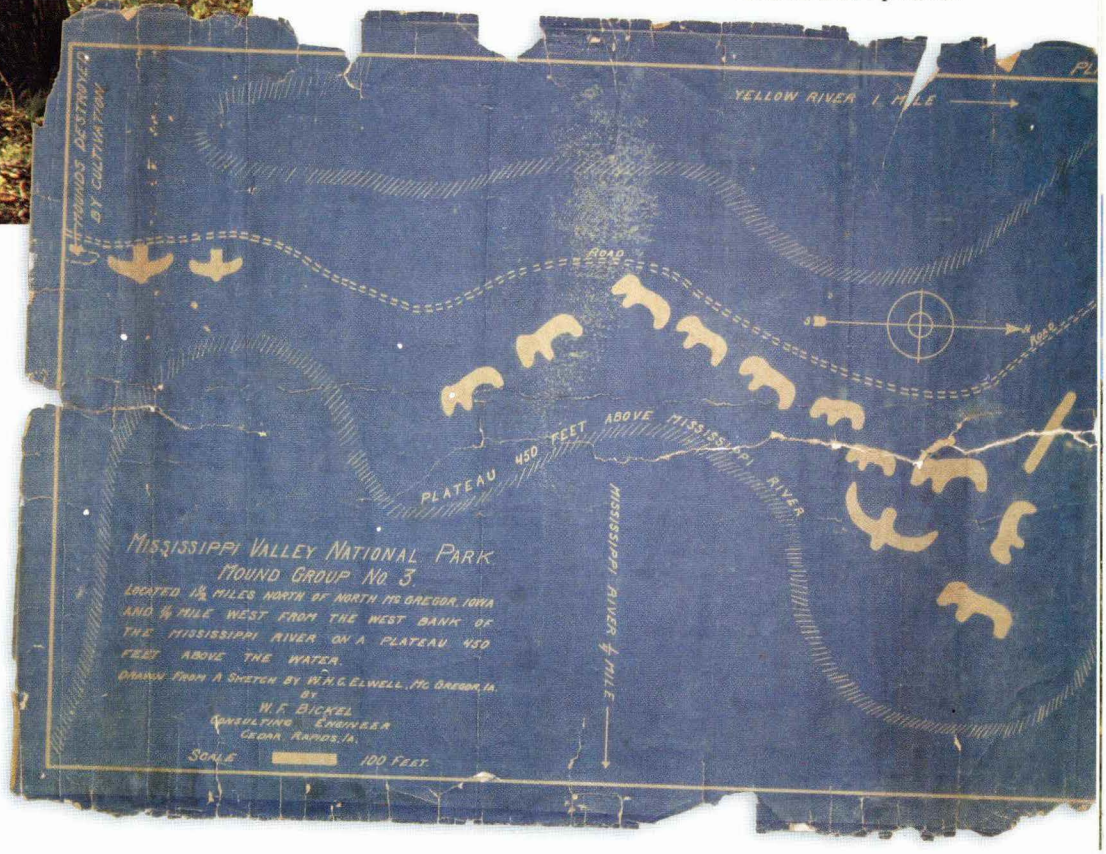
Hike up to the Mounds

It's a steep, slow walk up the trail which duals as an access road to the south unit's interior. I'm as much out of writing shape as hiking shape. I feel the burn in my thighs and pause to jot a few notes of the scene. Mature red oaks flank both sides of the trail, several show charcoaled trunks from a prescribed fire in 2009. The trail is glowing gold from early changing leaves of walnut and basswood. Three hundred feet above, chalky limestone outcroppings were used by the Woodland people as rock shelters and as chert quarry sites for making tools.

After a quarter-mile of climbing, I reach the bluff top. A spur trail leads to Founders Pond Overlook. In 1955, the Founders Garden Club of Des Moines donated this 40 acres to the park, which included two mound sites and Founders Pond. Today, fog drifts over the idyllic water body. Tree tops are illuminated by buttery light of early morning. A cacophony of waterfowl calls echoes across bluffs. The Yellow River winds picturesquely through an extensive bottomland forest and frequently floods into Founders Pond. This 1,045 acre tract is known as the Heritage addition and has a long legacy of charitable giving.

For two decades, the Iowa Natural Heritage Foundation worked diligently to fundraise nearly $1.5 million from 1,150 donors before an act of Congress transferred the property to the National Park Service in 2000. This parcel is a wild place for many animals, including golden eagles in winter. I don't spot any goldens today, but several bald eagles are fishing in the river and pond. Purple asters and lavender hued stiff gentians are blooming by my feet. I could stay lost in this scene for hours, but the trail beckons, so I hike on.

Mature white and red oaks sprawl across the trail until the view opens up in a native prairie remnant. Encroaching shrubby vegetation means it's been awhile since fire has renewed the prairie.



The path comes to a fork at a large wooded knoll. Several zebra barked aspens and a handful of huggable oaks stand guard on this hill known as Rattlesnake Knoll.

Nobody knows where the name came from, but rumor credits a woman named Sarah who lived in a one-room cabin in the meadow in the 1930s and '40s. During late summer and early fall, she harvested milkweed from the prairie and sold seed pods to the military for life jacket filling. Sarah didn't want visitors, so she gave the hill the misnomer, Rattlesnake Knoll. Timber rattlesnakes are not known to live on this ridge, but use bluffs overlooking the Mississippi as basking and den sites. I admire the bending branches of the old oaks, then take a left toward the bird and compound mound group.

Stiff gentians are one of the few fall wildflowers at Effigy Mounds National Monument in extreme northeast Iowa.

Along the way, I encounter several oaks that died due to oak wilt. Two pileated woodpeckers bring new life to the trees, echoing their booming calls from decaying trunks. A smile runs across my face as I am reminded of the recent designation of the Effigy Mounds-Yellow River Forest Bird Conservation Area as a Globally Important Birding Area to recognize the critical importance for observation and preservation of the area's uncommon nesting birds, including cerulean warbler, red-shouldered hawk, prothonotary warbler, bald eagle, osprey and peregrine falcon.

Further down trail, a red-headed woodpecker clings to the grooved bark of a red oak. After walking a few gentle hills, I arrive at the bird effigy before noon. The power of the park becomes palpable by tracing the outline of this effigy with my eyes. From wingtip to wingtip, the peregrine falcon-shaped bird stretches 193 feet across the bluff. I take several steps back and notice the bird mound complements geographical features of the landscape; it appears as if it is flying up over the bluff and out over the Big River.

The local Ho-Chunk people, a people directly affiliated with mound building, have the thunderbird as part of their social organization and clan symbols. The connectedness of the birds to the river becomes apparent when mapping all the bird mounds in the park; each face toward either the Yellow or Mississippi rivers.

My mind and feet stand still on the earth. Soft shafts of light filter through rounded leaves of a 100-year-old white oak. Eagles and turkey vultures ride thermals a hundred feet above the bird mound. The crisp smell of autumn has started to replace the damp smell of summer. A cool northerly breeze ushers in tinges of sadness as I think about the history of the mounds since European settlement.

Before Europeans, nearly 10,000 mounds existed between Dubuque and Prairie Du Chien, Wisc. More than 90 percent have been lost to the plow or urban growth. I ponder the Woodland people and their intricate connection to the daily rhythms of the land for thousands of years; how today, we as a culture, seem to be running in the opposite direction of civility and reverence for the earth. Instead of being present, sensate and connected to our environment, we tend

Visitors face a steep climb to the top of the south unit, but are rewarded with solitude and legendary views once atop the bluff.

to isolate our senses through concrete and screens. The blind faith of technology forces us to forget that we are not separate from nature; we are an important cog in it. Protected places like Effigy Mounds offer a refuge from technology-produced chaos that dims our innate ability to slow down and experience the sweetness of solitude, the fullness of peace. Effigy is a place that endured great loss and yet still remains a sanctuary of healing, reclamation and restoration.

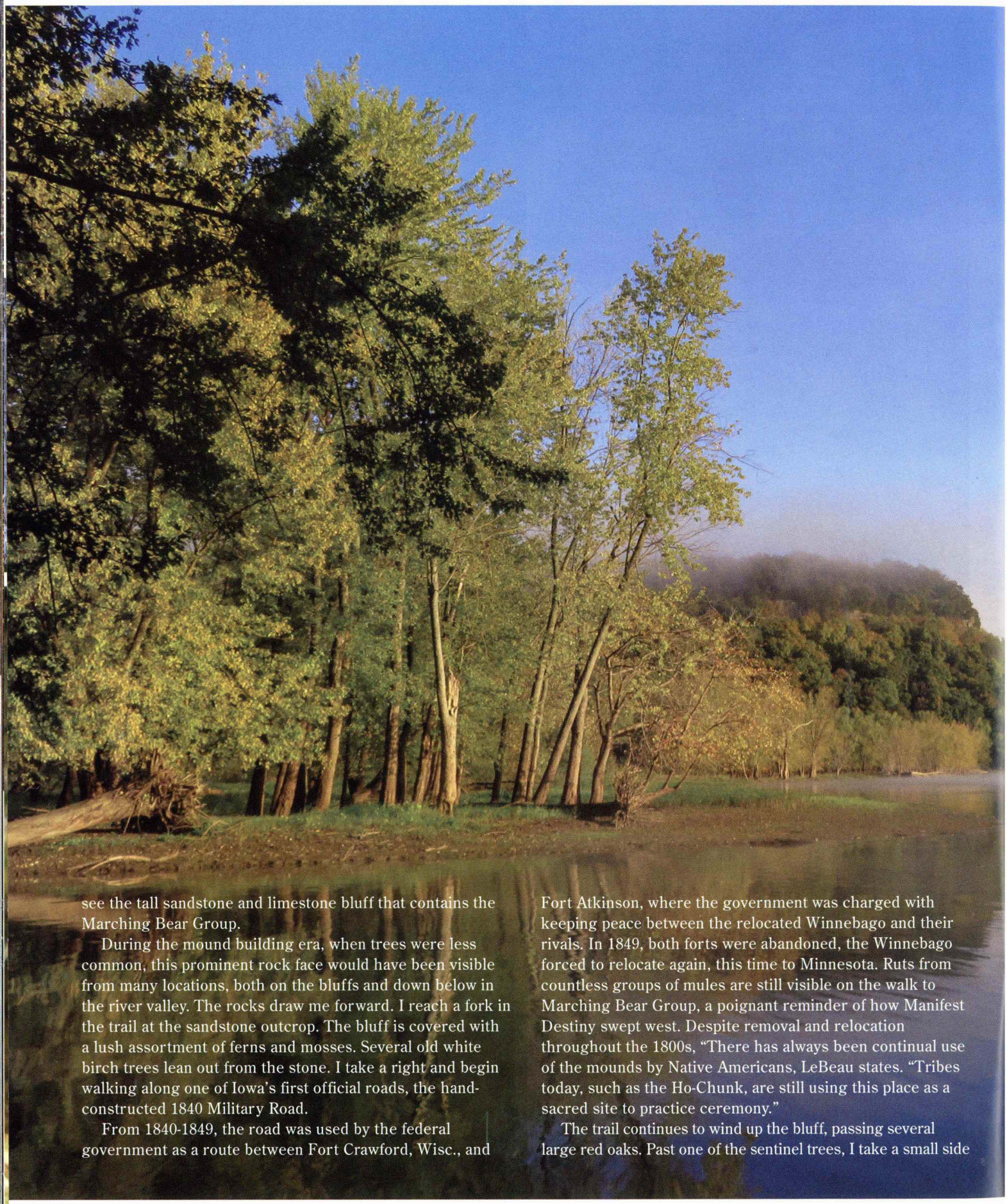
In 1998 and 1999, Effigy Mounds Resource Manager, Rodney Rovang; falconer, Dave Kester; and Bob Anderson of the Raptor Resource Project, a nonprofit organization in Iowa, worked diligently to reintroduce peregrine falcons along the bluffs of the Upper Mississippi River that had been extirpated since 1964 due to DDT. This ambitious project required Anderson to rear babies in falcon mews on his farm, then at 30 days transfer the chicks to new mews, allowing them to only see limestone rock and the outdoors. The goal, he hoped, was that the rocks would imprint on the birds for their next temporary home at Hanging Rock Bluff, a storied rock outcrop reached by a seven-mile strenuous round-trip hike.

