

JULY / AUGUST 2013

IOWA OUTDOORS

THE DNR'S MAGAZINE OF CONSERVATION AND RECREATION



IN THIS ISSUE:

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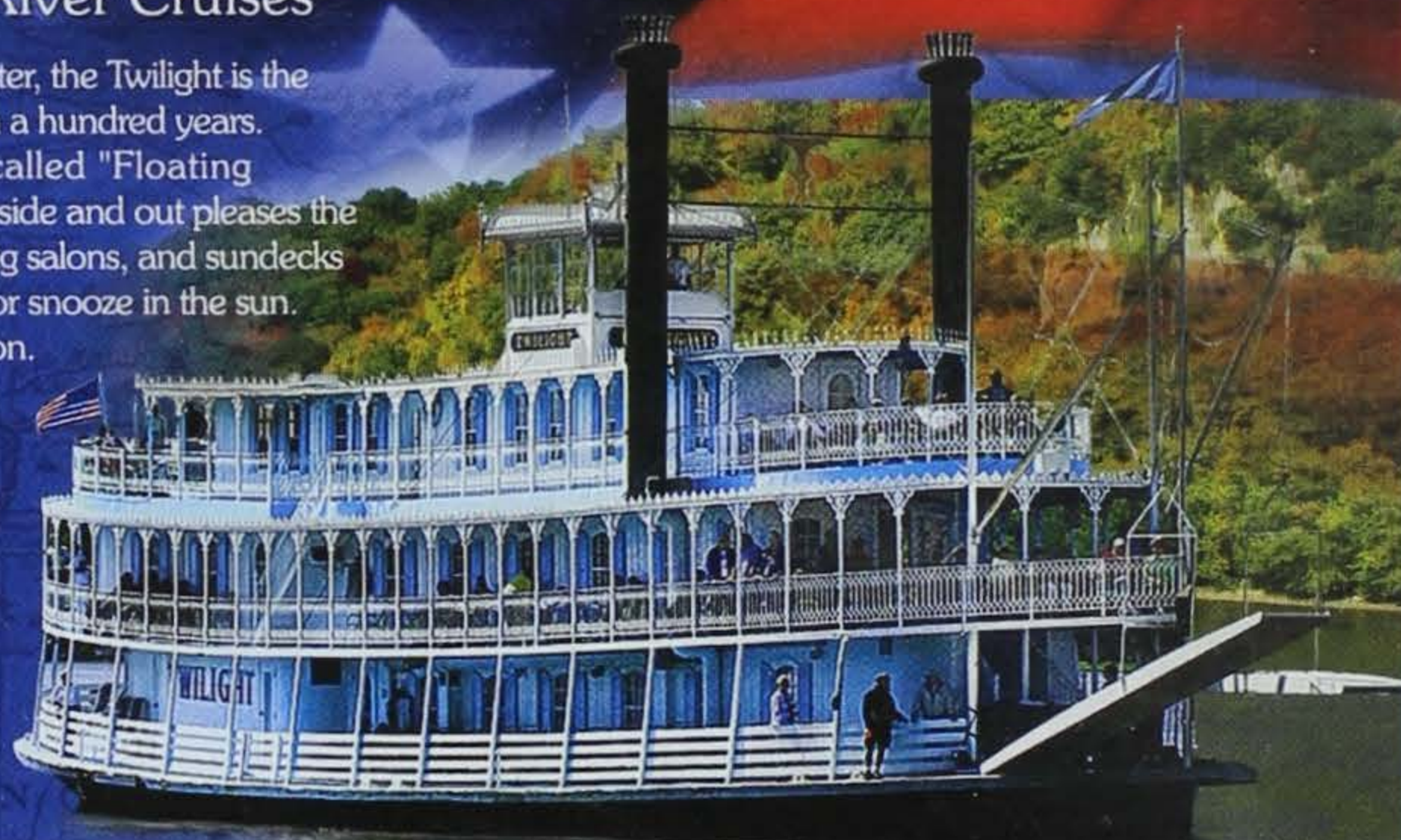
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DNR MISSION

To conserve and enhance our natural resources in cooperation with individuals and organizations to improve the quality of life for Iowans 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.

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DNR volunteer programs help Iowans give back to lands, waters and skies. **515-242-5074** or **keepersoftheland.org**.

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SANDY FLAHIVE is a Des Moines writer who likes getting in her Jeep and meandering around Iowa, discovering the hidden gems that lay in its many nooks and crannies. She also enjoys spending time at her remote cabin near Stephens State Forest in southern Iowa.




JEN WILSON is a travel and features writer based in Des Moines. Her work appears in *National Geographic Traveler*, *Frommer's Budget Travel*, *Midwest Living* and *Esquire*. Her first book, *Running Away to Home*, is available in bookstores and online at **www.jennifer-wilson.com**.

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Strange shale in northeast Iowa led researchers to a startling discovery—a massive, millions-year-old crater buried deep below Decorah. But the secrets keep coming—the crater preserves some of the best fossils ever found on Earth from the mid-Ordovician period.

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PHOTOS BY JAKE ZWEIBOHMER AND CLAY SMITH

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A dedicated, diverse group of young conservationists are making a big difference in parks one blister at a time—just as their CCC predecessors did 80 years ago.

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Declining mussel populations and vanishing species have biologists scouring Iowa rivers looking for answers for this oft overlooked, yet remarkable animal.

BY MINDY KRALICEK PHOTOS BY CLAY SMITH

ABOUT THIS PHOTO

Tough labor and harsh conditions in these modern day CCC camps prove this generation has sinew, pride and grit. For DNR's AmeriCorps Trail Crew, team membership is an honor earned by lugging railroad ties and 300-pound rocks while building and repairing park trails. Photo by Brian Button.

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ABOUT THIS PHOTO

A wooden staircase clings 50 feet up the side of a quarry wall in the Horseshoe Bluff Interpretive Area at Mines of Spain State Recreation Area in Dubuque. The DNR Trail Crew built the winding staircase in 2008, after laboriously tearing out 50 railroad tie steps and replacing them with stone steps that lead up to another area of the quarry in the process. The quarry was active in the 1930s when rock was needed to build the lock and dam just upstream. Read more about the hard working trail crew on page 44. Photo by Mark S. Edwards.

ABOUT THE COVER

Every year, hundreds of Project AWARE volunteers remove tons of river trash—car parts, household appliances and hundreds of tires—while forming tight bonds along the way. *Iowa Outdoors* photographer Clay Smith captures these herculean efforts while writer Jen Wilson makes her debut with the effort. Read more about her surprising experiences and the voyage on page 34.

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Myth Busters

BY SHELENE CODNER

SQUIRRELS SWEAT TO STAY COOL



It's a myth that has been driving us nuts. Unlike humans, squirrels have very few sweat glands and must find other ways to keep cool during the summer. Last summer, squirrels were reported laying spread out on branches and fences, leading to the question: Were the squirrels attempting to stay cool?

Chances are these squirrels were merely relaxing

during the hottest part of the day.

According to DNR forest wildlife research biologist Todd Gosselink, squirrels—not unlike other animals—will limit their activities during peak temperatures. Squirrels also lose their winter coats in preparation for summer, opt for leafy, shaded nests in the open air as opposed to their established tree cavities and participate in saliva baths on a regular basis.

Additionally, those big, beautiful, bushy tails are not just for looks. Besides being used for shade, the squirrel's tail performs an impressive biological function to aid in the cooling process. Because the tail is so thin, ambient air cools the blood in the tail rather quickly. This cooled blood is pumped to the squirrel's body to assist in lowering the squirrel's core body temperature.

Not unlike ourselves, squirrels compensate for extreme temperatures and manage to cool themselves through both self-regulation and biological function, therefore it is not unlikely that we might observe squirrels “chilling” (like those mentioned above) on a hot summer day.

Have you observed or photographed squirrels keeping cool in your area? If so, Project Squirrel—an endeavor of the University of Illinois at Chicago—would be interested in recruiting you as a citizen scientist. To report your squirrel observations or to submit your photos, visit ProjectSquirrel.org. For additional information regarding squirrels and other wildlife in Iowa, visit www.iowadnr.gov.

Ask The Expert — Becky in Cedar Falls asks

If our body temperature is 98.6°F, why do we feel hot when it is 90 degrees outside?

As the temperature outside increases, the complexity that is the human body continues to regulate our internal temperature to remain at 98.6°F. The burning question then is if our internal temperature is 98.6°F, why do we feel hot and sweaty when the outside temperature is lower—say 90°F?

The reason is based on thermoregulation, which is the process our bodies use to ensure we maintain our core body temperature. Thermoregulation attempts to create a balance between our internal temperature and the temperature of the air around us.

Our bodies are constantly producing heat due to metabolism. And when we physically exert ourselves, we produce additional heat. This is why if you are working out in a room that is a cool 70°F, you begin to sweat, continue to sweat and sweat more as the intensity of your workout increases. The more energy you exert the more heat the body must release to maintain its internal temperature. Sweating is how the human body releases excess heat to

maintain the 98.6°F core temperature and preserve the balance with external temperatures.

Theoretically, if it were 98.6°F outside, our internal temperature would be in equilibrium with external temperatures. However, mitigating factors influence our bodies' internal comfort level regardless of what the thermometer says. Clothing, humidity, sunshine and exerted energy all influence the amount of heat our bodies produce or absorb and the amount of heat that must leave the body to maintain internal temperatures. If our bodies do not maintain equilibrium, heat stroke occurs.

According to Mayo Clinic, heat stroke can occur when the body reaches 104°F. Prevent heat stroke by wearing light-colored, loose clothing, drinking plenty of non-alcoholic fluids and limiting physical activities during peak temperatures.

For more information about symptoms, diagnosis, treatment and prevention of heat stroke visit mayoclinic.com.



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

Avoid Swamping

BROACHING, or getting pinned sideways against a rock or other obstruction, can quickly cause a boat to swamp. Here's how to get unstuck.

FIRST, lean aggressively *downstream* toward the rock, log or obstruction so current catches under the hull, pushing up, and aiding buoyancy, says DNR river outreach coordinator Todd Robertson.

THEN put a hand against the rock to stabilize. While continuing to lean, use your hand to either pull forward or push backwards to slide off the obstruction.



Raccoon River, Polk County

WRONG—leaning upstream lowers the canoe gunnels or kayak cockpit to catch water and instantly flood. The heavy, swamped craft will be non-maneuverable. Swim away from the canoe to avoid getting pinned between the rock and boat or against the canoe.



Preserve Meteor Memories

Take night photos with a tripod and cable release. Set shutter speed to "B." Get away from glow of city lights and use a 50mm lens with focus set to infinity. On cameras with built-in lenses, don't zoom in too far (captures less sky) or use a wide angle (makes meteor streaks appear small). Keep shutter open until a meteor is seen, then release shutter. Experiment with exposure times and ISO settings to see what works best. Long exposures will wash out sky or show star movement. **The Perseid meteor shower peaks around Aug. 12 and 13, but good viewing persists leading up to and after the peak.** On the 12th, wait until around 11 p.m. for the moon to set for a darker sky.



Tadpole Tips



If you see a tadpole with a red tipped tail, that's unique to two virtually identical tree frog species—Cope's gray and the eastern gray. They only differ by their number of chromosomes and size of red blood cells and were once considered the same species. Learn more about Iowa's amphibians and reptiles at www.herpnet.net.

ACTIVITIES, TIPS AND EVENTS FOR THE WHOLE FAMILY

Leaps of Faith

When people climb 30 feet into the air, unusual things happen. Add physical challenges and the effect on fun-seekers becomes remarkable. That's why 10,000 people have "learned the ropes" at Langwood Education Center and left with greater self-esteem, confidence and trust in others.

"We've even had a bachelorette party use the course," although most visitors are school kids, athletes, corporate staff and families, says Katie Hammond, director of Louisa County Conservation, which runs the ropes course 18 miles south of Muscatine.

What's the draw? First, this isn't merely "fun"—it is thrilling, exhilarating and nerve-wracking. Second, it isn't mindless entertainment—people learn about their inner self, build trust, test courage and forge bonds that only result from a mix of tension and adrenaline.

"There was a high school P.E. class here," says Hammond. "Their teacher saw students talking to each other that had never spoken before in four years. Not only that, they were cheering each other. The course brings people together," she says. "It is designed to challenge people."

After learning safety tips, the typical first reaction is, "Wow. This is higher than I thought," says Hammond. "There will be some nervousness. And there are always

braver ones who scamper up first. Then everyone sees it isn't so bad."

From atop, get an eagle-nest-like view of the adjacent pond—think spotting turtles from 30 feet high or watching bluegills build a nest.

"People leave with a great feeling of 'I did it!' There is a natural high of excitement of doing something they didn't think they could do. This place builds confidence," Hammond says.



Team Building Course

Just a few feet off the ground, these activities force teamwork to solve a problem presented by the facilitator. Communication, leadership skills and teamwork are a necessity. One, a complex web of rope—called the Spider's Web—requires problem solving and team building to lift and pass a person through.