With lots of luck, sweat, and care, he and his team released 18 peregrines at Effigy Mounds. The success hit home when a female from Effigy Mounds was found nesting on river bluffs near Winona, Minn., in 2000. Today, more than two dozen pairs nest along the cliffs of the Upper Mississippi River National Wildlife and Fish Refuge. If I'm patient enough, I may hear the sharp call of a peregrine; earlier this year, they were spotted just upriver at Effigy Mounds.

Mounds in the shape of birds are not the only unique mound features of the south unit. Down the trail from the bird effigy is a compound mound grouping of seven mounds. This complex was arduously constructed and stretches an incredible 153 yards down the bluff. This grouping allows for more quiet time and reflection. Feelings of admiration and mystery swell. Why seven mounds and what does this complex mean?

Effigy Mounds Cultural Resource Manager, Albert LeBeau, says staff have learned a lot from the Woodland culture but that the place is continually evolving. LeBeau says he's fine not having all the answers, "It's part of the magic of this place," he shares. The mystery is just one of many reasons I find Effigy Mounds so special. I've been fortunate to share the trails with my best friends. The south unit forever holds a sacred space for me as being the home where I opened my heart and first told my future wife I loved her. It also houses many happy memories of guiding people here when I worked as an interpretive park ranger in the summer of 2017.

The blare of a train horn wakes me from my nostalgia. I gather my bearings and walk back down the trail towards the Marching Bear Mound Group. Out in the prairie, wild bergamot fills my nostrils with sweet smells. Bees and butterflies dance through the grasses. Cottontail rabbits dart across the trail into the tall grasses. A furry piece of scat on the trail tells me coyote likes it here too. Looking ahead, I

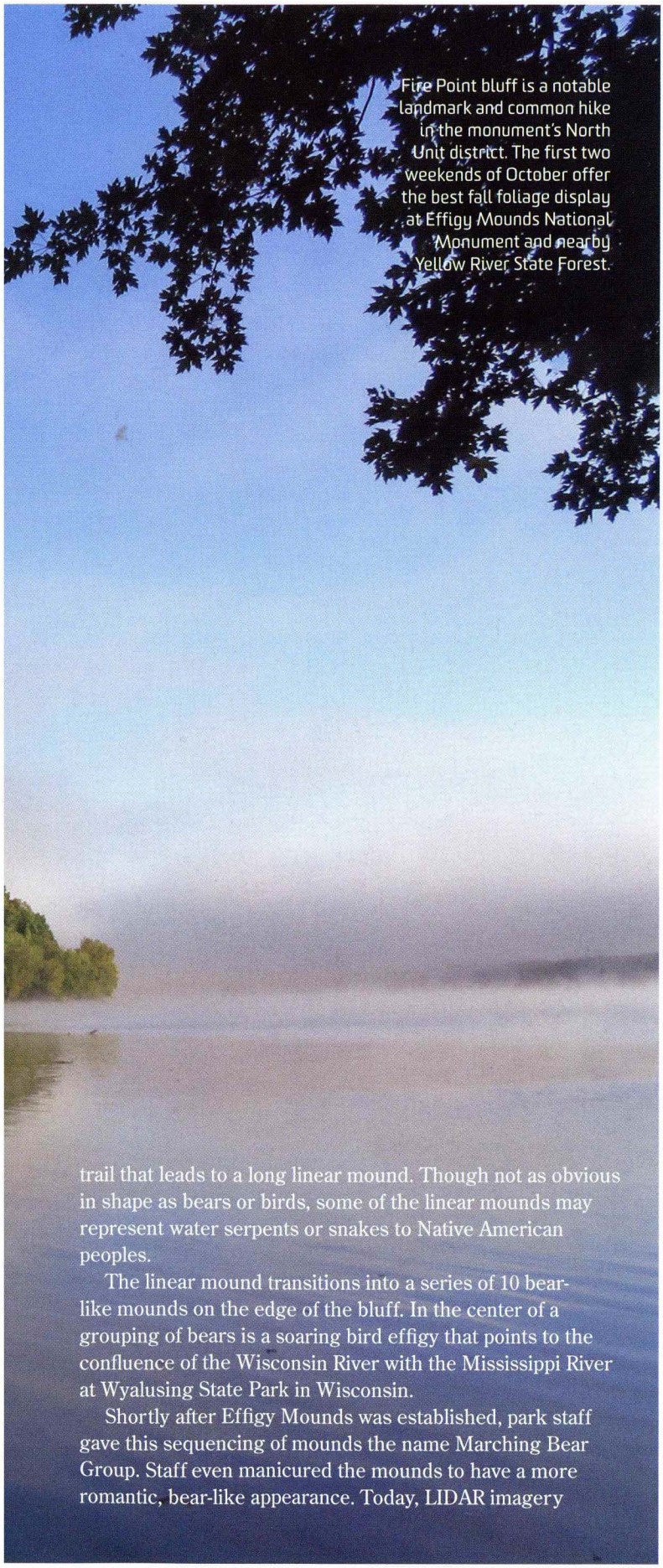


see the tall sandstone and limestone bluff that contains the Marching Bear Group.

During the mound building era, when trees were less common, this prominent rock face would have been visible from many locations, both on the bluffs and down below in the river valley. The rocks draw me forward. I reach a fork in the trail at the sandstone outcrop. The bluff is covered with a lush assortment of ferns and mosses. Several old white birch trees lean out from the stone. I take a right and begin walking along one of Iowa's first official roads, the hand-constructed 1840 Military Road.

From 1840-1849, the road was used by the federal government as a route between Fort Crawford, Wisc., and Fort Atkinson, where the government was charged with keeping peace between the relocated Winnebago and their rivals. In 1849, both forts were abandoned, the Winnebago forced to relocate again, this time to Minnesota. Ruts from countless groups of mules are still visible on the walk to Marching Bear Group, a poignant reminder of how Manifest Destiny swept west. Despite removal and relocation throughout the 1800s, "There has always been continual use of the mounds by Native Americans, LeBeau states. "Tribes today, such as the Ho-Chunk, are still using this place as a sacred site to practice ceremony."

The trail continues to wind up the bluff, passing several large red oaks. Past one of the sentinel trees, I take a small side



Fire Point bluff is a notable landmark and common hike in the monument's North Unit district. The first two weekends of October offer the best fall foliage display at Effigy Mounds National Monument and nearby Yellow River State Forest.

trail that leads to a long linear mound. Though not as obvious in shape as bears or birds, some of the linear mounds may represent water serpents or snakes to Native American peoples.

The linear mound transitions into a series of 10 bear-like mounds on the edge of the bluff. In the center of a grouping of bears is a soaring bird effigy that points to the confluence of the Wisconsin River with the Mississippi River at Wyalusing State Park in Wisconsin.

Shortly after Effigy Mounds was established, park staff gave this sequencing of mounds the name Marching Bear Group. Staff even manicured the mounds to have a more romantic, bear-like appearance. Today, LIDAR imagery reveals a different look at the mounds, and they are managed to retain their natural shapes. A deeper look reveals one mound more closely resembles a wolf than a bear.

Down the ridgeline, gnarled trees sprawl over several effigies. Some trees have recently been cut down to protect the structural integrity of the mounds and to restore the monument back to oak savanna. Before any trees can be removed, staff must go through a natural and cultural resource review compliance that includes consulting with 20 of the park's affiliated Native American peoples. Recently, staff are slowly taking down trees to restore the monument to the pre-European oak savanna ecosystem. The openings have created more spaces for prairie grasses and plants to reseed. At least four species of milkweed grow in the south unit, including purple milkweed. In warm afternoon sun, I look down the ridge and fondly watch monarchs drift over the mounds. A promising sign for an animal that has been petitioned for the endangered species list. The monarchs and the afternoon sun recharge my spirit. My mind is free to process without interruptions.

Walking the south unit trails and observing the mounds in stillness has awakened my imagination, one of today's most endangered senses. The journey up to the south unit has once again filled me with feelings of immense gratitude, peace and hope for the future. The mounds are tangible reminders of community produced through creativity, participation and collaboration. They are, as author and environmental activist, Terry Tempest Williams states, "Reminder(s) that we form the future by being caretakers of our past."

I may live five hours away now, but the Driftless with all its rivers, bluffs, plants and animals, is a place to love and though it's not where I grew up, it always feels like home. And in the end, we lose nothing by loving home.

the POWER of PERSISTENCE

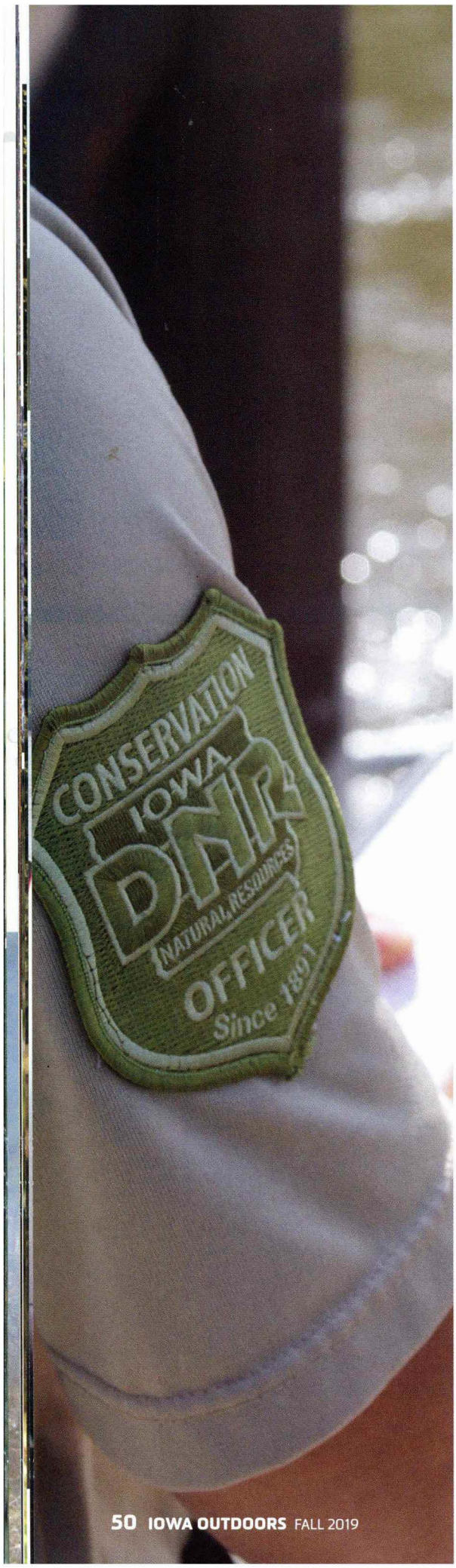
STORY AND PHOTOS BY *HALEY KNUDSEN*

Aron Arthur's journey to become a conservation officer is marked with grit and determination.

Sitting on a wrinkled wooden dock with a fishing pole in hand, Aron Arthur watches the sun-soaked bobber dance against the glassy water. He says his love of the outdoors emerged in places like that when his father took him fishing as a little boy. When he grew up, he aspired to protect what he treasured most.

Arthur now works with the DNR as a conservation officer, doing exactly what he fixed his eyes on at a young age. Arthur is responsible for enforcing natural resource-related laws, investigating outdoor incidents and educating adults and children through workshops and courses. Each day looks a little different for Arthur with the many hats he wears. However, the road that led him here was filled with rough pavement and many detours.

Since graduating with a degree in animal ecology from Iowa State in 2001, Arthur moved around the state working seasonally with the DNR. If a job opened up, he applied regardless of the location. When Arthur graduated, he did not have summer experience, which he believes is the key to getting hired.



"It's a hard ride, but the main thing is that you have to be a person of good moral ethic and you have to be able to work on your own. Most importantly, you have to be persistent," Arthur says.

He's worked sweltering summers as a water patrol and ATV officer as well as bitter winters as a snowmobile and range officer. Pouring concrete to pay the bills, he also worked construction during his seasonal jobs with the DNR.

After five years of shifting jobs and moving around, he applied to be a conservation officer in 2006. With the experience he gained from summer jobs, his hopes for the job offer were high. He made it to the final round of the job application process, but in the end, he was not offered his dream job.

A year later, a full-time position opened up and this time he made the cut. Arthur worked as a field officer until he took his current job as a conservation officer in Des Moines. Conservation officers tend to be career employees, so turnover is low and hiring is competitive.

"Like anyone who works at the DNR, they have a passion for the natural resources and if they want it bad enough, they'll stick to it and they will work hard and do what they need to do to get there," says Arthur.

Arthur receives many phone calls asking him what it takes to become a conservation officer. His advice: if this is truly what you want to do, it may take a long time to get hired full-time. In the meantime, do what you can to get your foot in the door.

"Do things that help make your resume look better, but also do things that will give you experience so you can rise to the top if you want to get hired," Arthur says.

The DNR's job description of conservation officers describe candidates as highly motivated, independent workers who have a strong desire to work in natural resources and with the people who enjoy them.

Arthur's work as a conservation officer is more office-based than it is a field position. A typical day includes a variety of routine activities such as filling out paperwork and scoring conviction reports. When someone gets a violation for fishing or hunting, that violation corresponds with a point system. Once the person reaches a certain number, Arthur initiates a suspension.

"I also make sure that radio licenses are up-to-date, review residencies and answer a lot of questions that come in, whether it's via phone or Facebook," says Arthur. "On top of that, I still get to go in the field and check licenses and

Polk County-based conservation officer Aron Arthur checks the fishing license of a man fishing on the Des Moines River. Iowa residents can purchase three-year, one-year or short term fishing licenses.

write tickets, but not as much compared to my other duties."

Someone needs to be the enforcer when people violate fish and game laws. The people who get convicted have to serve time or pay penalties that the code allows. This is one of the reasons why Arthur believes his job is crucial.

"I'll get out occasionally. On my lunch breaks, I'll walk down to the river, check licenses and talk with fishermen. And sometimes I'll write tickets to people who don't have fishing licenses," Arthur says.

The money from tickets that conservation officers write do not go toward their salary. When people buy hunting and fishing licenses, that money helps conservation officers manage resources that fund wildlife and fisheries. This is how lakes are stocked and managed as well as how the DNR is able to buy and manage public land.

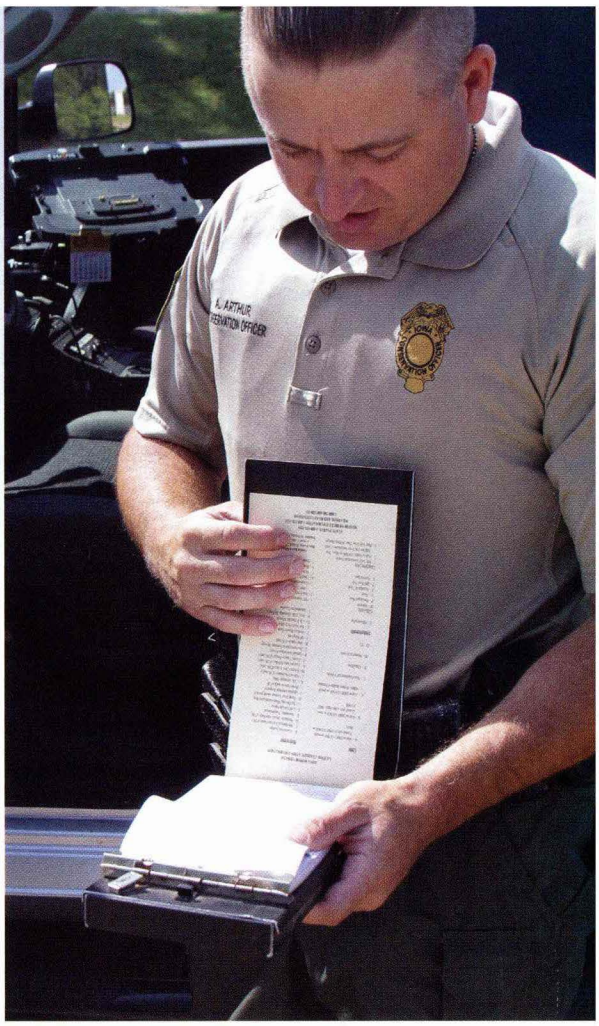
"A lot of people think we have a quota to meet. We don't," says Arthur. "We are out there making sure people are buying licenses so in return, they have a place to hunt and fish."

At times, his job calls for a little more excitement than writing tickets.

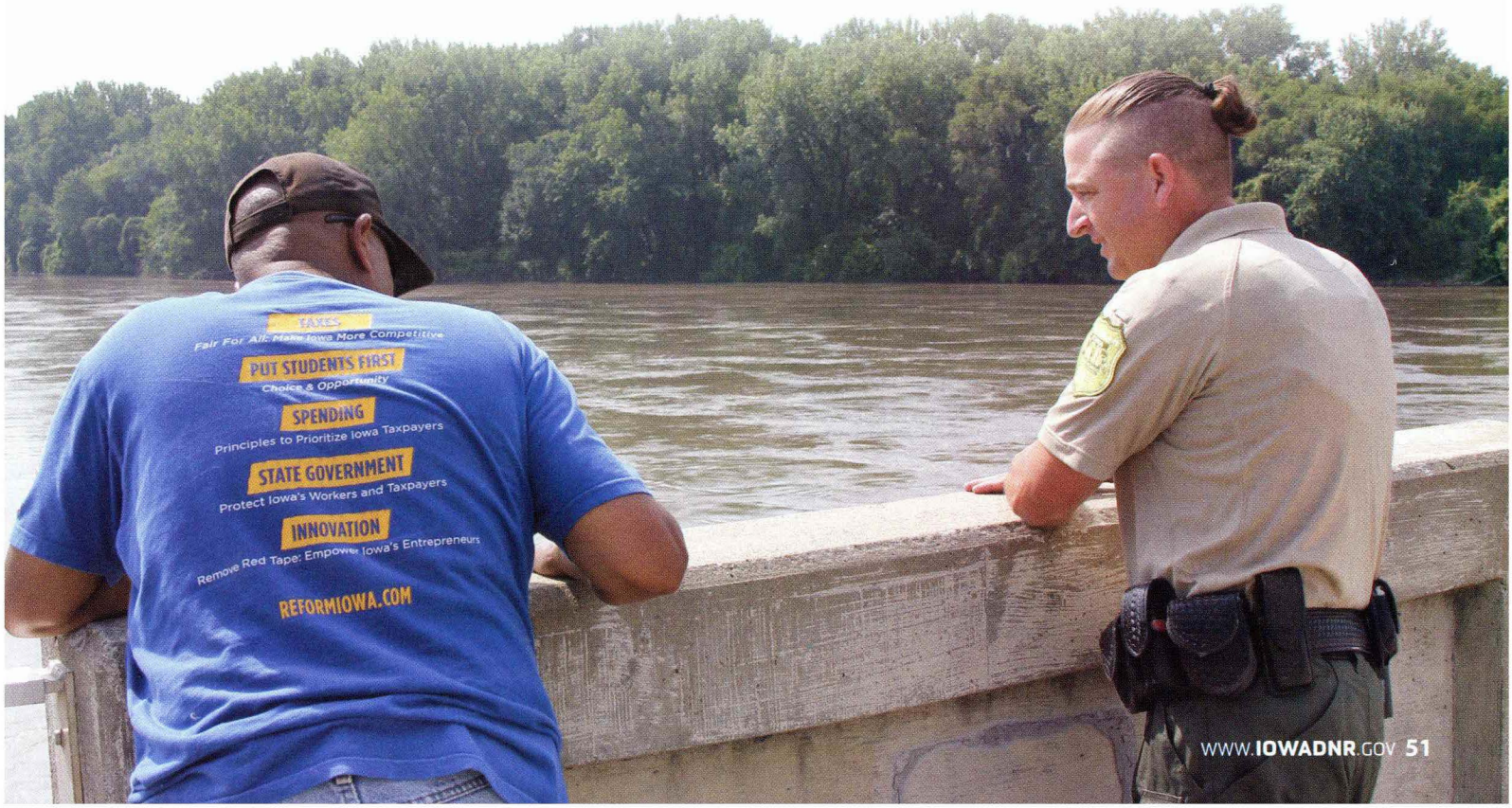
"You're not going to believe this," said a park manager on a phone call to Arthur in 2012. He claimed that someone was stealing highly-valued black walnut trees and selling them to make veneer for furniture, tables and other wood products. That was the beginning of Operation Black Walnut. After a few years of investigating, Arthur was able to find the vehicle of the man that was stealing the trees on a game camera and linked the culprit to a cigarette butt left behind.