Requirements and Cost

Minimum group size is 6. Well-fitting, close-toed shoes required. Bring water bottles, sunscreen and insect repellent. Wear pants or longer cut shorts to prevent chaffing from safety straps. Prices vary based on group size and needs. Call for pricing and reservations. Open from March or April through October

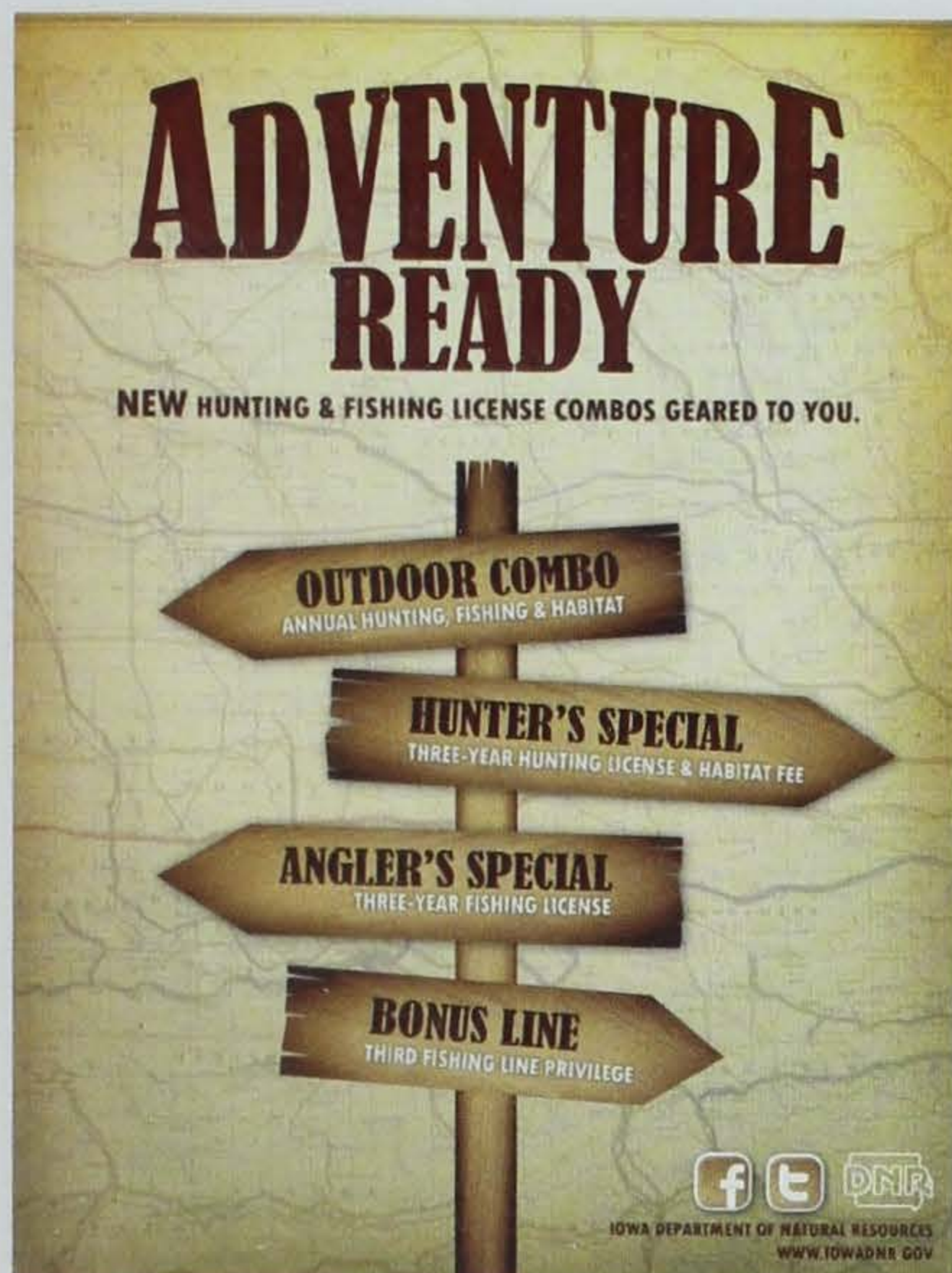
or November, weather permitting. Customized programs available. You can schedule your group for a whole day with both high ropes and initiative activities or a half day with one component.

For prices, details or to schedule your group, call or email [319-523-8381](tel:319-523-8381), lccb@lccb.org or visit louisacountyconservation.org.

Stay the Night

Rent the onsite A-frame dorm for \$186 per night. Full kitchen, showers and 21 cots, plus free canoe use, bird-viewing blind, hiking and volleyball.





Anglers and hunters can win gift cards simply by buying one of the DNR's new license options. The Adventure Ready Gift Card Giveaway began this spring and runs through mid-December.

Several hunting and fishing license vendors are providing gift cards: The Baker's Pantry in Dallas Center, Bass Pro Outdoor World in Council Bluffs and Altoona, Cappel's Ace Hardware

Together Fish, Hunt and Win \$50 Adventure Ready Gift Card Giveaway

in Atlantic, Fin & Feather in Iowa City, Four Seasons Bait and Tackle in Le Mars, Hy-Vee in Sheldon, Jerry's Live Bait in Anamosa, Mills Fleet Farm in Mason City, Scheels in West Des Moines, Sportsman's Warehouse in Ankeny and Theisens in Dubuque.

"This is a great way to partner with retailers and provide customers with licenses that offer convenience and expanded outdoor opportunities," says Chuck Corell, who oversees the DNR's Conservation and Recreation Division.

To participate, buy one of four qualifying licenses at any license retailer (it does not have to be at a gift card vendor), or at www.iowadnr.gov/giveaway

Qualifying licenses are:

- **OUTDOOR COMBO LICENSE**—annual resident hunting/fishing/habitat combo license for \$47.

- **ANGLER'S SPECIAL**—a three-year resident fishing license for \$53.
- **HUNTER'S SPECIAL**—a three-year resident hunting license with habitat included for \$86.
- **BONUS LINE LICENSE**—resident and nonresidents can fish with one additional line (with the purchase of the annual fishing license, which allows two lines), for \$12.

The DNR announces the weekly winner every Tuesday on its website and via Twitter. **Anyone who purchased one of the four licenses since the first of the year is automatically included in the drawings, which run through Dec. 23.**

Get Fit, Have Fun, WIN PRIZES with Healthy & Happy Outdoors

Spend time outside enjoying natural areas while burning calories and having fun with the DNR's new initiative, Healthy & Happy Outdoors, or H2O.

"Our goal is to connect healthy lifestyles with outdoor recreation and nature destinations," says Chuck Gipp, DNR Director. "We are using technology to help Iowans discover where they can go, what they can do and even reward their participation. We want every Iowan to know that spending time outdoors increases physical activity and reduces stress," says Gipp. "H2O provides a tool to make that happen, no matter where you live or what your current lifestyle."

Find more than 1,600 outdoor activities at state and county parks and recreation areas and log activities online. The website will continue improving with tips, healthy links, mobile applications and more.

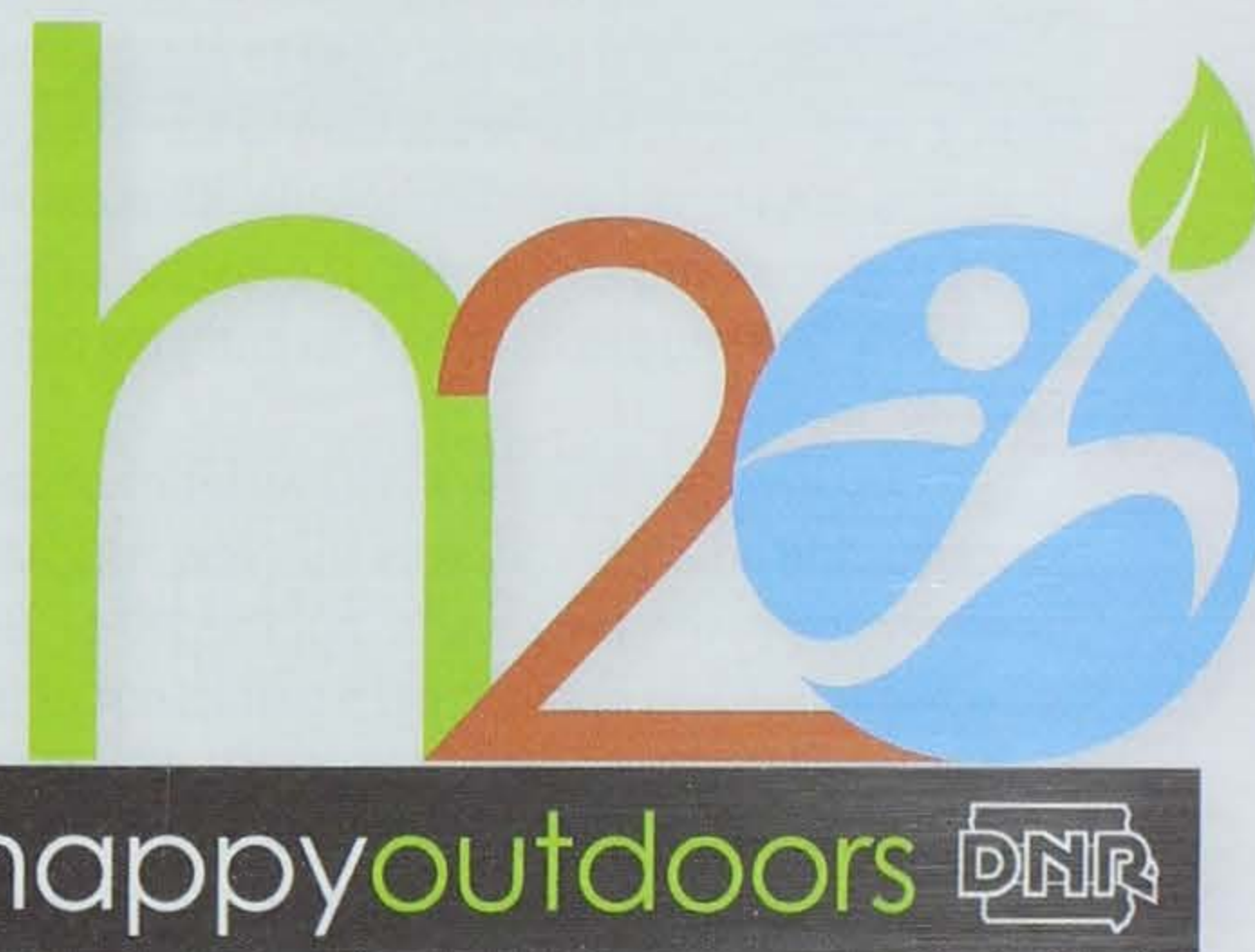
Participants who log activities are automatically entered into prize drawings

for outdoor gear. Monthly drawings will start in August at the Iowa State Fair.

The DNR launched H2O in April in support of the Governor's Healthiest State Initiative, with the goal of making Iowa the healthiest state. The DNR hopes to have 1,000 participants this year and 50,000 by 2016.

A 2009 report by Resources for the Future, a national environmental policy center, says "...contact with nature positively affects blood pressure, cholesterol, outlook on life, stress reduction and behavioral problems among children." They found participation in outdoor recreation impacts stress and obesity.