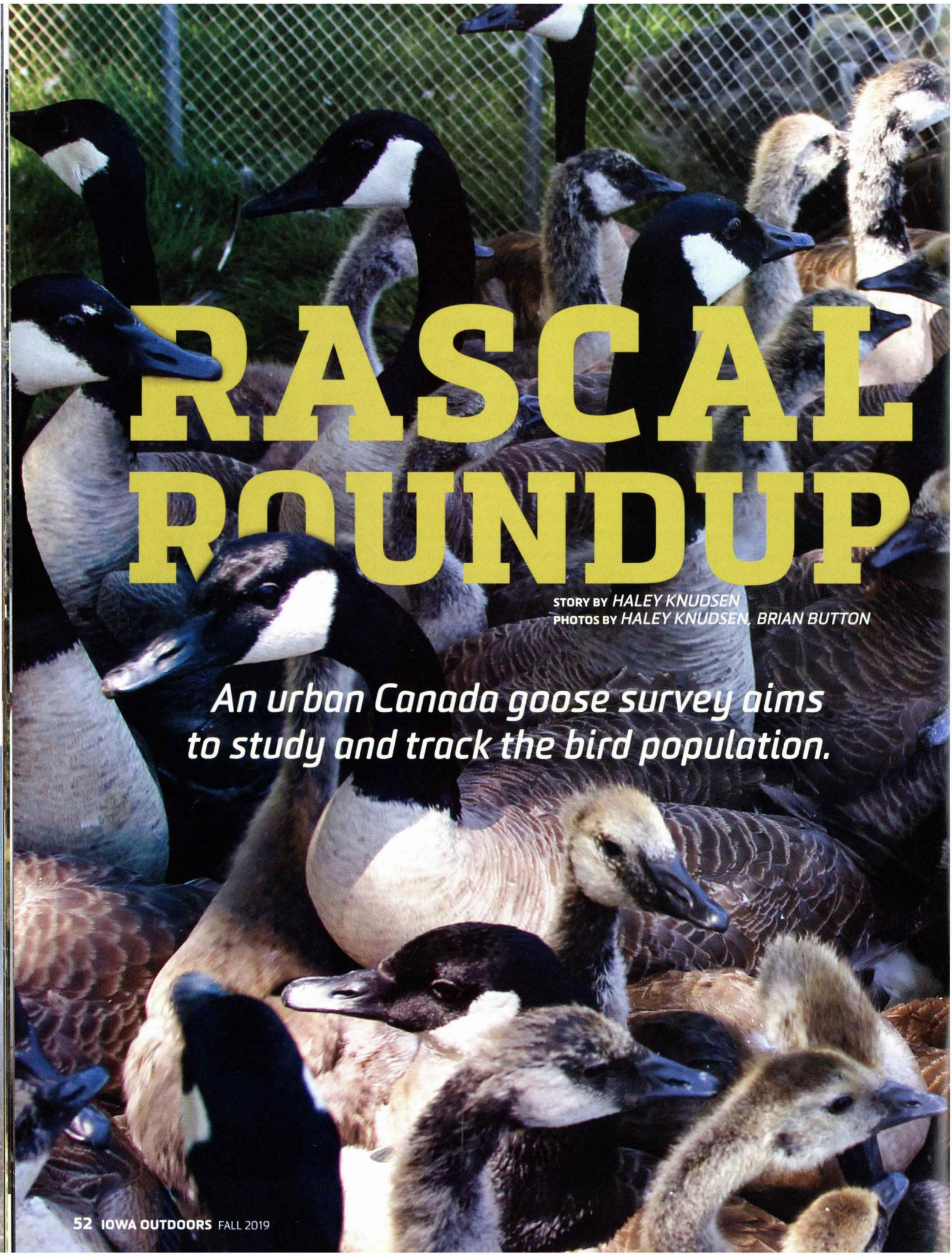
The tree thief, Randall Walker, pled guilty to the theft of 35 highly valued black walnut trees, fined more than $56,000 in liquidated damages and sentenced to 15 months in a federal penitentiary. Walker cut down and stole from public lands at Saylorville Lake, Lake Red Rock and the Neal Smith National Wildlife Refuge.

Arthur believes that all aspects of his job are important, regardless of how newsworthy they may seem. On top of making sure people follow the rules and regulations, the programs Arthur is in charge of are also important. He leads hunter education, outdoor skills workshops and more. A list of classes and workshops in your area can be found at *iowadnr.gov* under "Camps & Workshops."



Arthur believes it is important to engage with the community to establish good relationships. He wants people to see the presence of conservation officers and for them to know that they are protecting the resources the public loves.





RASCAL ROUNDUP

STORY BY *HALEY KNUDSEN*
PHOTOS BY *HALEY KNUDSEN, BRIAN BUTTON*

An urban Canada goose survey aims to study and track the bird population.

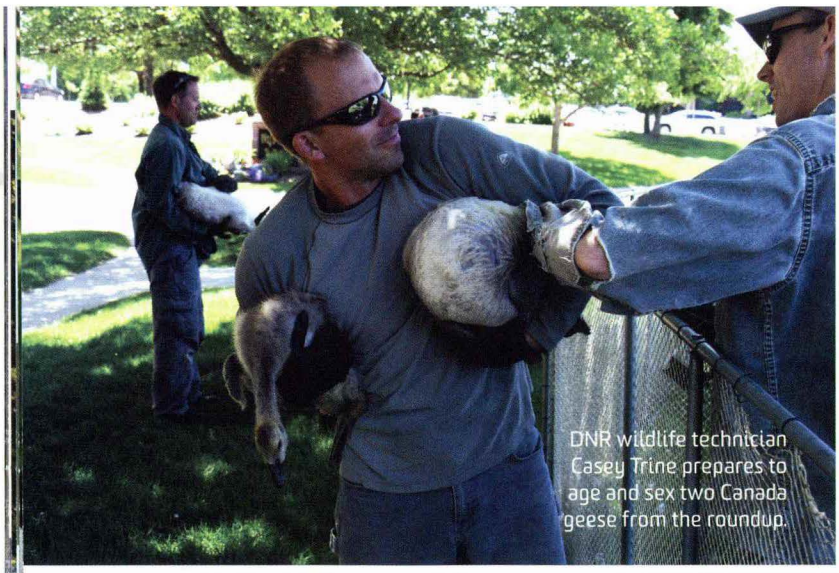
Neighborhood residents peer cunningly from behind the curtains of their suburban cookie-cutter homes watching a cluster of a dozen people with kayaks, walkie talkies and large segments of netted fencing panels roam around their yards. The staff involved in the roundup waits to hear the game plan, flocking behind shrubbery and camouflaging themselves against garages to quietly surround the geese from a distance. In a swift motion, DNR waterfowl biologist Orrin Jones intently raises the binoculars to study the gaggle. Straggles of fabric hang from the torn elbow of his well-worn, sage green shirt while he radios directions.

"It's important to get the geese surrounded before we make our presence known," says Jones.

The keenly-aware geese know when their surroundings change and the waters shift. Some of the geese they will capture today are ones that have been captured in previous years. Jones identifies these geese as being more aware and says they get smarter each year because they know a roundup and tagging are coming. Going slow is the key to outsmart the geese.

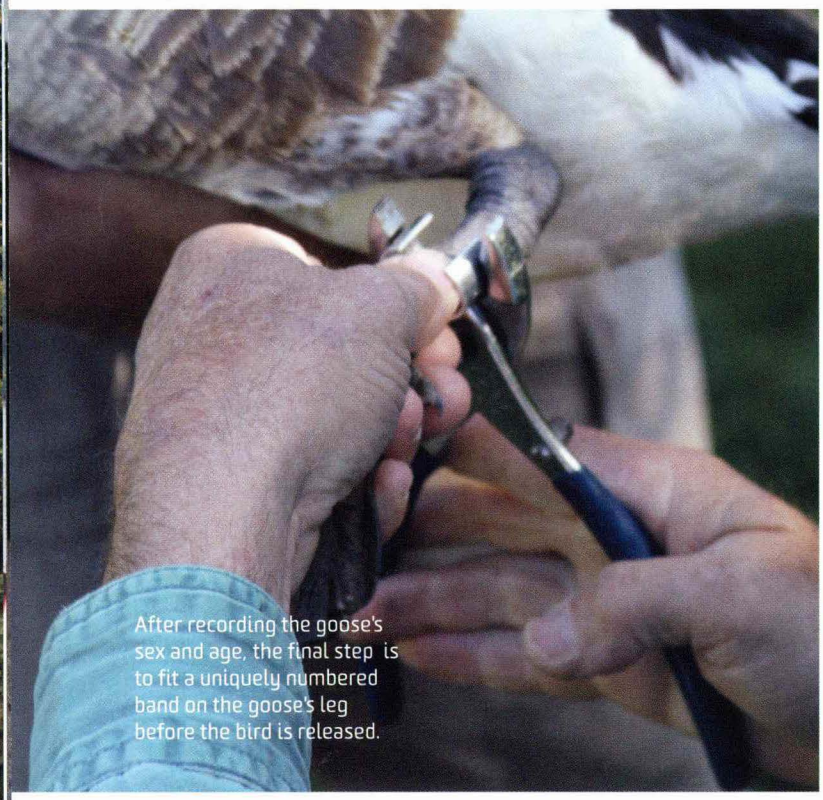
The kayak sneaks into the water and the paddler makes his way to the goose-lined shore. The herd of wildlife staff and volunteers creep in with their arms slowly waving side to side, taking care to not startle the geese. Others grasp the metal perimeter of the fencing. They inch closer and the geese sound their cackling alarm. Few can fly away because many are in a stage of their annual life cycle where they molt and have lost their flight feathers. From the geese's perspective, this is a very traumatic day, so the staff is peaceful in their mannerisms. Like a parent calming down an overwhelmed child, the staff knows everything will be okay and the geese will leave unharmed.

"It's a wild goose chase," says Jones. However, instead of running with no end in sight like the old saying goes, this chase is methodical and requires calculated persistence. The workers secure the netted fencing pieces into a pen.



DNR wildlife technician Casey Trine prepares to age and sex two Canada geese from the roundup.

ISU graduate student Ben Luukkonen and DNR waterfowl biologist Orrin Jones examine a satellite image of urban ponds in the Des Moines metro to decide where to go for the next goose roundup.



After recording the goose's sex and age, the final step is to fit a uniquely numbered band on the goose's leg before the bird is released.

The Relentless Presence of Urban Geese

The DNR receives many complaints from urban municipalities about too many geese. The issues they cite include excessive amounts of droppings and goose aggression during the nesting season when protecting their young. Due to public concern, the Iowa DNR needed a better way to manage Canada geese in urban areas. Banding provides valuable data to inform management plans.

The abundance of urban ponds create the perfect micro-oasis for Canada geese. The ideal habitat for a goose is water to cool off in and low cut grass to munch on and watch for predators.

"You think the geese would want more variety in their diet, but everything they need is in these urban settings," says Bob Klaver, a professor at Iowa State University.

To have a successful goose roundup, the team divides up responsibilities, relies on local staff who know the area and works with homeowners associations.

"There are many different entities we have here," says Casey Trine, DNR wildlife technician. "We have people from state parks, wildlife, law enforcement, volunteers, county conservation boards and we also have prisoner help. When we have this many geese, it is fantastic to get this many people together to help."

One roundup can take an hour or two depending on the amount of geese corralled. The neck is tucked into the bird's wing to keep it from flailing around and injuring itself. One by one, the workers in the pen scoop up the geese and hand them over to be sexed and aged before they clamp a uniquely numbered aluminum leg band.

"After being handled, they disband and disperse and go to the opposite end of the lake. They won't utilize the area of the park we banned for more than a week. For them, it's startling

After rounding up the geese from the shores of this urban pond, wildlife staff and volunteers move the pen to a shaded area as they prepare to band the geese.

and something they're not used to, so they want to be a long way away," says Trine.

Put a Band On It

DNR Wildlife staff band over 4,000 giant Canada geese statewide each year. There are 16 wildlife units in the state and every unit has a quota of bands.

"We can use this information to know what our goose population is doing in the state, how healthy it is and how our reproduction has been each year," says Trine.

Researchers band geese in late June and early July while they molt. Geese replace their flight feathers once a year rendering them flightless. Molting geese's tattered wings leave the bird in a constant state of bed head.

When hunters recover the bands, they are encouraged to report the information via the website on the band. Hunters can keep the bands and many like to collect them as mementos of their hunts. The band identification tells how long the bird has lived and helps biologists map flight corridors and hunting seasons. If biologists record a large enough sample of banded birds, they can estimate the survival and recovery rates, which is a measure of the hunting pressure on the population.

However, researchers usually only collect two data points from conventional banding; one when the bird is banded and the other when the bird is harvested by a hunter or found dead. Sometimes researchers will collect more than one data point if they recapture a bird that is already banded. Most birds are recovered in Iowa, but there are a number of birds banded in Iowa and end up in Missouri and Minnesota.

"Recaptures are very crucial because we can know if birds are coming back to the same spot if they were banned here, or where they are migrating from if they were not," says Trine.

Not much is known about the life lived in between banding and death.

Jones holds the tracking collar as he and Luukkonen wait for the adhesive to dry. The study has surpassed one million tracking locations from these collars. Covering the goose's eyes calms the bird until they can safely release her.

A Day in the Life of a Goose

The roundup is also part of a collective effort between the DNR and researchers at Iowa State University to study the movement of urban Canada geese by attaching GPS-GSM transmitters.

"That's where the transmitters come in to fill an information gap," says Ben Luukkonen, graduate student in wildlife ecology at Iowa State University. "That way we can know exactly where that bird goes throughout its entire life between when it's banded and when it dies or is harvested by a hunter."

The GPS transmitter continuously collects the bird's location every 15 minutes for the two years of the study. Every day, they are receiving about 4,000 locations from geese. In total, they have received over one million data points uploaded via cell network. Once a day, the transmitter will connect like a cell phone to an online server so researchers can monitor the geese every day and see what they are doing. A solar panel on the collar recharges the transmitter.

"It's remarkable technology," says Lukkonen.

Jones selects one female goose from the round up to adorn a special tracker around her neck. He and Luukkonen find a shaded spot away from the busyness of the larger roundup to fit the tracker. First they inspect the goose for physical abnormalities. Then they check the fit of the collar. They want to make sure that it is wide, but isn't going to come up over the neck and isn't going to sit too far down. After that, they glue the overlapping ends of the collar for a secure connection before letting her loose.

"It's really valuable for us to be able to put that transmitter out there and get that information," says Luukonen.

However, the style transmitter they used for the first year had challenges with cell coverage in rural areas. Luukonen says they were able to purchase transmitters with better rural coverage.

"We primarily put those out at the rural sites and we have been very pleased with how those have worked so far," says Luukkonen.

There is an inscription on each of the transmitters that has Jones' contact information on it.

"We encourage hunters to report their harvest of not only banded birds but transmitted birds and we provide them with a reward for doing that," says Luukkonen. "We work with hunters to get the transmitters back and ask them a couple of questions about their experience and that's valuable information as well."

About a century ago, Canada geese were extirpated, or locally extinct, in Iowa due to unregulated harvest and loss of habitat. With efforts from state and federal agencies, management practices and designated no-hunting zones, the goose population increased throughout the years.

"Iowa has gone from having absolutely no geese to now what a lot of people would consider over-abundant. I think there are a lot of people that simply don't know that, and I think it's a really great conservation success story," says Luukkonen. "Who would have predicted that back when they were reintroducing Canada geese that they would have ever reached the levels they are today?"

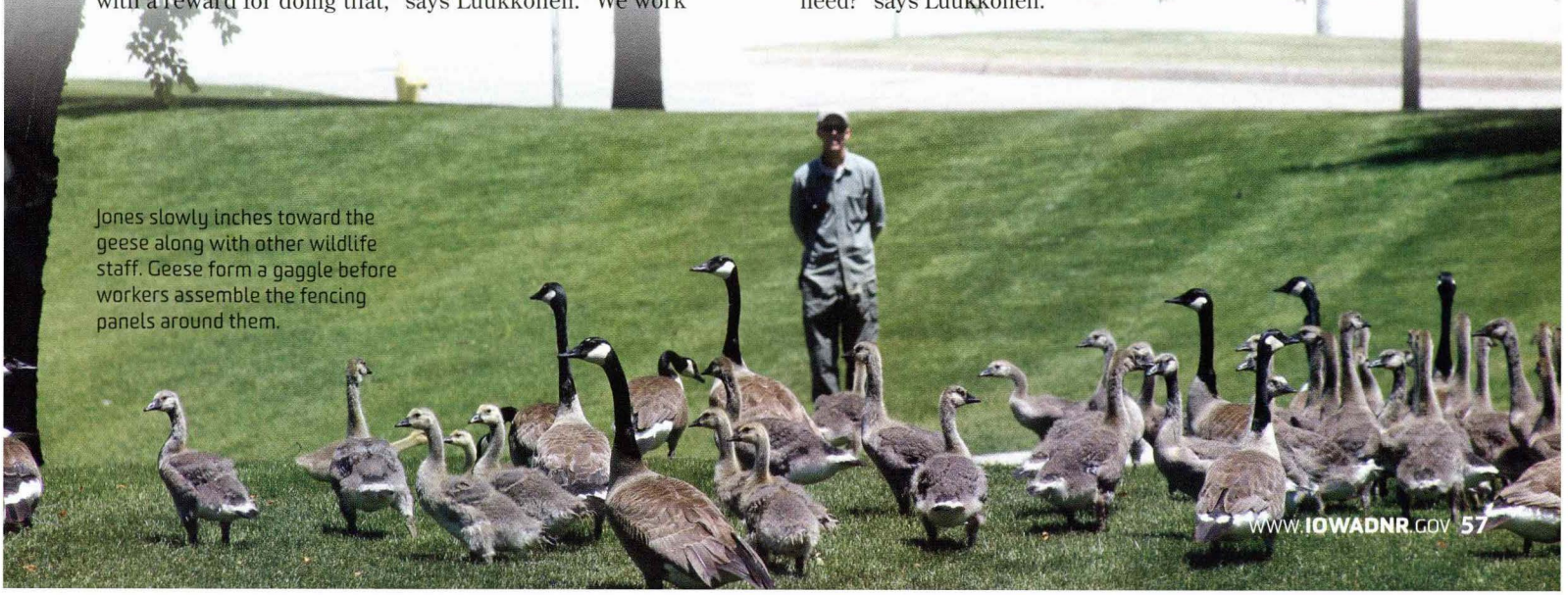
Closed areas to hunting serve as goose refuges and not only help Iowa's population of breeding Canada geese, but are also important stopovers for migrating Canada geese. These areas were originally created to help boost the population when they were reintroducing the birds. Geese in these closed areas are fitted with a transmitter and serve as a control group to compare the movement of urban birds.

"In these areas that are closed to hunting, really the only difference between the two is urban development. It gives us an opportunity to compare the two movements of geese in urban areas as well as geese in rural areas to see if they are doing anything different or if they behave the same," says Luukkonen.

What's Been Uncovered So Far

Preliminary results show that urban birds spend more time in the city than the rural birds spent inside of the refuge.

"There's no way to know for sure why this is. I could speculate, and I think there are people that think the same way. They're pretty smart birds and if they have everything they need—they really like fertilized lawns that are mowed right up to the water and they have minimal disturbance in urban areas—why would they go fly around if they have everything they need?" says Luukkonen.



Jones slowly inches toward the geese along with other wildlife staff. Geese form a gaggle before workers assemble the fencing panels around them.