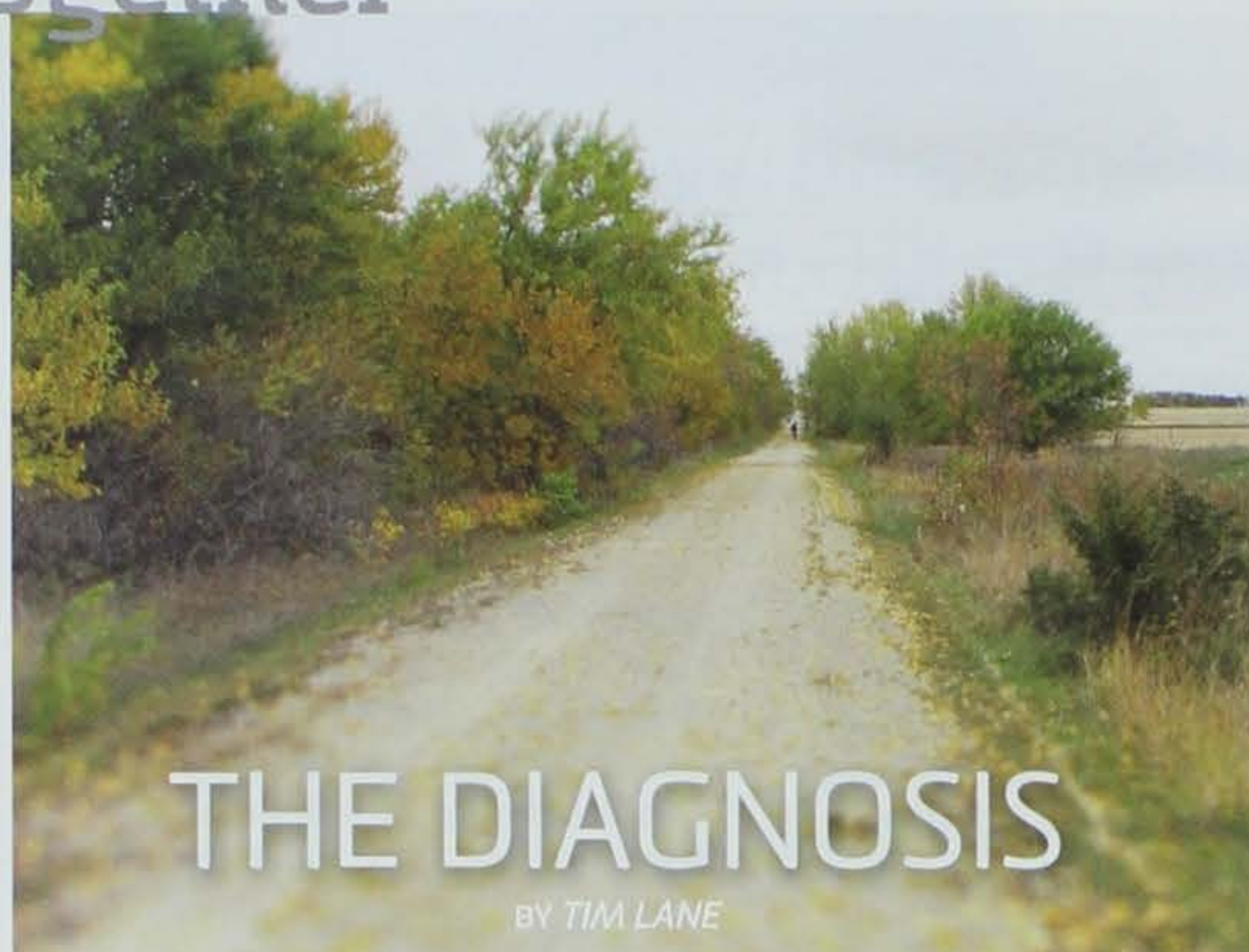
With more than 28 percent of Iowans obese, Iowa can find solutions for increasing physical activity by encouraging visits to parks, trails, lakes and recreation areas, says Gipp.



**Get Registered.
Get Outside. Get Healthy!**
It's easy to get started:

1. Register online at www.iowadnr.gov/h2o.
2. Get outside and log your activities on the H2O website.
3. Need some recommendations? Find hundreds of parks across the state in an interactive map, along with suggestions for outdoor opportunities you might enjoy.
4. Win prizes! Each activity you log counts as an entry for regular drawings of awesome outdoor-themed prizes.

Together



THE DIAGNOSIS

BY TIM LANE

On Feb. 20 of this year I was preparing my car to trade it in on a nice new 2013 model. In the middle of my task I received a call from Dr. Glowecki of West Des Moines. He called to inform me I had prostate cancer.

Ten minutes later I was meeting with the financial manager at Hummel's Nissan who inquired about my health. It was the first of many conundrums. I am not sure that the dozens of folks that inquire about my health on a daily basis really want to have that information. It is sort of like asking someone if you could give them a hand and they say: "Sure lend me \$10,000."

On the other hand I do not wish to place more trepidation upon the status than it deserves. So I started telling folks, "Well this will sound more dramatic than it is, but I have been diagnosed with prostate cancer."

At that point my knowledge of prostate cancer was at 1 on a scale of 1 to 100. I did know that my prostate had recently earned a place on top of my list of least favorite organs.

I now know that there are 200 varieties of cancer with as many levels of severity. And prostate cancer is the New York Mets of cancers. And by that I am referring to the 1962 Mets...not the '69 or '86 Mets. This was a team with a 40-120 record, and finished 60.5 games out of first place. You are as likely to die with it than from it. As I now envision it, this cancer needs training wheels, but nonetheless required ample reflection.

I have spent my life preaching the value of physical activity and 90 percent of my motivation came from the value it had in preventing cardiovascular disease. The fact that it also prevented "some cancers" was simply icing on the cake. I did feel a bit like the French, who had put all their efforts in the Maginot Line only to have their enemy slip in via Belgium.

All my activity may not have prevented this. It was still time well spent. My overall goal has always been to prolong life. But there are two ways of achieving that goal. One is to add years to your life and the other to add life to your years.

I feel like Marshall McLuhan and his "The medium is the message" quote. He was saying that the way a message is communicated influences how the message is perceived. Physical activity is not just a means to an end; it is an end unto itself. How we prolong our life also impacts the quality of that life!

I have spent countless hours on Iowa trails, in parks, on lakes and rivers and my life has been a million times richer as a result. You might question the validity of that last sentence, so I encourage you to get out there and verify it for yourself. Don't take my word for it...check the math! For myself I am looking at my diagnosis as a life sentence and will be striving to serve it well.

TIM LANE is a nationally recognized authority on public health and physical activity. In October, he will become president of the Iowa Association for Health, Physical Education, Recreation and Dance.

But Why?

Helping adults answer children's nature questions

BY A. JAY WINTER

A. Jay Winter educates up to 20,000 Iowa children each year as the DNR's training specialist at the Springbrook Conservation Education Center.

DELANEY, AGE 10, IN LINN COUNTY ASKS:

Is a mussel just a clam?

Mussels and clams are both mollusks—animals with a soft body inside a hard shell.

You can tell them apart in two ways: in Iowa, mussels are larger than clams and also have byssus threads.

The two species of native clams in Iowa, the fingernail clam and pea clam, are smaller than your fingernail. If you see something bigger, it's likely a mussel.

Mussels attach to the bottom of the stream with a byssus or byssal thread, which looks like pieces of hair or thread coming out of their shell. Iowa's freshwater mussels do this when they are very small, to keep water from sweeping them downstream. (Saltwater mussels keep their byssal threads which forms a "beard" on the shell.) As they grow larger, they use a foot—it looks like a big tongue—to dig into the streambed.

You might have trouble finding mussels in some Iowa streams. In the last 100 years or so, people began building dams and straightening streams, which destroyed areas where mussels live, called habitat. People also took great numbers of mussels to make buttons and sell pearls.

However, Iowans keep working to bring back mussels, and for important reasons. Mussels take pollutants out of water—filtering up to a gallon of water in an hour. They provide habitat for some insects and crawfish, and fish depend on them, too.



Together

Honey Creek Weddings

A Destination Wedding Without The Plane Ticket



Situated mere steps from the shores of Lake Rathbun, Honey Creek Resort State Park is a one-stop-shop for that special day. Relax knowing your wedding day will be perfect as resort staff tend to the details from the moment you arrive to the minute you leave.

"We are full-service," says Marsha Whisler, resort wedding coordinator. "Events can be planned totally outside to a mix of both inside and outside, from large scale weddings to smaller, intimate weddings. We can help with everything from the rehearsal dinner to the breakfast buffet and gift opening."

Choose a reception dinner package from a salad, single entrée, seasonal vegetable and potato or rice package to a full-out-butler-passed hors d'oeuvre reception, salad and fruit selections, and a dinner buffet featuring hand-carved sea salt and peppercorn slow roasted prime rib with all the trimmings. A complimentary king suite and dressing room for the bride and her attendants comes with all packages.

Before the wedding, take advantage of the expansive lakeside view and its spires of trees for that elegant, romantic wedding book photo. Or gather the crew and head to the adjacent Preserve on Rathbun Lake Golf

Course and capture that special moment on your favorite green. All it takes is a tee time.

Wedding packages are available for up to 300 guests. Invite 125 or more and receive complimentary table service, dance floor, wedding party, cake, gift, guest book and DJ tables and video projection system. Spend your first night of married life in the complimentary king suite.

Once the formalities have ended, guests can head to Buccaneer Bay Indoor Water Park for a relaxing dip in the secluded whirlpool while the kids tackle the two-story water slide. And there is always time for a boat ride around the lake, a chance to catch giant crappies and trophy walleyes or a round of golf before heading home.

And as bride and groom, don't forget to check out Honey Creek's honeymoon packages, which feature a king suite, breakfast, dinner, wine and other amenities.

"Brides don't forget their wedding day," says Whisler. "My goal is to make sure the guests never forget it either."

For more information, contact Marsha Whisler at 641-724-1406, or visit honeycreekresort.com.

Together

Gently Light the Night

Enjoy a soft, glare-free glow perfect for low light needs, such as reading in a tent, with this unique solar-powered light housed in an inflatable waterproof bag.

The diffuse light mimics a small lantern in a design that folds flat. The featherweight (3 ounce) light fully charges after five hours in the sun and holds the charge for four months. The light shines up to eight hours and can be recharged 500 times.

It's a small light with a big purpose—the company's mission is to make solar lighting a regular part of relief aid distributed after natural disaster or crisis. For example, lights were provided after Hurricane Sandy and other storms when power supplies are disabled and batteries scarce. The company also sends lights to impoverished, remote areas worldwide that lack lighting or rely on candles or kerosene lanterns.

To learn more, or to buy or donate lights, visit LuminAID.com. Price \$19.95



RUN for Beeds Lake State Park



Support water quality at the Beeds Lake Restoration Run/Walk and Breakfast. The event benefits Friends of Beeds Lake, a nonprofit group working to improve lake quality. Choose from a 5K walk/run, 10K run or half-marathon. A 1K tadpole trot is for kids 12 and under.

The Courses: The 5K course is flat and scenic. The 10K course has a hill. Half-marathon starts in Coulter (runners ride a shuttle bus) and

includes parts of the Rolling Prairie Rail Trail with gentle inclines along the route.

When: Saturday, Aug. 24. Half marathon begins at 7:30 a.m. The 5K walk/run and 10K begin at 8:30 a.m. and the 1K Tadpole Trot about 9:30.

Register: At the park Friday, Aug. 23, 4-7 p.m., followed by free pasta feed or online at www.active.com. Race day registration 6:30-7:30 a.m.

Saturday, Aug. 24 with extra \$5 fee. Half marathoners must register and be on shuttle bus by 7 a.m.

Fees: \$20 for 5K and 10K, \$35 for half-marathon. Tadpole Trot is free.

Where: Beeds Lake State Park, 1422 165th Street, Hampton.

For more visit friendsofbeedslake.com or call Mike Sutter at 515-368-0573.

Great Escapes

PHOTO BY LOWELL WASHBURN

BUILD YOUR DREAM WEEKEND IN DYERSVILLE

It's no secret Dyersville got its fame nationally as home of the Field of Dreams movie set, along with recent attention on the 12-field All-Star Ballpark Heaven complex set to open next year. It's also widely known for the majestic spires of the Basilica of St. Francis Xavier and the National Farm Toy Museum.

But if you want to do a little trout fishing, maybe chase some walleyes, ride the bike and end the day next to a roaring campfire—all in the same weekend—then Dyersville should be your home base.

Spend a day on a coldwater stream. Dyersville puts you less than 30 miles away from six stocked streams: Bankston and Swiss Valley in Dubuque County, and Bailey's Ford, Fountain Springs, Little Turkey and Twin Bridges. Looking for more of a challenge? Cast a fly in one of six put-and-grow streams winding through Dubuque and Delaware counties,

of which Dyersville straddles. Stop at the Manchester Fish Hatchery and see the operations there, a mere 20 miles away.

Up for a bike ride? For less than the cost of a dozen night crawlers, you can ride the Heritage Trail, a compacted crushed limestone 26-mile jaunt from Dyersville to Dubuque. Wind through woodlands, high bluffs, river overlooks and prairies. Marvel in the 450-foot descent past old mining and mill towns.

Back in Dyersville, set up the tent or park the camper at New Wine Park, three miles outside of town. The 184-acre park offers hiking trails, picnic areas, playgrounds and shelters. Make time to walk through White Pine Hollow State Preserve, just 10 miles to the north. A National Natural Landmark, it's named for its dominant old-growth tree, the white pine.

Just remember the gloves and bat, because no visit is complete without a trip around the bases at the Field of Dreams.

Dyersville

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www.easterniowatourism.org

Lost In Iowa

BY SANDY FLAHIVE PHOTOS BY CLAY SMITH



From the leafy branch of a nearby oak tree, it isn't a majestic eagle demanding a stare-down with the lone inhabitant on the deck of the cabin at Nine Eagles State Park. It's a wide-eyed, yellow-beaked barred owl with an attitude.

"Here's lookin' at you, kid," seems to be the pudgy raptor's friendly greeting. However, its prolonged frosty, piercing gaze suggests—maybe not.

"Just so you know, I'm here for the long haul, so either get used to it or go inside," is the visually transmitted challenge

issued by the immobile face and imperturbable eyes.

As moonlight begins to gild the black trees and Mr. Owl takes on a silvery sheen, the deck occupant opts to stand her ground. After all, there's more than enough room for both of them in this Decatur County park, located a few miles north of the Iowa-Missouri border, that proclaims by its beauty and charm there are still a few snippets of magic left in the world.