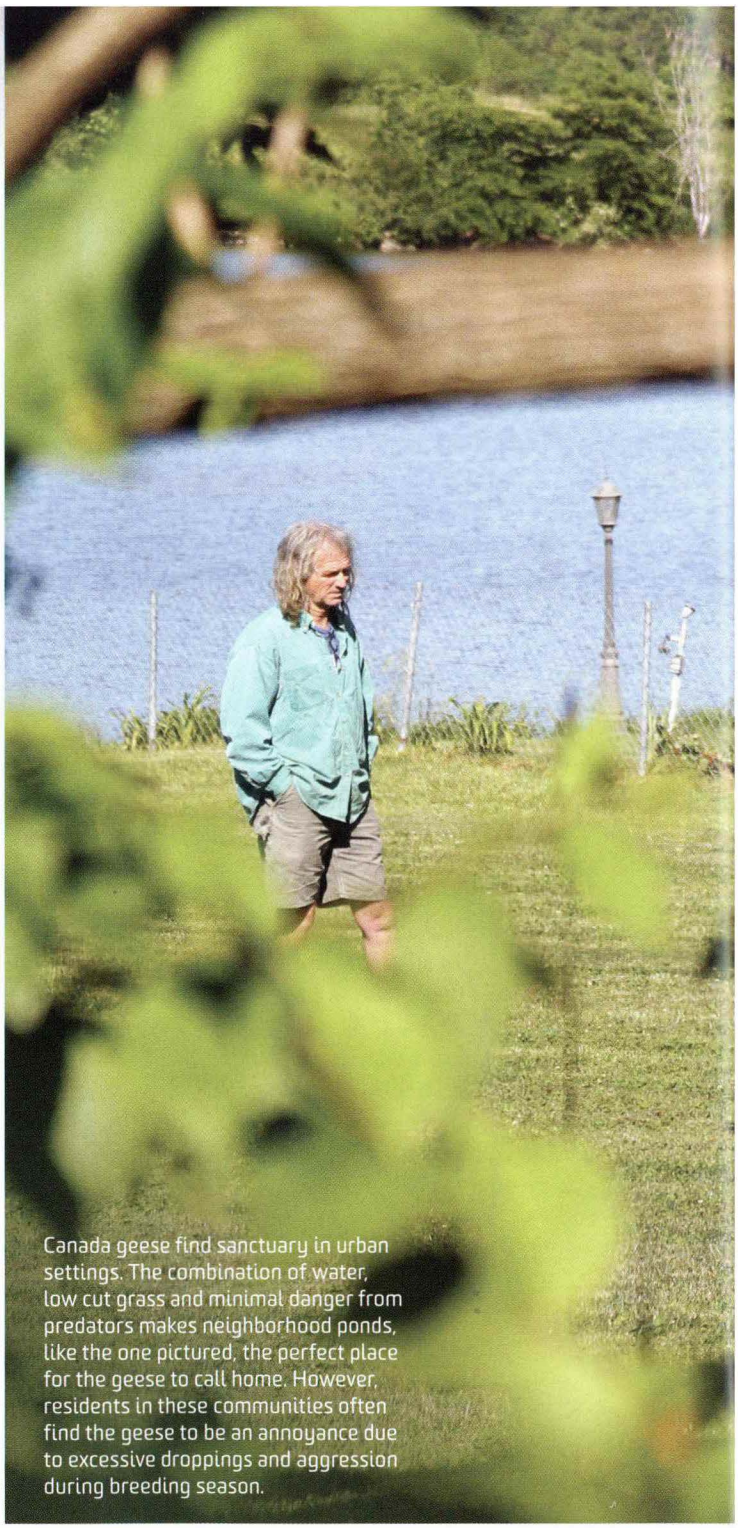
Temperate breeding Canada geese generally do not begin nesting until they are 3 years old. The juvenile geese, those under 3 years old, congregate with adult geese that failed at nesting. During this time, these birds migrate north before molting to selected areas that offer food and safety away from predators while they replace their feathers. Molt migrations are a recently observed phenomenon because biologists thought that birds didn't deviate far from their breeding grounds when it came time to molt. So far, this study has unexpectedly seen many birds make molt migrations.

"A much higher proportion of the females we marked made a molt migration this summer, so that is something that is unexpected and perhaps noteworthy with regard to the movement side of the study," says Luukkonen.

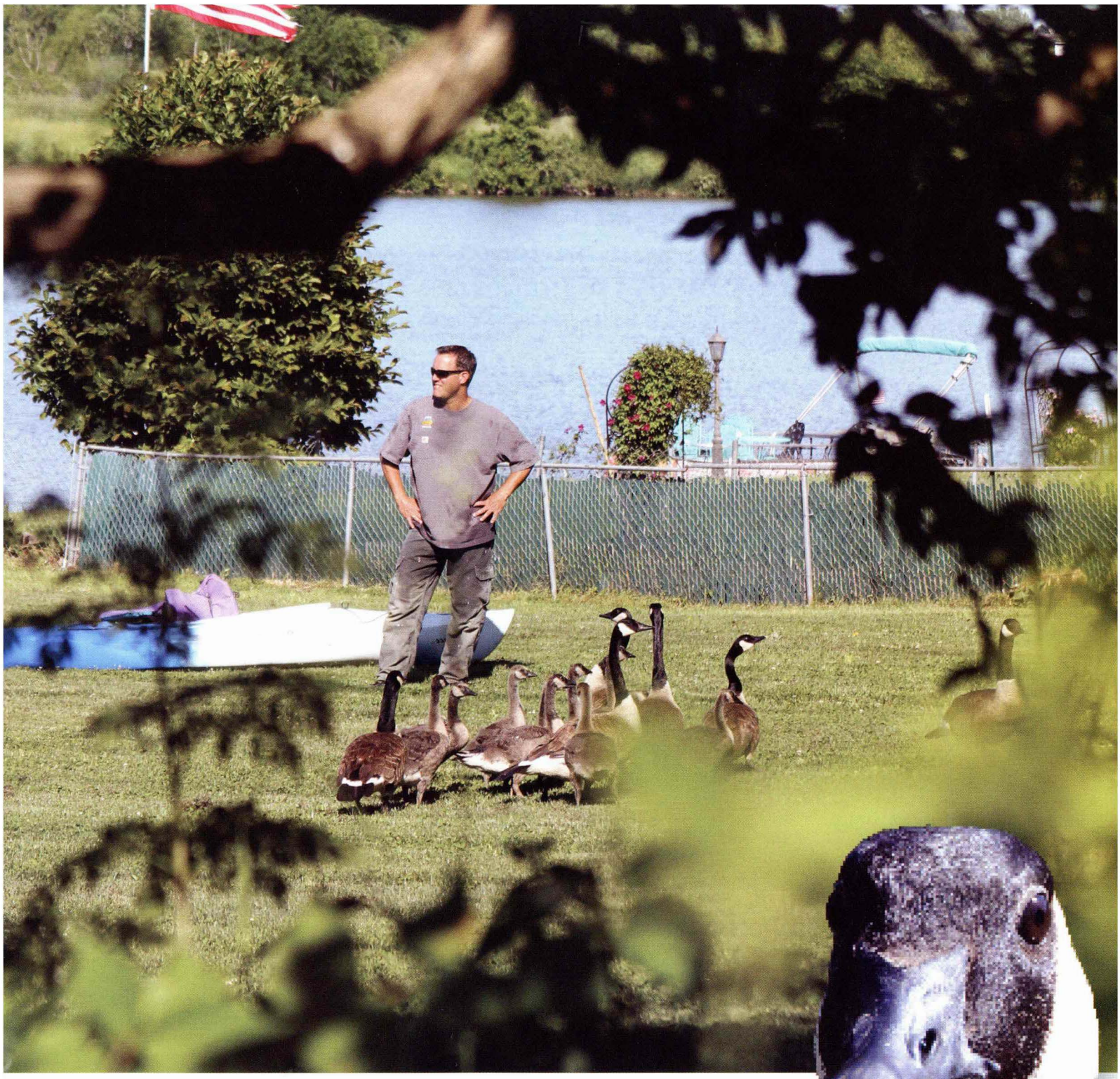
Although some consider them a nuisance, Canada geese are valuable to Iowa waterfowl hunters. The U.S. Fish and Wildlife Service estimates harvest for many different waterfowl species in each state. The harvest estimates for Canada geese in the last few years have exceeded those of mallards.

"That's kind of unheard of because mallards are highly harvested species of duck, so that's an indication of how important Canada geese are to waterfowl hunters," says Luukkonen.

This leaves a dilemma for the Iowa DNR as well as many other agencies. They are trying to manage Canada geese as



Canada geese find sanctuary in urban settings. The combination of water, low cut grass and minimal danger from predators makes neighborhood ponds, like the one pictured, the perfect place for the geese to call home. However, residents in these communities often find the geese to be an annoyance due to excessive droppings and aggression during breeding season.



a valuable resource while minimizing human conflict that primarily occurs around large urban areas. That's where the project came about.

In 2003, the DNR established a special hunting season to hunt in Des Moines, Cedar Rapids-Iowa City and Waterloo-Cedar Falls zones. These seasons are designed to increase the harvest of local Canada geese in and around urban centers to decrease conflicts between geese and people. However, establishing this zone does not constitute permission to hunt. Hunters must obtain permissions before hunting. Check with the DNR's website or the local land manager before attempting to hunt.

"If the complaints are any indication, it would appear that, at least under the status quo, those are not working as intended to reduce population to a level that is acceptable to stakeholders," says Luukkonen.

The results from this research will impact and shape future urban goose management. Part of that is trying to determine if hunting is a viable effort to manage these urban populations, and if it is, what the best way to do that is.

BY BRIAN BUTTON

DON'T CALL A FLORIST, CALL A *FORESTER*

Memorial Plantings Make a Lasting Tribute to Beautify and Honor For Generations

Often the first thought when a funeral or birth approaches is to call a florist. While the benefits are quick, the duration is fleeting. With more planning, a living memorial refocuses grief from loss onto the continuation of life and memory. Trees planted in honor of a newborn will grow with the child. Later as adults, that grown child will fondly recall the parents that planted the now mature tree long after the parents have passed.

Last spring, 29 trees were planted near the DNR's office in Des Moines in memory of former *Iowa Outdoors* managing editor Alan Foster, who passed away last fall.

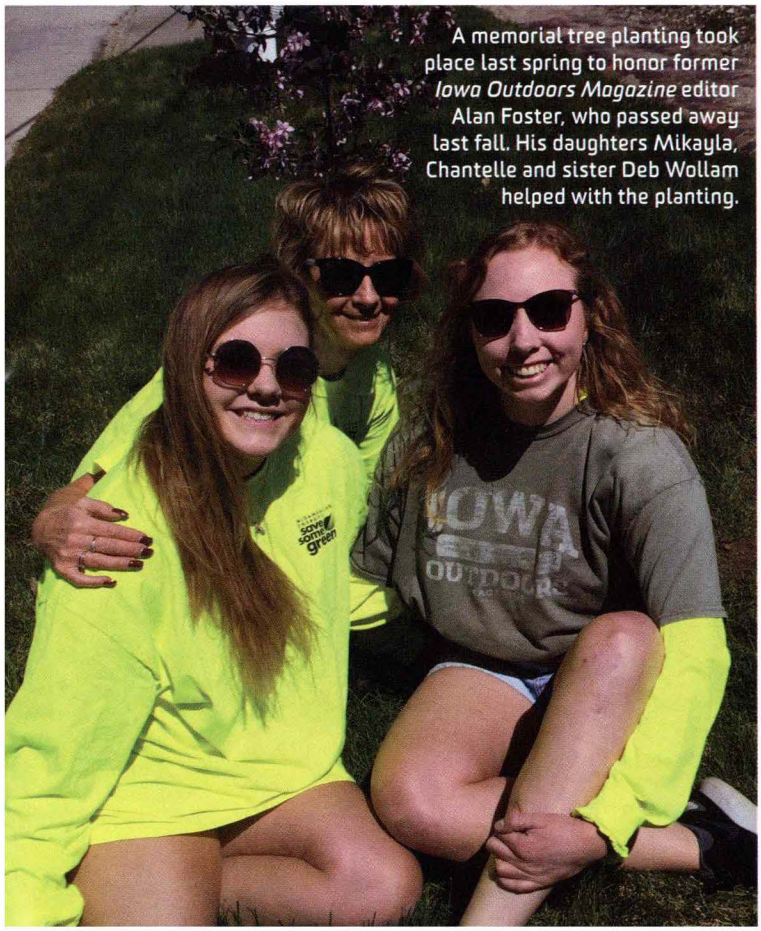
"We are excited that we will be able to drive down here, walk down here and always have a great memory," says Deb Wollam, Alan's sister. She, other family members and DNR staff volunteered to help dig the holes, plant trees and mulch them. Several trees were in full bloom, creating instant beauty. The diverse species mix will offer contrasting fall colors of scarlet, yellow and purple throughout autumn—for the next century.