The story of Nine Eagles begins with Allen Scott, who bestowed the name on his property when he became the first

An Object of Affection



Wooded hills and valleys abundant with oak trees make Nine Eagles one of southern Iowa's most scenic parks. A main draw is the 64-acre lake with clear water and sand beach perfect for swimmers and sunbathers to kick back and relax.

white person to take residence in the county that previously had an all-Native American population. Eventually the land was acquired by the state and dedicated as Nine Eagles State Park in 1939.

Sometimes billed as "the hidden secret of Decatur County," the park woos visitors with its scenic rugged hills and valleys abundant with 300-year-old oak trees, an exhaustive list of native plants and wildlife and waterfowl galore.

"This park is gorgeous," declares Verna Holstrem, who with her husband, Leonard, propelled their Winnebago off

Interstate 35 for a look-see. "We've driven from northern Wisconsin to Texas dozens of times and usually stop over in northeast Iowa but, frankly, that has nothing over this." Obviously thrilled with the find, she adds, "We're already in love with the place. Next time we camp, it's going to be here."

They won't be disappointed when they hang their hat for a longer stay. The mellow ambiance is a magnet. And as far as being "in love with the place?" Well, join the crowd, because Nine Eagles falls under the category "object of affection."

Lost In Iowa

That's what it is for Bill Davis and Shannon and Amanda Collyar from nearby Lamoni. "We come here a lot every summer," says Shannon. "It's the perfect place to relax. We do it all—camp, swim, fish, especially for catfish." That's high recommendation coming from an active member of Iowa Catfish Drifters, Inc., an organization of avid catfish anglers.

But don't let the pleasant, laid-back atmosphere fool you. This 1,100-acre sanctuary has enough going on to dish out a slice of life for a wide variety of appetites.

Camping? Sure, you can do that to the hilt because the park has three campgrounds with 68 campsites, 28 of which have electrical hookups and handy showers, restrooms and a dump station.

And if you can't leave home without it, meaning your horse, of course, seven primitive equestrian campsites with fire rings, water, catch boxes and hitching rails will nicely accommodate both you and your equine. Six miles of bridle trails take riders through inviting pockets of timber and tranquility.

Bud Taylor, park manager, along with summer campground hosts Lewis and Joy Streit, make sure Nine Eagles retains its reputation as an excellent, well-kept recreational facility.

"Camping is sort of the flavor of the park," says Taylor. "We have lots of returning campers, and we're fortunate that a number of signs on Interstate 35 point more folks in our direction."

It's not by any means all about camping, though. For two-footed trailblazers and mountain bikers, Nine Eagles presents nine miles of trails lined with patches of native prairie plants. In winter, seven miles of multi-use trails beckon snowmobilers and cross-country skiers. Throughout the year, white-tailed deer and wild turkeys rightfully claim first dibs on the park, though they seem willing to share it with the human element.

A three-mile hiking trail that affords a good look at skimming waterfowl winds through towering oak and hickory trees as it outlines a 64-acre fishing lake, popular also for its sunny beach where swimmers and sunbathers cavort.

"We came up from Princeton, Mo., to swim for the day," says Cindy Porter, who has teenagers Anna and Logan Swank in tow. "It's the second time this week."

And if you're up for a picnic? Unload goodies and gobble up the fare at either shaded tables near the lake or

other picnic areas scattered throughout the park.

Taking advantage of the lake atmosphere are K. L. and Ginny Zimmerman from Lenox, who along with Kayla, 12, and Miles, 9, are revving up the grill and laying out the meal. Ginny confesses, "We've driven past this park so many times, but finally we stopped and we're glad we did."

Of course they are, and chances are good they'll be back again and again. It's that Nine Eagles attraction at work.

The lake that everyone is enjoying has a timbered watershed that makes it one of the clearest artificial lakes in the state, but as recently as 1998, Nine Eagles Lake was on the state's impaired waters list as a result of severe gully erosion, failing sediment ponds, improperly managed trails and badly constructed and managed drainage pipes.

Through massive efforts by DNR's water quality, fisheries, watershed, parks and forestry staff, sediment has been reduced by 85 percent.

All this makes Taylor kick up his heels with joy. "Where the water once was thick and muddy with silt, now you can see 6 to 8 feet down," he says. "Aquatic life has greatly benefited, the fishing is excellent, beach-users are back, so overall park use is way up."

Gazing out over the renewed and improved body of water on a crisp spring day is Mike Morris of Des Moines, who waxes nostalgic. "I grew up in Lamoni," he relates, "and when I was a kid we swam here all the time, but I haven't been back for 20 years. It's changed since then, but it's looking good." He swears he has no intention of letting another two decades pass before returning. "I'm not doing that again," he promises. "In fact, I'll be back this weekend to relax and do a little fishing."

If you build it...

The charming cabin where guest and owl duke it out is manifestation of the popular phrase, "it takes a village." The village that brought to fruition the construction of the classy 500-square-foot accommodation that began receiving guests in spring 2012 consists of friends and neighbors, park staff, government agencies and local businesses.

As a whole, their devotion to Nine Eagles



LEFT: Playgrounds, shaded picnic areas and open shelters are located throughout the park for the enjoyment of day-guests and overnight campers. **BELOW:** Once on the state's impaired waters list, the lake has recently undergone extensive watershed improvements and is one of the clearest artificial lakes in Iowa



Lost In Iowa

Kay Herring is one of the vast number of individuals—all of whom dote on Nine Eagles—to have a hand in the construction of the charming cabin now open to guests. The 500-square-foot structure has an inviting deck that overlooks the pristine lake and hardwood timber.



Kay Herring



is extraordinary—and necessary. All parks should enjoy such attention. Leadership is also key, and for years, Kay Herring and Debbie Sinclair, two of many ardent fans of Nine Eagles, have been instrumental in guiding efforts to ensure the park's success.

Herring, a retired teacher who obviously has a penchant for doing, not retiring, has a history with Nine Eagles dating back to high school and college. "Friends and I would collect samples from the lake for biology class," she says. "We also got 'roasted' many a day on that beach under scorching summer suns.

"Wouldn't I have been shocked back then to learn that decades later I would be asked to serve as president of a Nine Eagles Friends group? We developed by-laws and, more importantly, rendered a lot of TLC to what then was a run-down park," she muses. "There's always been a group of friends working hard at park issues."

One of those friends is Sinclair, who with her husband, Howard, lives near the park and is a zealous Nine Eagles advocate. Both have committed impressive amounts of hands-on work and financial support to the park, with much of the Sinclairs' personal contributions made in memory of family members.

Like Herring, Debbie has served as head of the Friends group. To say she has fought tooth and nail for various park projects would be an understatement.

"I know I barrel ahead sometimes to get things done," she admits. "I've met with representatives of the DNR to negotiate on shelters and playground equipment. I've gone to Des Moines and met face to face with legislators when prodding needed to be done, and Howard and I have held lots of fundraising events for the park."

Her efforts and those of Herring are applauded. Morris Boswell, a local leader and promoter of all things Decatur County, maintains it's everyone coming together that allows the park to achieve results. "There's been a lot of give and take among friends, park staff, government agencies and the local community, and sometimes it becomes controversial," he acknowledges. "It's part of the history of Nine Eagles, but it's all been for love of the park."

Slip Bluff Park

Good things come in pairs—including parks—and the other half of the pair in Decatur County is Slip Bluff Park. Aptly named, this park offers views from its perch on a steep limestone bluff from which, through time, thin layers slough and slide downward to the banks of the Grand River far below.

Richard Erke, director of the Decatur County Conservation Board, tends to this popular 450-acre park (half in hardwood timber), its 16-acre fishing lake (think bass, bluegill, catfish, walleye, crappie), comfy campground (15 electric, four tent sites), and woodland hiking trails.

Like Nine Eagles, Slip Bluff Lake has undergone major water quality improvements in recent years, with excellent results. "It, too, was on the impaired waters list due to erosion-deposited sediment," explains Erke, "but it's had an amazing turnaround. Where once you couldn't see 6 inches into the water, you sometimes can see 10 feet."

The park is known for its lively lore. Juicy tales abound of locals blowing up horse-thieves' caves and outlaws escaping capture. Much of the history is in regard to Native Americans who lived in the area.

"Every little ridge along the Grand River was the location of a Native American settlement," Erke says of the grand waterway that meanders alongside the park through treed outcroppings, its width ranging from 100 feet to mere tunnel-width and occasional rapids and rock-beds along its path. "There's fire-cracked rock everywhere on the bank where Native Americans camped, and brass pots have been found where they tapped nearby apple trees.

"Chief Potoff supposedly is buried near the park on the banks of the Grand, marked by the large mound with the oak tree growing out of it," he points out.

Today paddlers can access the Grand River at four locations, with another being developed.

Slip Bluff Park is also site of major work. The Decatur County Conservation Board, U.S. Fish & Wildlife Service and Southern Iowa Oak Savanna Alliance joined forces to restore oak savanna terrain—its original landscape before settlement.

An always-in-progress project, restoration involves removing invasive brush and thinning trees. Other phases include prescribed burning to bring to life native grass and forbs in the forest.



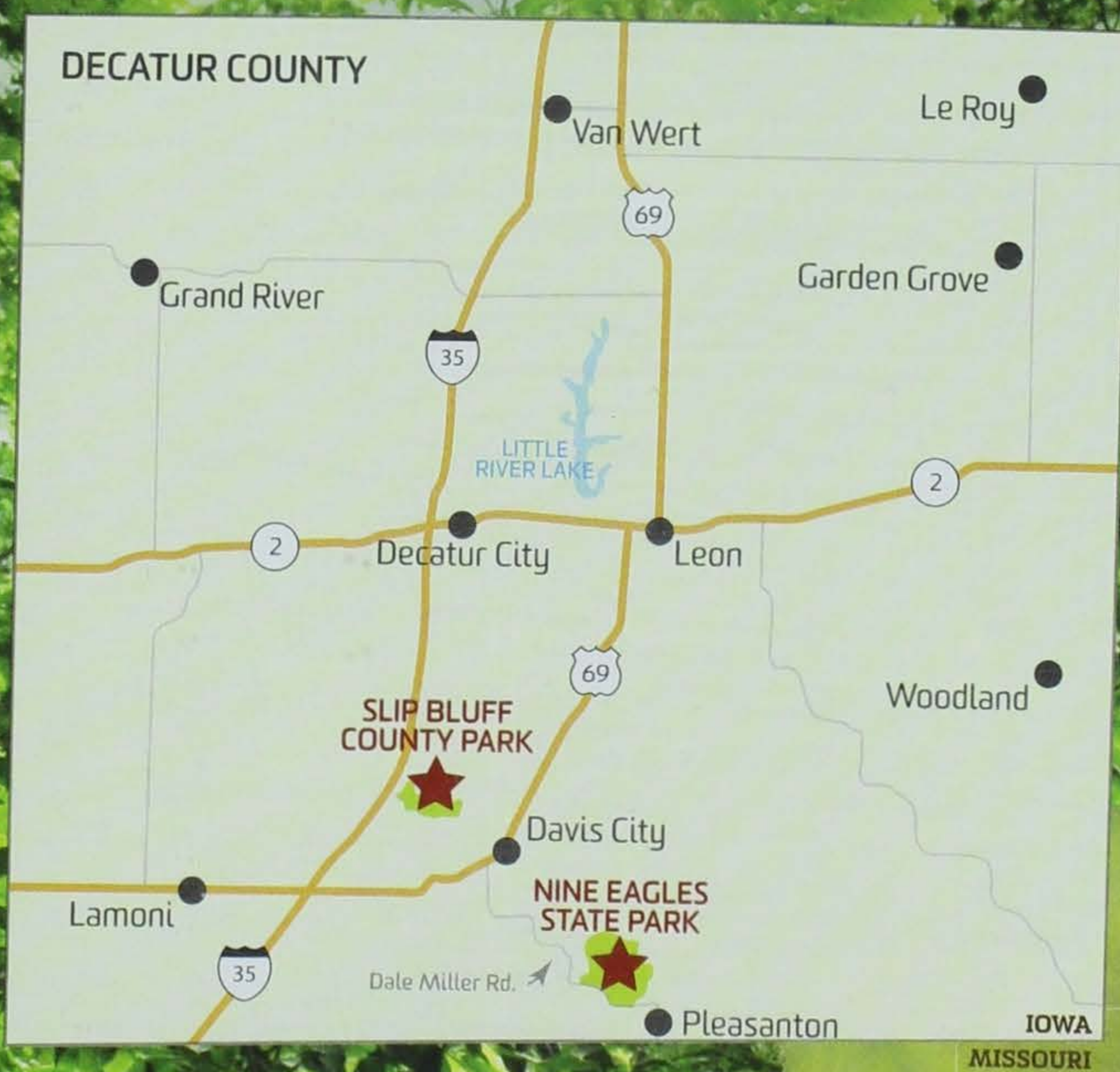
The rare *Boletus dupainii*, found at Timberhill and two other locations in the nation.



Lost In Iowa



The steep limestone ridges of Slip Bluff Park provide panoramic views of the surrounding hills and valley far below, through which winds the Grand River. Slip Bluff is the site of two major undertakings: a water quality project that cleared sediment from the lake and a restoration to the oak savanna terrain it once was.



Lost In Iowa

"This makes for a great study area," says Erke of his park. "We've divided it into zones and units, applying different restoration methods in each. Landowners will be invited to see the results and informed as to how they can go about the process on their own land."

The uniqueness of Slip Bluff also has to do with its relation to, of all things, Interstate 35. It is reputed to be the world's only county park which can be accessed from an interstate rest area. A hop, skip and a jump (or just a short walk) and you're in the park.

They came, saw, conquered

It is impossible to utter the words "oak savanna" without acknowledging the dynamo couple who moved to scenic south-central Iowa in 1993 because "We wanted to move to the country." They ended up, mostly by accident, leading an unconventional charge that has turned into a movement in the world of savanna restoration.

Meet Sibylla and Bill Brown.

With their three children grown and out of the house, the Browns uprooted from a comfortable Des Moines home and lifestyle and headed south to settle into a new contemporary home on 200 acres of hills, woods, wildlife, plants and insects in Decatur County. They called their new world Timberhill.

Once the boxes were unpacked and the house in order, they decided to go for a stroll on their land...and that's when it all began.

"There was no walking anywhere," reflects Sibylla. "Our woods were an impenetrable jungle of brambly underbrush of every sort. Something had to go."

What went—after months and years of all-consuming, self-directed study, observation and experimentation by the couple who had enthusiasm to burn but were totally uneducated in ecological restoration (he, a dentist; she, an English major)—was the brambly underbrush. It didn't come without the expertise of Jim Munson, Gregg Pattison and Pauline Drobney, all with the U.S. Fish and Wildlife Service; DCCB's Erke, and a host of other experts.

What entered was a whole new approach resulting in unparalleled success in savanna restoration. Some call it a revolution.

It all boiled down to the succinct Brown battle cry: "We burn every year!" says Bill, "Usually near the end of winter. If you burn in the spring, you damage the invertebrate habitat."

"Burning during the dormant season is better for all species," adds Sibylla. "The locals called us pyromaniacs at first. They thought we were bonkers, but by doing it, though it took a few years, we began to see that annual burning and a little thinning lets the light in so the land can remember what it once was, awaken, and live again. It allows nature to work the way it is intended."

Once the results of the Browns' practices became apparent, even the initial naysayers began to jump onboard the "run a fire through it and thin as needed"

bandwagon. A citizens committee formed—the Southern Iowa Oak Savanna Alliance—and currently has 60 landowners with 1,000 acres across 10 south-central Iowa counties signed up to restore habitat and awaken the rich reservoir of long-suppressed native plant communities.

Today at Timberhill, sunlight shines through the widely spaced, fire-resistant oak trees, blazing upon an understory of grasses and sedges, which in turn promote the growth of 460 species of plants—even the elusive showy orchid. Among the 200 mushroom species growing there, the headliner is the rare *Boletus dupainii*, recorded at only two other sites in America. All this in turn satisfies the demands of scores of insects (51 kinds of ants) that call this savanna home.

It is nothing short of a huge treat to take a jaunt around Timberhill and watch everything dart about happily, including tour guide Sibylla, who imparts enough information to surely constitute a full-credit course in the ecology and restoration of an oak savanna. There is, however, one discordant note.

"That red-headed woodpecker obviously doesn't like strangers," she says of the swooping, nagging bird overhead. "Birds love all of this, and that one is obviously very possessive. Summer tanagers, indigo buntings, hummingbirds, pileated woodpeckers, swallows, bats—they're all happy here."

To which one can only sigh wistfully and conclude enviously, "Who wouldn't be?"

Decatur County Travel Notes

LEON

The county seat, Leon, holds a championship rodeo each year the first week in July at the fairgrounds. Other attractions include the Little River Recreation Area with a 787-acre lake, modern and primitive campsites, and three rental cabins. The area is an anglers' and hunters' paradise. **641-446-7307** or mycountyparks.com

LAMONI

Lamoni is home to an Amish community that sells specialty items around town yearround. A Civil War reenactment is held each Labor Day weekend.

515-707-4523 or civilwardays.org

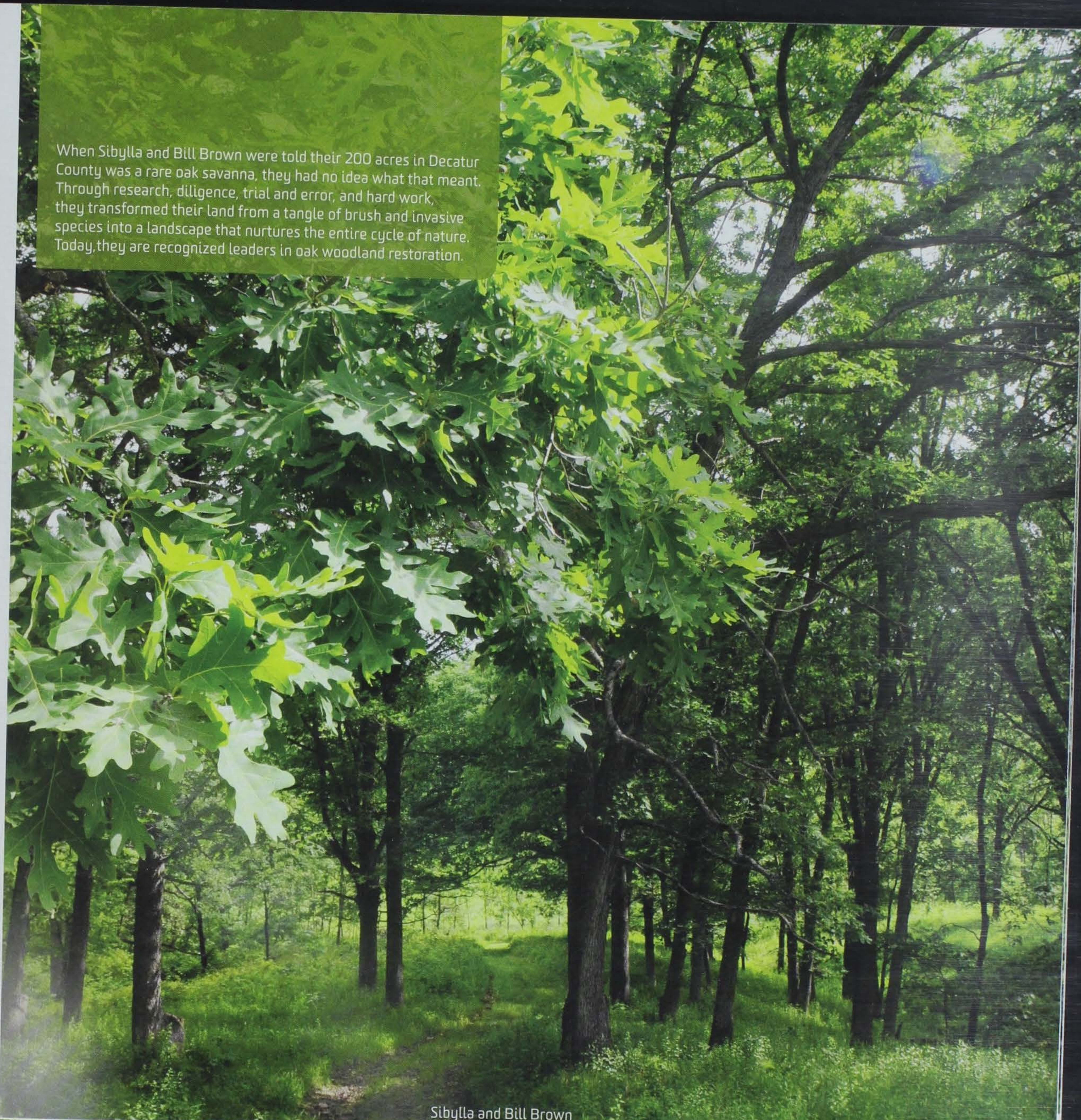
NINE EAGLES STATE PARK

Make reservations at **1-877-427-2757** or online at <http://iowastateparks.reserveamerica.com>. Park address 23678 Dale Miller Road, Davis City. **641-442-2855**

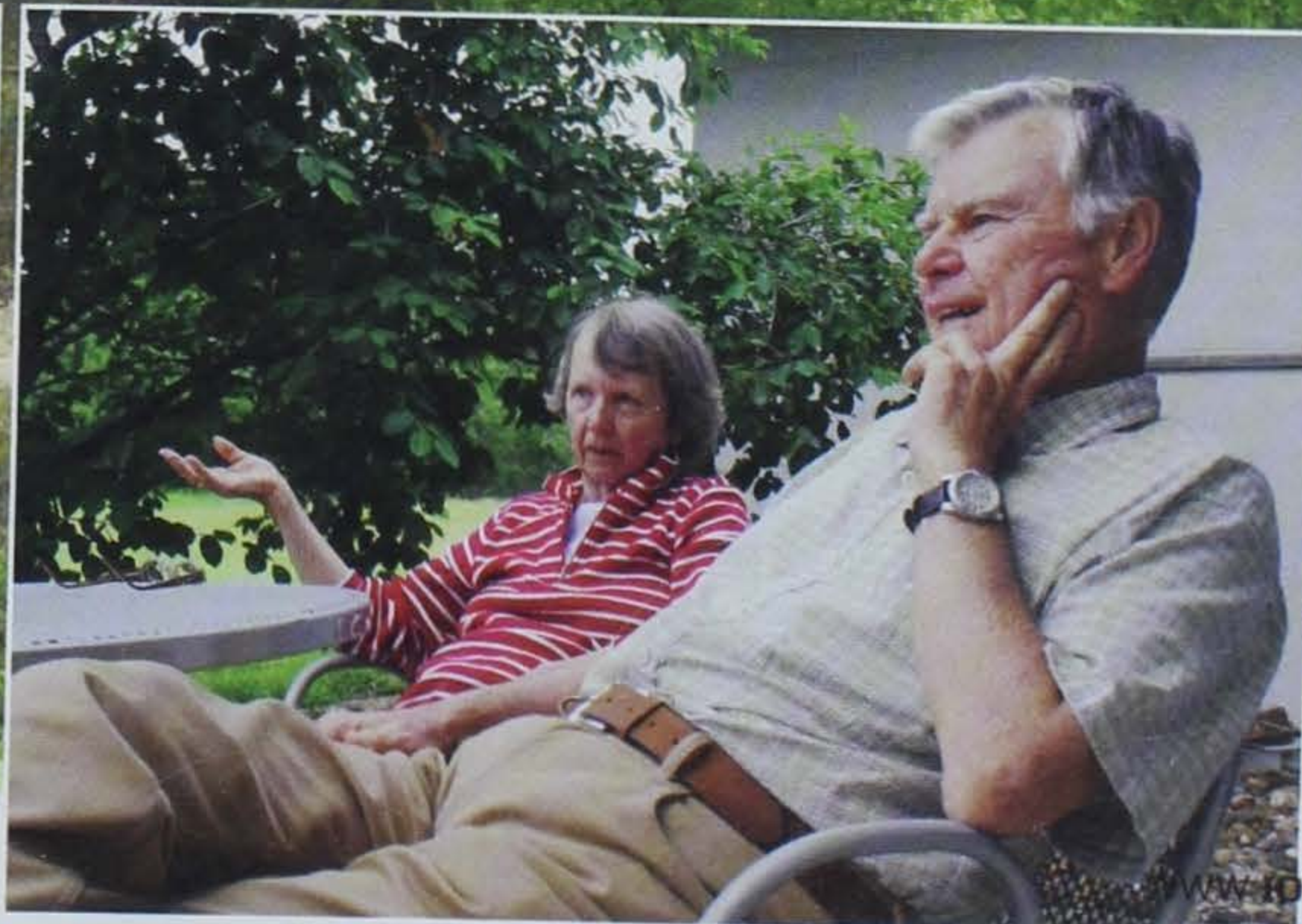
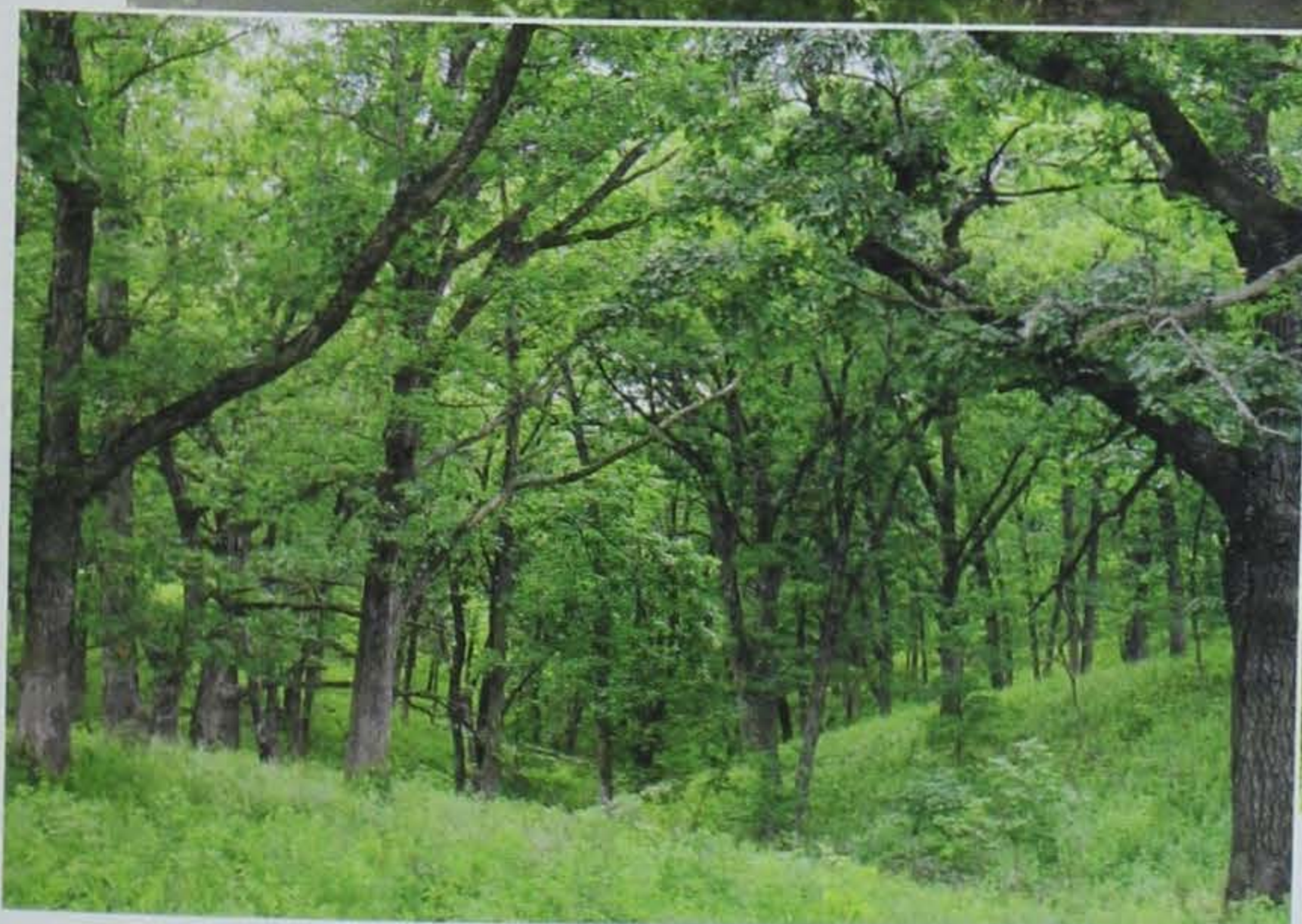
DAVIS CITY/SLIP BLUFF COUNTY PARK