With a living memorial, young trees become stronger, taller and fuller every year, becoming more magnificent over time to help those grieving or reflect the growth of a child. As the project ensued, all could see that both sides of two blocks were beautified. The tree-lined street will provide havens for birds to fill the air with song, nest and rear young, fragrant and colorful flowers for pollinators, shade and evaporative cooling for the neighborhood during hot summers, acorns and berries for wildlife and a leafy, scenic stretch of street for nearly 10,000 motorists that pass daily.

Fall is an excellent time to plant trees, says DNR urban forester Emma Hanigan. She advises to plant locally-raised stock for the best genetics and disease-resistance and to diversify species. Our memorial planting included oaks (scarlet, white and chinkapin), pecan, Kentucky coffeetree, disease resistant cultivars of American elm and smaller trees below utility lines including yellowwood, serviceberry (also called Juneberry) and crabapple. The diverse mix offers something special for every season—even winter, as the crabapple variety, royal raindrops, holds its red fruits over the winter to attract robins and cedar waxwings upon their return in early spring.

FALL PLANTING TIMES

DNR foresters say optimal fall planting times run mid-October to mid-November, although planting can occur until before the ground freezes. Make sure to water trees weekly until the ground freezes. To buy hardy and diverse tree seedlings of Iowa genetics, contact the state forest nursery at 1-800-865-2477 or see an online catalog at iowadnr.gov.



A memorial tree planting took place last spring to honor former *Iowa Outdoors Magazine* editor Alan Foster, who passed away last fall. His daughters Mikayla, Chantelle and sister Deb Wollam helped with the planting.

SELECTING THE RIGHT TREES

Maple species currently represent more than one-third of all trees in Iowa communities, creating a great risk of tree loss due to insects or disease. DNR urban forester Emma Hannigan says to check the DNR webpage for a pdf file called "Choosing Trees for Your Yard—Rethinking Maple." It helps match species needs with site characteristics. A diverse tree mix is necessary for maintaining a healthy and resilient community forest. By planting a variety of species well-suited for the site, you help ensure a community's tree canopy is a valuable resource for the future and enjoy interesting traits different species present all year.

When selecting trees, consider mature size. Be sure to look around the yard and neighborhood, and select a species that will add to diversity on the block.

BY *BRIAN BUTTON* PHOTO BY *ERIC BURSON*

The American Bison

Bison, the iconic symbol of the American west, thrived across the Great Plains from Canada into Mexico, as well as eastern and southern states. A shaggy-maned mammal with a large head, heavy forequarters and a large, muscular hump, great herds once grazed the grasslands and were first seen by Europeans in the 1530s during Spanish expeditions. Both males and females have horns, with male horns slightly more curved inward.

BISON HELP PRAIRIE

In recently burned areas, sprouts of new plants thrive and offer protein-laden freshness to bison. As herds roam, they chew down tall plants, which creates habitat for wildlife that prefer shorter plants. Grazing encourages the growth of various plant species, increasing growth rates to provide more food. By favoring grasses, bison help wildflowers grow with less competition from tall grasses.

WALLOWING AROUND

Bison roll on the ground to remove biting insects and hair when shedding, and to cool off when hot. These areas with bare dirt depressions are called wallows. Bulls also wallow to leave scent and display strength. Large wallows collect water, creating habitat for amphibians and aquatic insects. Some plants and invertebrates also like the open soil around wallows.

SHAGGY SEED DISPERSERS

As bison roam, seeds—either eaten or stuck to hair—get a free ride across the prairie to spread. Seeds are nourished by nutrients in bison droppings to help them sprout. Currently, research about the impact of bison on seed transport is going on at Neal Smith National Wildlife Refuge east of Des Moines.

BISON SLAUGHTER

Native Americans relied on bison—using every part from bones to hair. The U.S. government promoted bison slaughter to decimate Native American populations and destroy their way of life. Bison numbers, estimated at 30 to 90 million, were driven almost to extinction by the late 1880s, hitting a low of several hundred. Waves of trappers and traders killed millions for hides and meat, highly desired in the east. Bison were also killed for sport—carcasses left on the prairie as wonton waste. Later, piles of bones were gathered and shipped east, ground up for fertilizer.

BISON IN IOWA

In 1673, French explorers Marquette and Joliet reported Iowa herds as large as 400 near the Mississippi River. In 1820, explorers mention a herd of 5,000 about 15 miles east of Spencer. Heavier settlement by the 1850s rapidly decimated bison. Iowa's last wild bison was killed in 1886. Even when gone, wallows still covered the state. One near Kellerton was 20 feet deep and covered 2 acres. Wallows could still be seen in Black Hawk County in 1918. Skulls and bones are still found along river banks by paddlers today—some hundreds, even thousands of years old.

IOWANS AND BISON

William "Buffalo Bill" Cody, born in Scott County in 1846, went west to become the most famous bison hunter. John Lacey, a U.S. Congressman from Oskaloosa, wrote an act in 1894 to protect bison, making it a crime to poach bison in Yellowstone National Park. William T. Hornaday, educated at Oskaloosa College and Iowa State University, became the first director of the Bronx Zoo and was an early conservationist. Fearing inevitable bison extinction, he went west to perform taxidermy so future Americans could see what they looked like. He also acquired 40 live specimens for the zoo. In 1905, he formed the American Bison Society. That same year, the first large game preserve in the nation was created and Hornaday provided 15 zoo bison to be relocated there.

FAVORED FOODS

Buffalo grass and blue grama are favored. Other grasses, like big and little bluestem, Indian grass, switch grass, side oats grama and other grama grasses are eaten, too. Grama grass nutrition is high, even in winter. Like other ruminants, bison have a four-chambered stomach to digest high cellulose plant material with the help of fermentation by protozoa and bacteria. Teeth have evolved for grinding. Bison spend much of their time regurgitating and chewing cud before moving the material into the last two stomach chambers.

BY JESSICA MONTANA, FIELD OFFICE SUPERVISOR, ATLANTIC

BLOODY HALLOWEEN SPILLS AND OTHER TALES

On a normal day, a DNR environmental inspector reviews reports and any compliance issues and remedies made at a facility since the DNR's last visit. Then, he or she contacts the owner or facility representative to schedule time to conduct a routine inspection. That's the routine … usually.

But, some days a call comes into a DNR field office to report manure flowing in the gutters, in which we bewilderingly ask, "Are there goats on the roof?! How is there manure flowing through gutters?"

Alison Manz, DNR environmental specialist, was on call that day. She finished her Insects and Animal Safety presentation to her co-workers, then made her way to the City of Willey in Carroll County. No, she did not find goats, or other livestock, on the roofs of any home, however, she did observe manure around an intersection in town, flowing down street gutters. While a responsible party could not be identified this day, a local producer from a nearby farm assisted with cleaning up manure using absorbent, a skid loader and a street sweeper.

Then, there are those days that align so perfectly in the "you-can't-make-this-up" category—which always seem to happen on a Friday at 4:27 p.m., three minutes before state offices close.

For example, in 2015, a day before Halloween, the southwest Iowa field office received a spill call. A tanker truck carrying 6,000 gallons of a unique liquid went into the ditch. Again, Manz was on call and responded. Upon arriving, she saw a tanker truck turned over in the ditch, but also observed a normally sandy-colored ditch darkened with a red, gooey, sticky substance. Fitting for Halloween, the overturned tanker truck carried pig blood and plasma.

To assist clean-up, any container involved in an accident is typically emptied before being righted; however, this day, the tanker truck was righted before the contents were emptied causing all contents to bleed (sorry) into the ditch.

"Why can't we just leave it there?" someone asked. "It's not toxic or a chemical." True, Manz agreed; however, she explained blood can carry disease that birds and critters can walk through to potentially spread that disease—it's a biological hazard. Further, while pig blood might not be a traditional chemical to clean up, it still cannot remain in the ditch—in essence, "if it's not supposed to be there, then it has to be cleaned up." (Personally, I had visions of the dreadful prom in Stephen King's *Carrie* rolling through my mind as Manz explained the situation to me.) And of course, there are smell issues and if left, could flow into a water way to decompose and deplete oxygen to potentially kill fish. Plus a bloody mess is, well, not aesthetically pleasing to say the least.

County officials helped build a dirt berm in the ditch to aid pumping blood into a container for proper disposal. Berms not only help pool contents for clean-up, but prevent substances from traveling further, potentially into a waterway. Here, the berm prevented blood and plasma from reaching Elk Creek.

Equipped with proper training and experience, Manz handles any situation coming into the DNR. And, thankfully, she is on call often. Similar DNR staff at the Atlantic office and five other field offices across Iowa do the same, too, daily.

In June 2019, while off work and not on call, Manz received a call from a family member. Out of breath, the caller was short, "There's been an accident. You need to

get down here now." Dressing quickly in her DNR gear, she headed toward the accident, not knowing what she would find.

About one-quarter mile east of her community, Manz approached a truck overturned in the ditch of Nishna Avenue. She noticed jugs and tanks of various chemicals strewn about surrounding the lame truck.

Hauling approximately 1,000 gallons of Roundup, 50 gallons of herbicide metolachlor, water and other various chemical jugs, the truck was totaled. Most jugs remained intact, however, the water, Roundup, and metolachlor tanks were breached, spilling into the ditch.

Immediately understanding the severity, locally trained residents, fire crews and Manz systematically and professionally took control. Manz communicated with residents and fire crews who were qualified in handling chemical spills, to ensure site cleanup quick as possible.

The sun was setting and lightning flashed in the distance, a storm fast-approaching. Emergency locates for any buried utilities were completed, plus instruction to build a dirt dam below the spill, approximately 1,000 feet from the West Nishnabotna River.