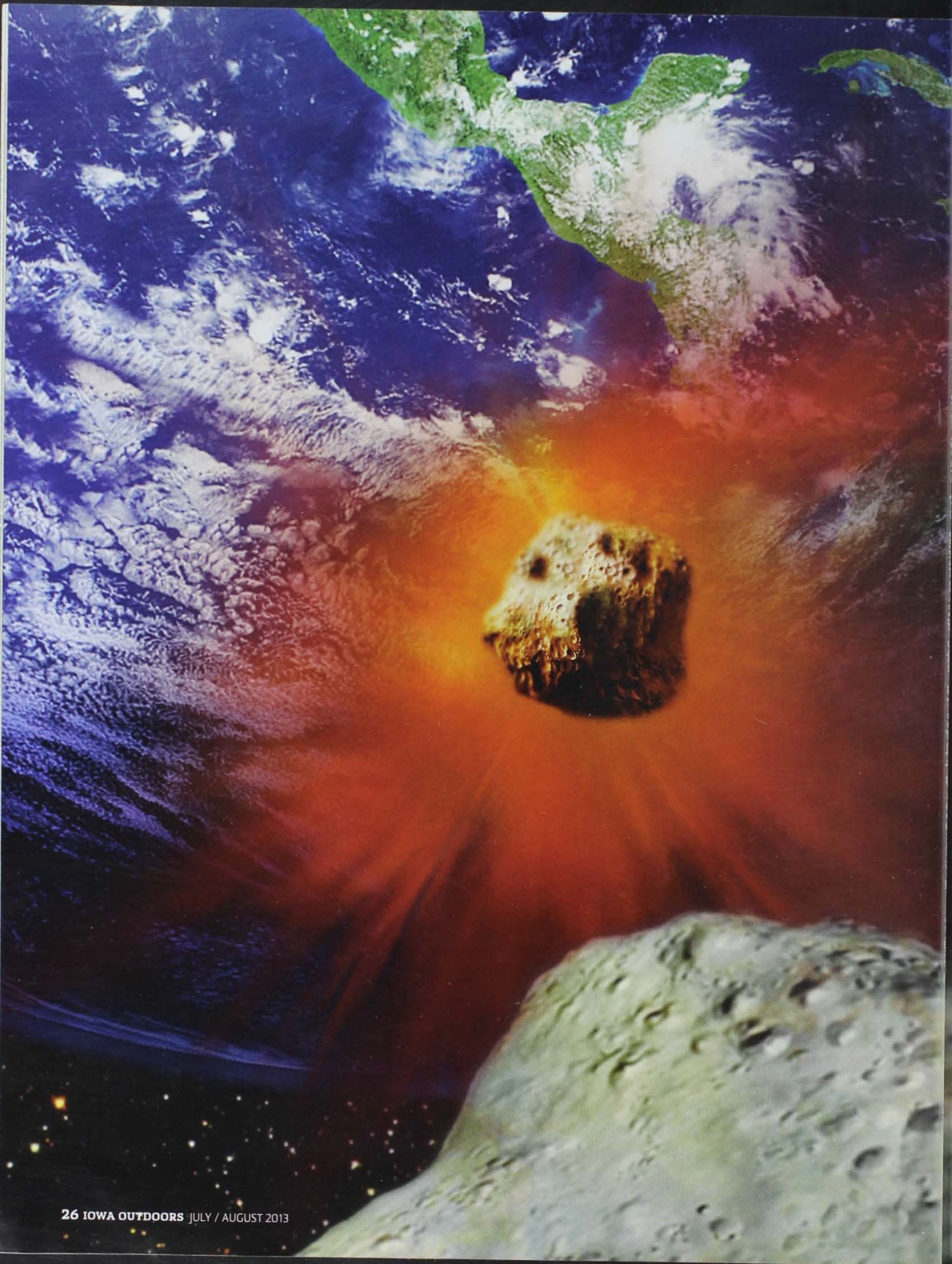
Slip Bluff County Park is 4 miles west of Davis City. **641-446-7307** or mycountyparks.com. Six miles northwest of Nine Eagles State Park, the Davis City Café is a great place to grab a burger. 🍔

When Sibylla and Bill Brown were told their 200 acres in Decatur County was a rare oak savanna, they had no idea what that meant. Through research, diligence, trial and error, and hard work, they transformed their land from a tangle of brush and invasive species into a landscape that nurtures the entire cycle of nature. Today, they are recognized leaders in oak woodland restoration.



Sibylla and Bill Brown





KARST SECRETS

BY SAM SAMUELS PHOTOS BY JAKE ZWEIBOHMER AND CLAY SMITH

Long a curiosity, northeast Iowa's hidden springs, disappearing rivers, caves and sinkholes lead researchers to a startling new discovery—a massive meteor crater buried deep below Decorah.

If there is one word to explain the beauty, the mystery and the fragility of the landscape around Decorah—the rugged terrain of steep hills and stark limestone bluffs; the hundreds of miles of cool, spring-fed streams that are home to the best and most fishable brook and rainbow trout; the cascading waterfalls; the sinkholes that dot the landscape and, occasionally, open inconveniently to swallow up a few hundred square feet of farm field or, worse, road; the vast network of subterranean caves; the “losing streams” that vanish into nothing only to reemerge out of dry ground miles away—that word is karst.

We don't often think when we pass through this or

that parcel of land about the subterranean structures and forces that have made this particular field or hill or river system what it is. But visiting the bluff country of northeast Iowa, there's almost no way to appreciate it without a glimpse below the surface. The distinctive geology of this corner of the state gets its name from the Karst region of Slovenia. There, as here, the bedrock is made of limestone and dolomite, two varieties of rock categorized as carbonate rocks because of their calcium and magnesium carbonate content. While that may seem like a bit of high school chemistry trivia, it's the carbonate that makes this area so special. Because though it is solid rock, it has a habit of dissolving in plain water.

“Karsts are fragile and vulnerable,” says Bob Libra,

Iowa's state geologist. "Slightly acidic water dissolves them. They're like slow-moving Alka-Seltzer."

As a result, over millions of years the rock just below the soil here has become riddled with cracks, holes and fissures. Sometimes these are visible from the surface in the form of bluffs and outcrops. Sometimes they lurk below the soil but still are crucial in forming the landscape above. This region is also sometimes called the Driftless Area. When glaciers plowed through the upper Midwest during the last ice age, they left behind a pulverized terrain of silt, clay, sand, gravel and boulders called drift. Although this area dodged the most recent glacial ice advance, it was glaciated in earlier times, but almost all of that drift eroded away long ago except for some scattered deposits. Here, instead of the familiar flat or rolling landscape of most of Iowa, this region boasts deeply cut river valleys and steep, majestic bluffs.

There are two ways to enjoy a trip through the bluff country: with geologist and without. Last summer I visited with geologist, in the person of Bob McKay of the Iowa Geological Survey. As a man deeply involved in the Survey's Upper Iowa River Basin Mapping Project, McKay seems to know every stream, bluff, cave and sinkhole for miles around. Riding around with McKay is like taking in the gorgeous landscape with an audio Wikipedia commentary.

"We're getting into the major karst area of the state," McKay says as our vehicle approached Decorah, and even a non-geologist like me could see the change in the landscape from flatlands to steep bluffs and scenic overlooks. "There are other karst areas in the country. Mammoth Cave, Kentucky. Parts of Missouri. Florida too. The karst there causes giant sinkholes." Sinkholes in Florida have been known to swallow up houses. Last March, one swallowed a man in a rare sinkhole fatality. Fortunately, the sinkholes in Iowa seem to be shallower and, perhaps because Iowa is not as densely populated as Florida, haven't yet taken any lives. But they can open up unexpectedly, usually at a large rainfall event, and in rare cases do structural damage to roads.

I want to see one.

"They're hard to spot from the road, with fences around the farm fields," McKay says. "Most of them have trees growing in them." As we drive, we look out for thick clusters of trees. Armed with his detailed geological maps, McKay knows where to look, and it's not long before we see what looks like a suspicious grove of trees with hardly any trunks. They're growing from a hole, and only the crowns are visible from the road. While it's on a private, fenced-in field, and we can't go climbing down, I have now seen an Iowa sinkhole and can cross it off my list. But there are more impressive and beautiful features to come.

Decorah boasts an enviable system of city parks. McKay and I drive up into Palisades Park, which stands on a high system of bluffs overlooking the Iowa River from the north as it cuts through town. The steep terrain

here is lined with trails for hiking and biking. As we hike along, there are frequent scenic overlooks that take in the town itself and the river below.

"These cedars are some of the oldest trees in the state," McKay says, pointing out specimens clinging to the rocky bluffs. From some vantage points, we have to look straight down to see the trees growing out of nearly vertical rock below us.

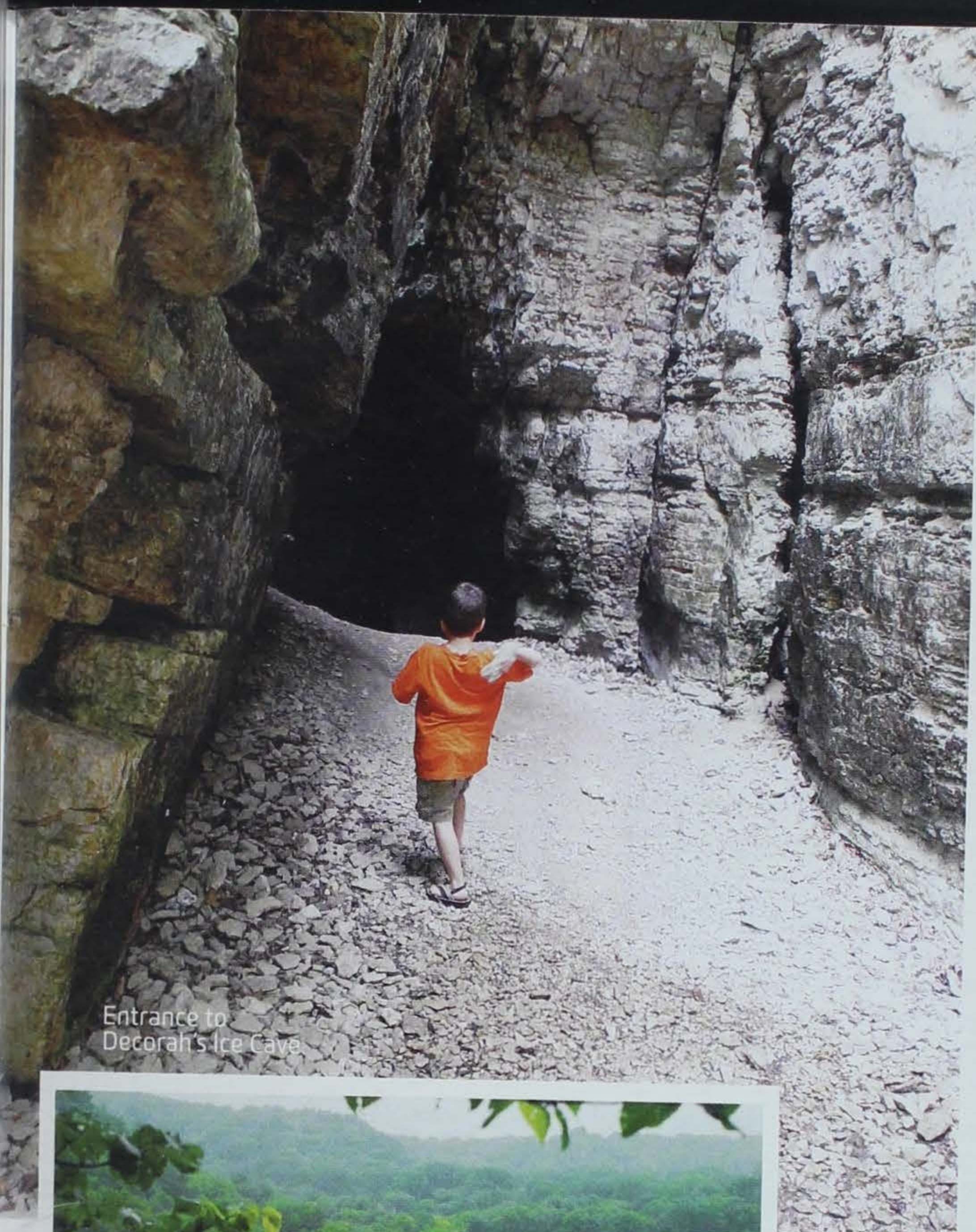
Along the base of the bluff, McKay drives us along the appropriately named Ice Cave Road to our next geological curiosity. A sign marks the entrance, and an ornate stone staircase leads us up to the mouth of, yes, a deep cave inside the city limits of Decorah. McKay leads me in, and as we descend further into this cave, the warm air of June quickly gives way to a distinctly chilly atmosphere. Eventually we're stopped by a barred gate forbidding further exploration, but not before we see the feature for which this cave is named. The walls are freezing to the touch and are lined with ice.

"Ice forms here that lasts all summer," McKay explains. It's another peculiarity of the karst system, the cave here trapping cold air to form a year-round freezer.

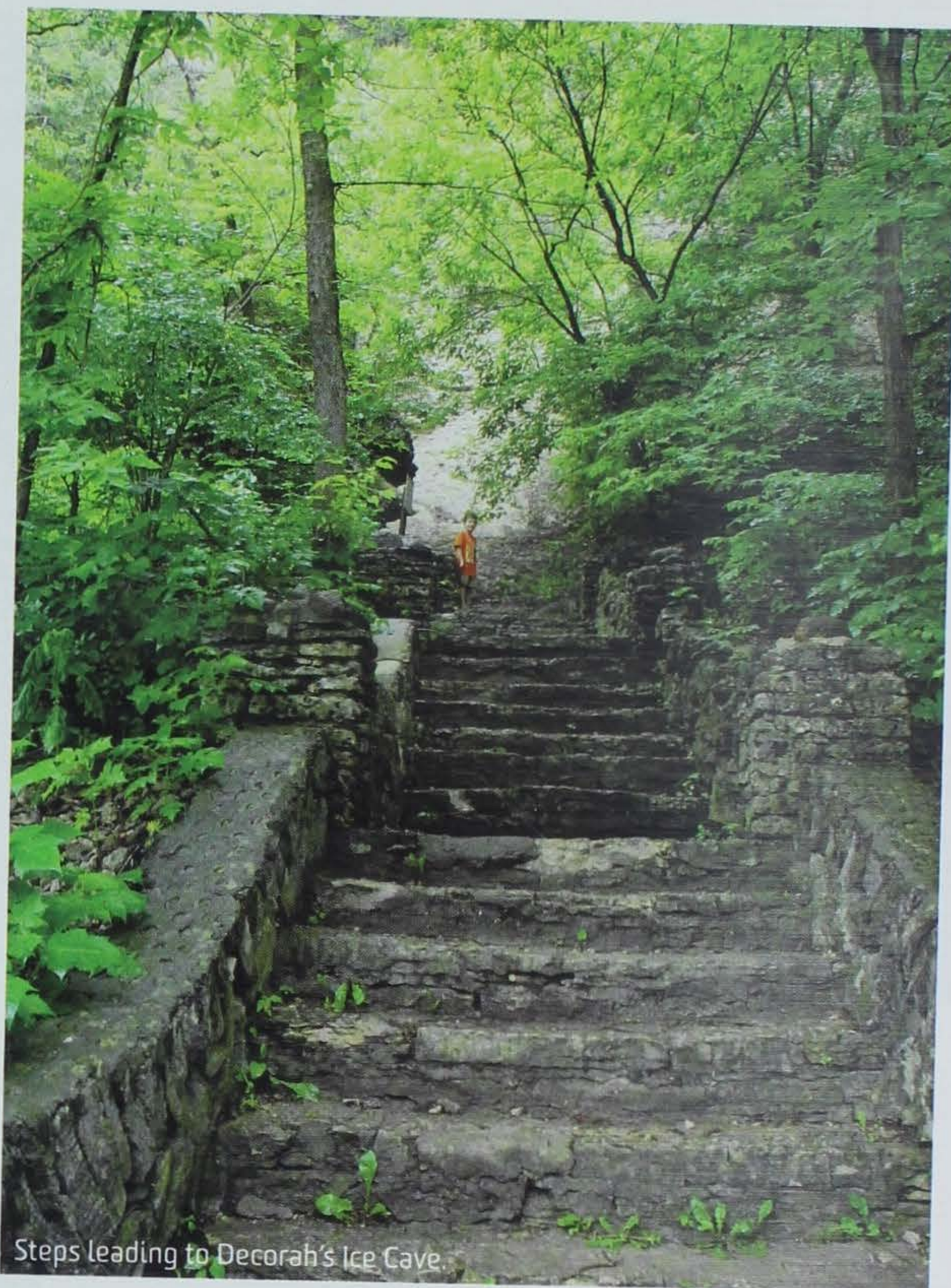
Water moves through karst differently than through bedrock in other parts of Iowa. Ordinarily, water percolates below the surface and becomes part of the groundwater, a slow-moving underground aquifer that benefits from being filtered through rock. But in karst areas, unseen cracks and voids below the surface can form channels through which water moves quickly.

That can create problems. Water runoff in one area may flow through channels that are in effect underground rivers, and emerge in unexpected places surprisingly quickly and with very little filtration. Farm runoff in Iowa is often heavy with contaminants such as nitrates from fertilizers. Once the runoff moves freely into streams, there's no stopping it before it spills into