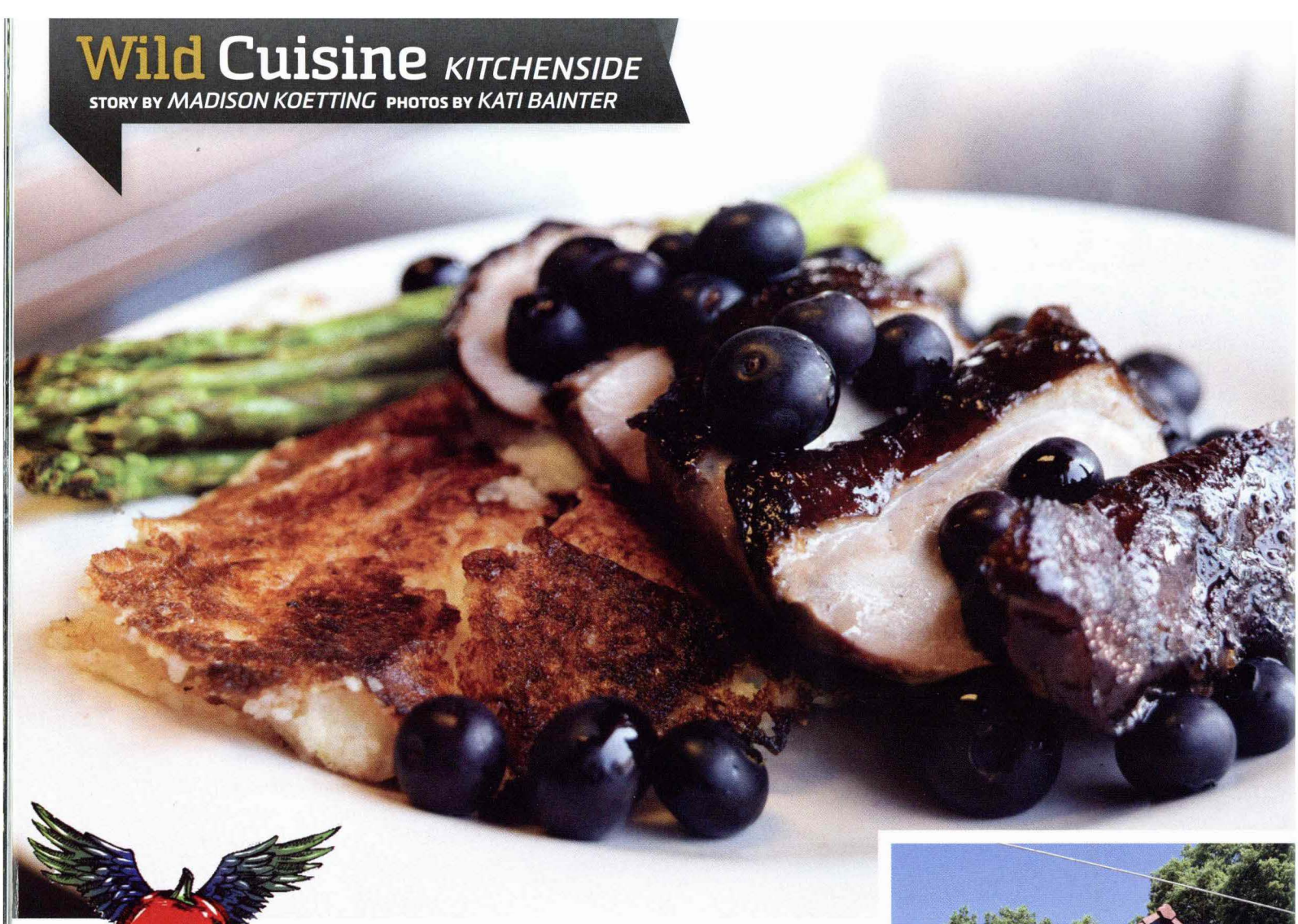
After the truck was righted and removed, an excavator began digging. Using a pump, empty totes and a generator, crews worked to clean-up approximately 1,000 gallons of spilled liquid from the ditch. Local residents returned later that evening with portable lights to assist. With guidance and calmness, Manz stayed with clean-up crews into the night. By 11 p.m., the ditch was completely cleaned to site and smell requirements within hours after spilling.

Whether a spill of pig blood, a fish kill in a pond from unknown sources, a pontoon boat mysteriously sinking at Twelve Mile Lake, accidents involving tanker trucks, or broken underground gasoline pipes, every release is required to be reported to the DNR within six hours of occurring. While each clean-up is unique and different, DNR field staff always investigate "Why, Who, When, What, Where and How" and assist with clean-up efforts.

Some incidents warrant going further, staying longer and working later, to ensure not only the environment is protected, but residents are cared for as well. DNR field inspectors do that too.

Most releases and clean-ups occur without tragedy; however, the June 2019 incident with Roundup and metolachlor was different. That day needed extra. The truck driver did not survive. He was a beloved member of the community. This article is dedicated to the City of Harlan, Shelby County and the Hemminger Family.

STORY BY MADISON KOETTING PHOTOS BY KATI BAINTER



Smoked Duck Breast Over Goat Cheese Grits

Hidden within Des Moines, this restaurant creates dishes just as memorable as its name by combining everyday, simple ingredients.

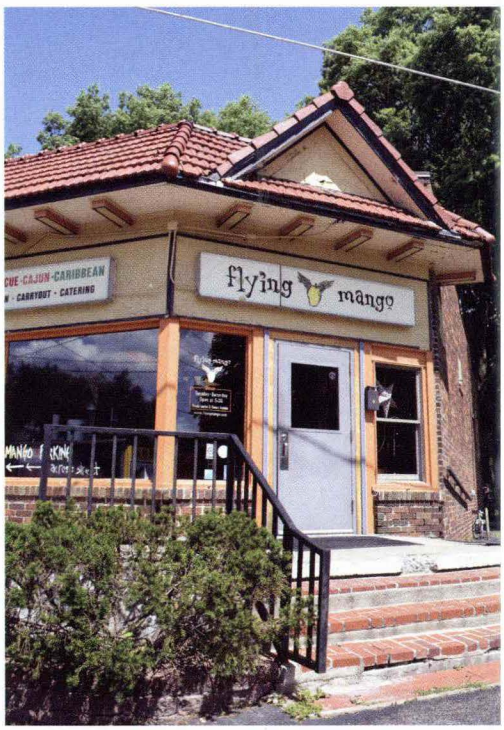
Barbecue, meet the Caribbean. Owned and operated by husband and wife Michael Wedeking and Suzanne Van Englehoven, Flying Mango is known for its "award-winning succulent barbecue, bold flavors from the Caribbean and unique homemade side dishes." Its eclectic menu offers everything from smoked beef brisket to southern comfort food, and as Wedeking puts it, "If I don't eat it, I don't sell it." Named for the owner's experience as a licensed pilot and his favorite fruit, Flying Mango is creating relationships with the Des Moines community through one-of-a-kind dishes and its inviting atmosphere.

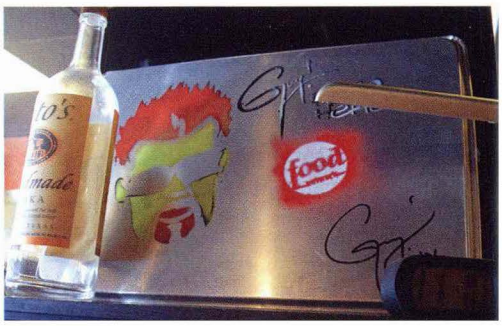
SMOKED DUCK WITH SMOKED BLUEBERRIES AND GOAT CHEESE GRIT CAKE

The goat cheese grit cake provides a tart and pungent taste, serving as a complement to the sweet and smoky flavor of the blueberries. Each ingredient offers its own distinct flavor and offers a melt-in-your-mouth sensation when combined all at once. Duck serves well with grilled asparagus or your vegetable of choice.

SMOKED DUCK WITH BLUEBERRIES

1 duck breast
1 carton of blueberries





Using cherry, or any type of unseasoned wood, smoke the duck breast at 200 degrees for 45 minutes. Pour blueberries in a disposable foil baking pan and smoke at 200 degrees for 10 minutes. Let duck sit for 15 minutes before serving.

TIP: Mike recommends smoking the duck on low heat for small periods of time. Using unseasoned wood in the smoker provides the most smoke and some moisture.

TIP: For added flavor, dilute blueberries in 1-2 oz of rum and carefully ignite to burn off alcohol.

This will create a sauce-like texture to top the smoked duck.

GOAT CHEESE GRIT CAKE

3 1/2 cups water
2 cups heavy cream
1 1/2 cups half and half
1 stick butter
2 tsp. salt
1 1/2 cups stone-ground grits
4 oz goat cheese

Combine all ingredients except the goat cheese and grits in a stock pot. Bring to a simmer, stirring occasionally. Gradually whisk in grits, but make sure not to add in too quickly or they will clump. Add goat cheese, and reduce heat to low and cook for 50-60 minutes, stirring frequently. If grits are too thick add more water or half and half.

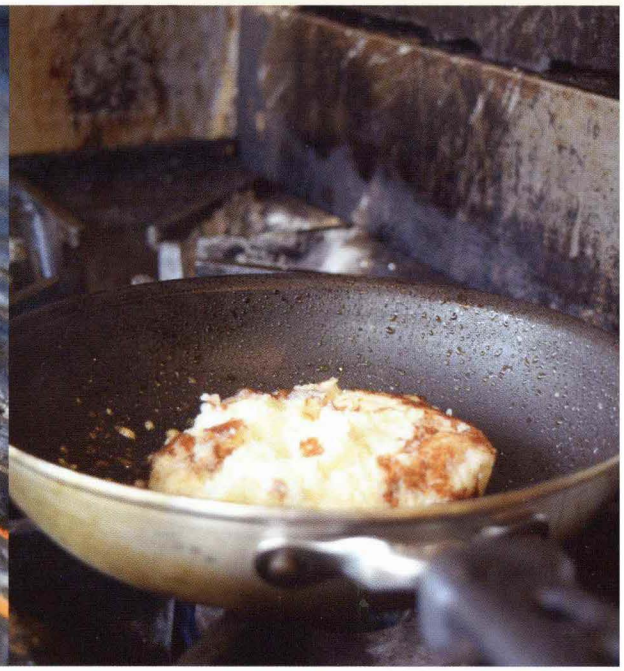
FLYING MANGO

515-255-4111
4345 Hickman Rd, Des Moines, IA 50310
flyingmango.com

HOURS:

Tues.-Thurs. 5-9 p.m., Fri.-Sat. 5-10 p.m.
Available for private parties

Flying Mango's smoked duck recipe was featured on Food Network's Diners, Drive Ins and Dives in January 2015. The crew came back in 2018 to showcase the restaurant a second time on Triple D Nation, Guy Fieri's "Flavortown Favorites."



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