Entrance to Decorah's Ice Cave

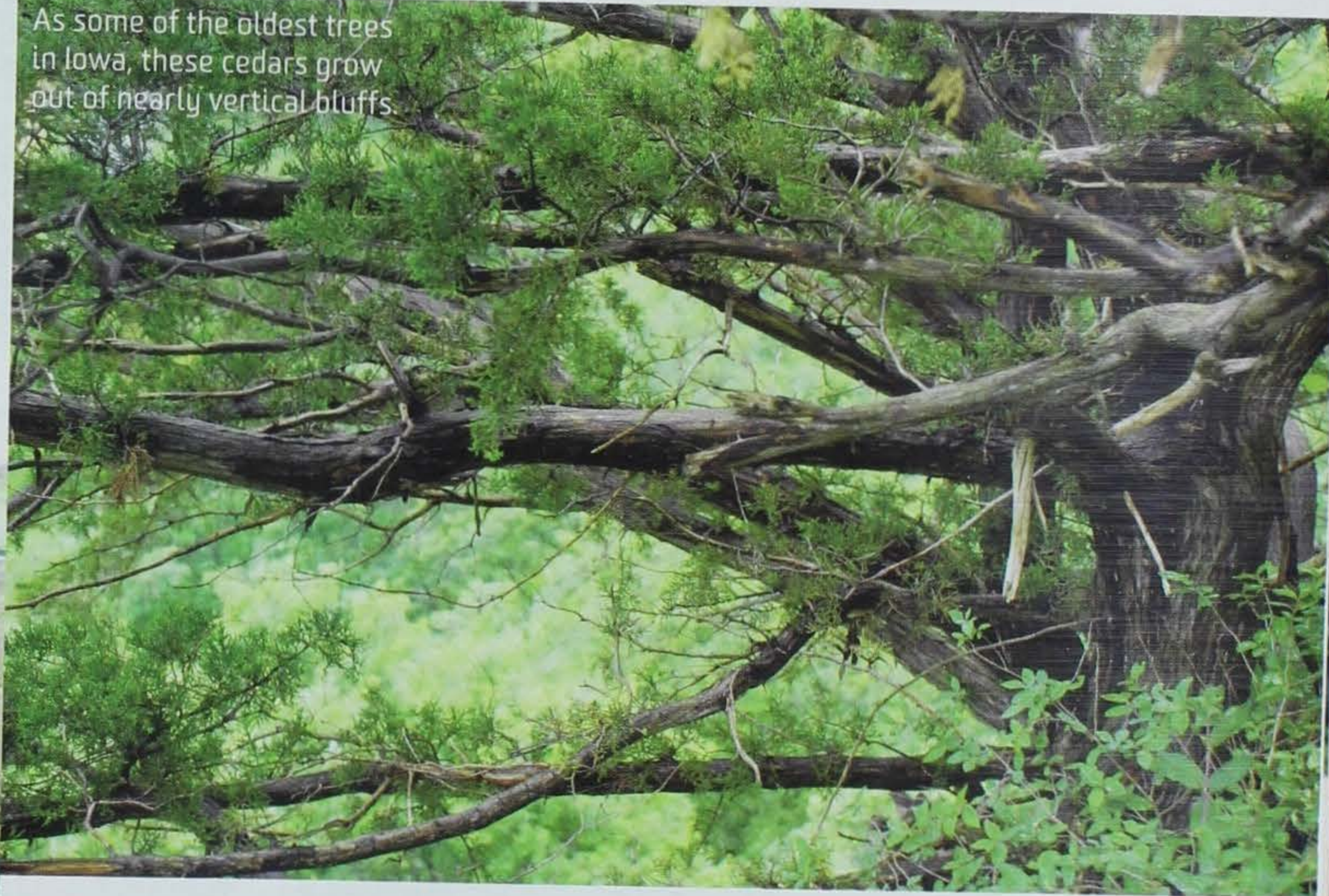


Steps leading to Decorah's Ice Cave

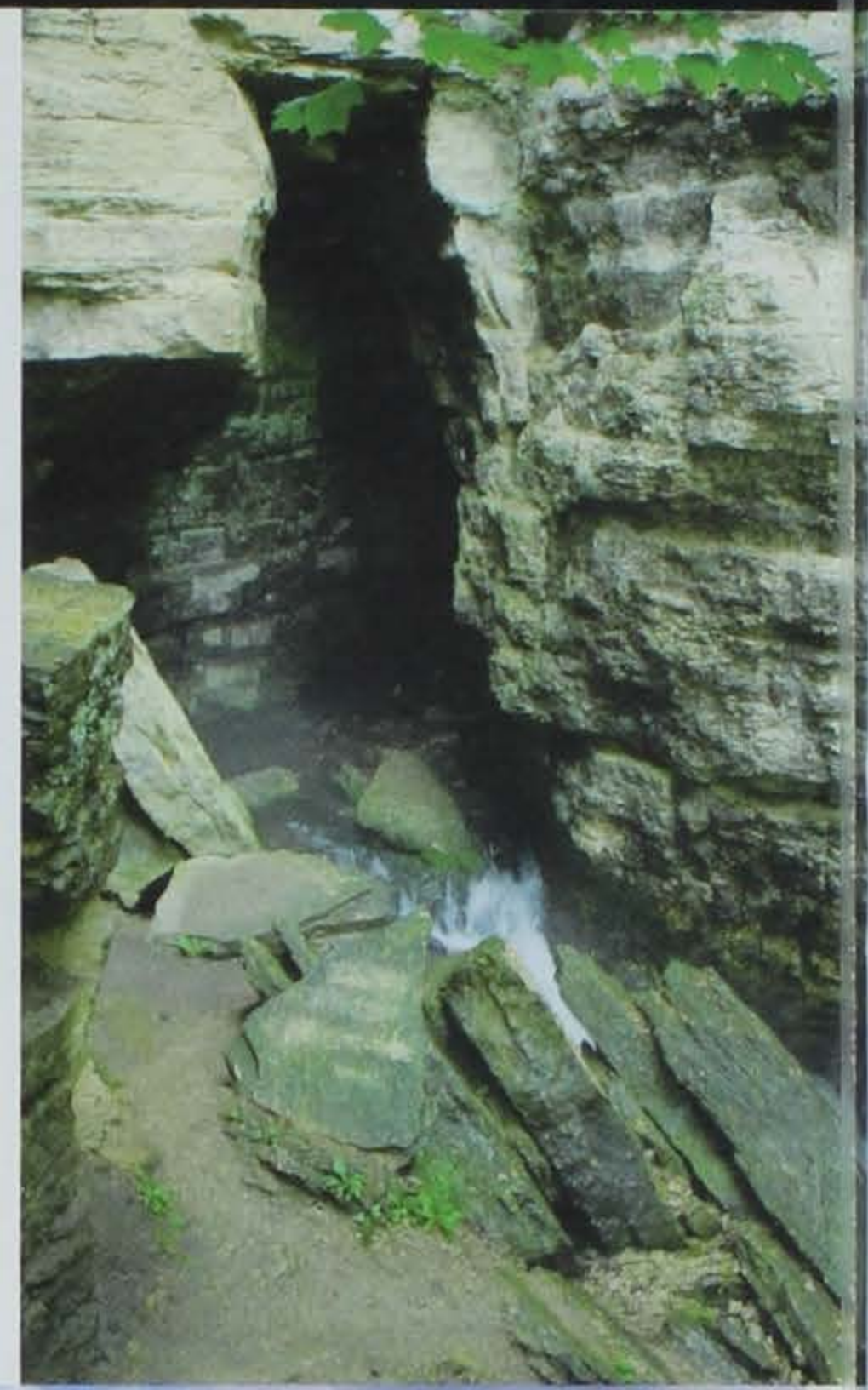
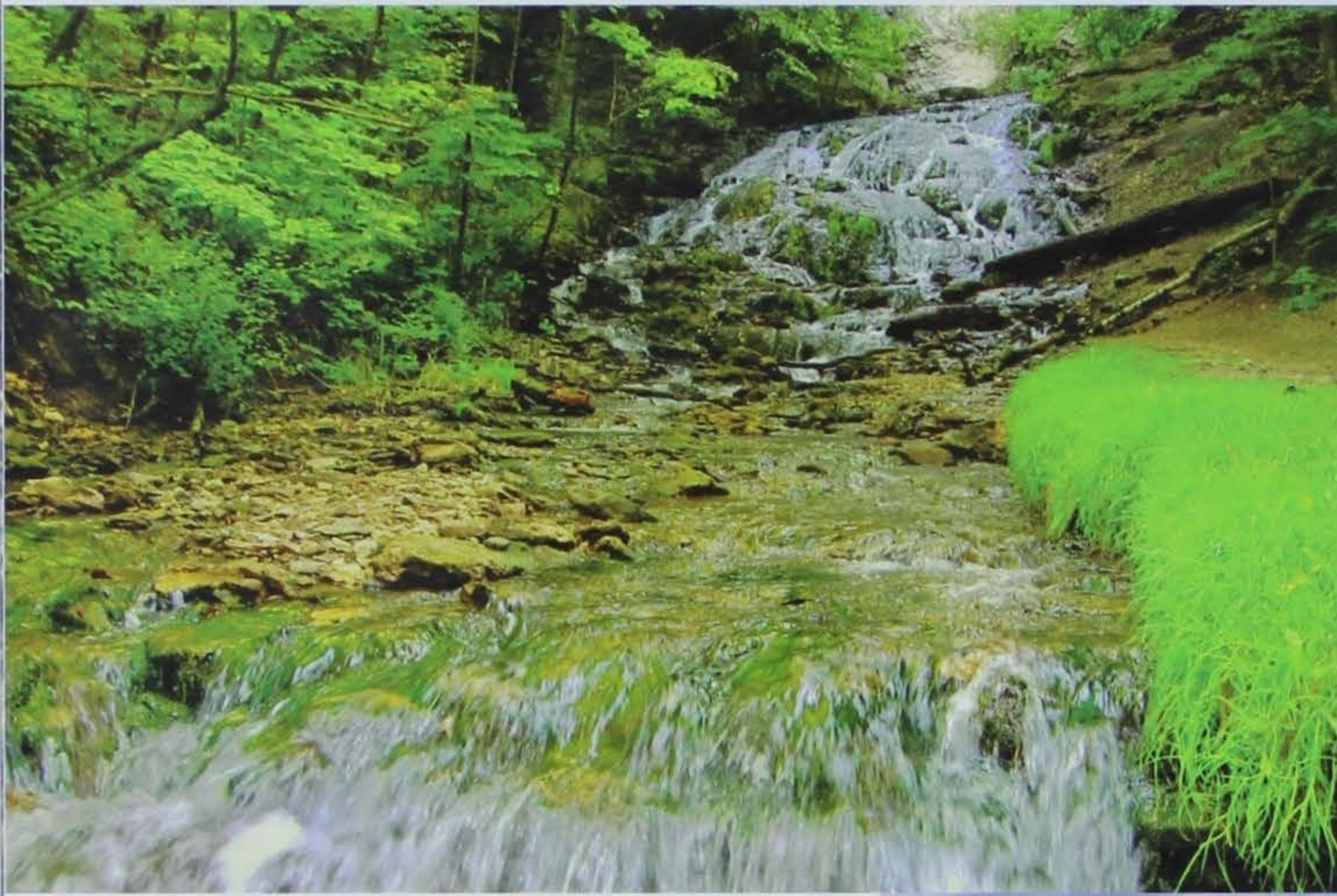


Upper Iowa River

As some of the oldest trees in Iowa, these cedars grow out of nearly vertical bluffs.



To better manage and protect water resources in northeast Iowa's splendid karst topography, DNR geologists and partners began an effort to map its hundreds of sinkholes, springs, disappearing rivers and seeps across the entire Upper Iowa River watershed. Ironically, it was the search for water resources, namely drilling wells, that first hinted at a possible meteorite crater deep below the Decorah area. **AT LEFT:** Sinkholes dot the landscape, some filled with water, others containing mature trees growing from within that conceal the vast trunk height. Sinkholes provide a direct link to water resources below ground and can quickly carry any pollutants underground. Protecting and better understanding the complex hydrology of karst topography is vital for caring for water quality.



TOP and TOP RIGHT: Dunning Spring burbles from a crevice, then spills down a rocky face in a long, wide cascade. **BELOW RIGHT:** A rock outcrop, located near the Oneota Country Club, displays faulted, tilted and brecciated structure—proof of a violent force. It is one of few above-ground clues to a large meteorite impact. **BELOW:** Siewers Spring feeds the Decorah Trout Rearing Station, where the DNR bring 150,000 trout to stocking size each year. The spring typically releases 3,000 to 5,000 gallons per minute. Clean, clear and cold waters are a must for trout—and areas with springs and sinkholes are at risk to pollutants and sediments in runoff from the land and paved areas.

A white dashed line shows the 3.4-mile-wide location of a below-ground meteorite crater.



larger rivers, eventually finding its way into the Gulf of Mexico. Scientists have linked farm runoff in the Midwest to a growing “dead zone” in the Gulf, a plume-like area of ocean at the mouth of the Mississippi River where aquatic life has been severely damaged. Anything that can slow the movement of runoff is beneficial. The karst in this area can contribute to the rapid movement of contaminants from sources straight into the watershed.

This area has drawn special attention from water experts at Northeast Iowa Resource Conservation and Development. RC&D, as it’s called, has undertaken frequent monitoring of water purity at many points throughout the Upper Iowa River and the Turkey River watersheds. By locating places where runoff enters rivers, they’ve been able to work with farmers and community members to find workable solutions, such as planting perennials in strategic areas of farm fields to slow the flow of runoff. Together, RC&D and local citizens are working to preserve the purity of this great natural resource.

On the brighter side, the swift movement of water underground here also makes this area rich in springs and in cool-running streams. After we leave our ice cave and re-acclimate to the warmth of early summer, McKay takes me to another local gem, Dunning Spring.

Here, we climb through a green wooded glade and clamber uphill alongside a gently tumbling waterfall, its flow broken up into patterns of lace by the rugged rocks of its face. I dip a hand in and find the water remarkably chilled.

“It’s 52 degrees,” McKay says. “Good for trout.”

Indeed, as we make our way across the river later that afternoon, I’m struck by a startling sight. The Upper Iowa River, right in the middle of town, appears to be simmering. It’s hundreds of trout breaking the surface over and over.

Meteorite Discovery

As if the karst itself were not enough to keep geologists busy, McKay recently confirmed a theory he has long been working on: this area was the site of an enormous meteorite impact hundreds of millions of years ago.

About two hours southwest of here, Iowa’s Manson Meteorite has long been an acknowledged prehistoric event that, if it were to occur today, would wipe out all life for thousands of miles (*see Iowa Outdoors July/August 2008*). But for sheer age, the meteorite that hit here puts Manson to shame. Manson struck some 71 million years ago; this one struck about 470 million years ago.

The first hints that a meteorite may have struck here came from historic water well drilling. Some of the first

wells dug up highly unusual rock that should not be seen in this area. A layer called the Winneshiek Shale was discovered, at a depth where shale was completely unexpected. It was a clue that at some point in the distant past, something catastrophic disrupted the rock patterns here. Further drilling defined the shale area in a neat circle—consistent with a meteorite impact. Samples of quartz were shared with retired Smithsonian Institution scientist Bevan French, one of the world’s leading experts on meteorite impact structures. French quickly confirmed that this was “shocked quartz,” which is considered an all-but-certain sign of a meteorite impact.

Recent aerial surveys conducted by the U.S. Geological Survey provided even more proof. The surveys included images taken with instruments that measure the electrical properties and density of rock below the surface. These images show a clear circular basin of shale about 3.5 miles in diameter—the crater of the meteorite now buried many feet below the ground.

McKay takes me to a place where we can see one of the few signs of what’s now being called the Decorah Impact Structure on the surface and with our own eyes. His suspected meteorite crater formed a circle. Ideally, McKay would have drilled and extracted cores of rock from many areas in the circle to confirm the underground crater. But that much drilling is prohibitively expensive. Instead, McKay and other researchers examined the surface along every possible section of the outer perimeter of that circle, looking for any outcrop of rock that showed signs of the devastation of the meteorite.

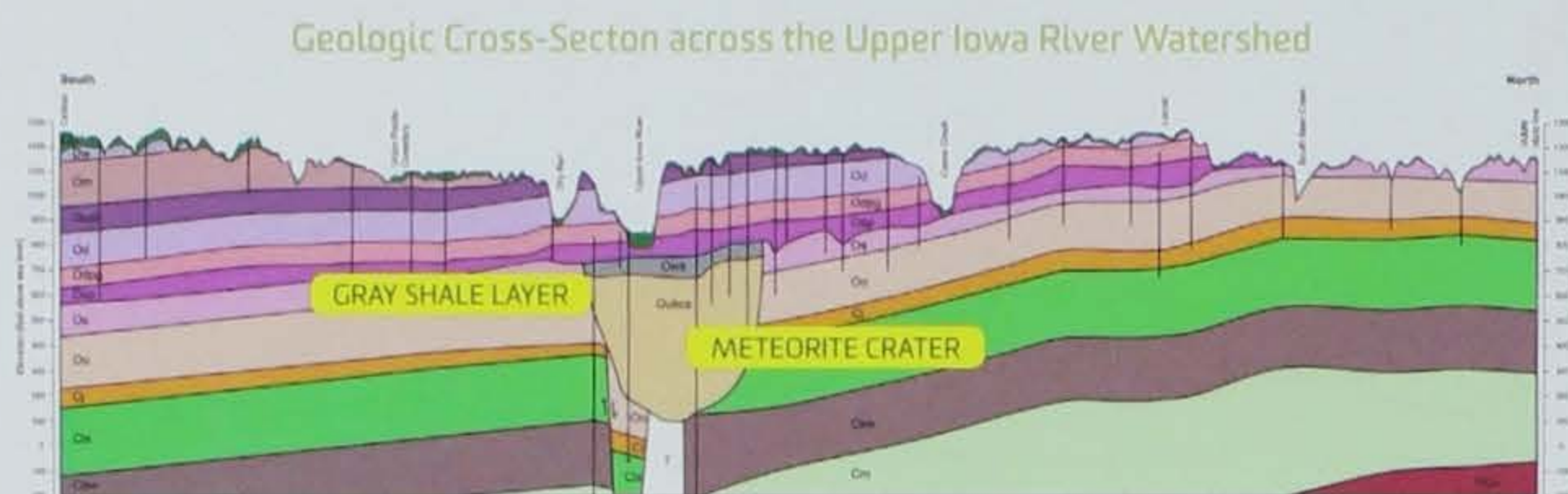
The one telltale outcrop happened to be on the grounds of the Oneota Country Club, and McKay is eager to show it to me. While golfers enjoy the waning afternoon, we head into a wooded area at the outskirts of the golf course, where he shows me the Country Club Outcrop.

Shaded by trees, a wall of rock tells the unmistakable story of the upheaval that struck this area so many millions of years ago. The rock is lined with layers that should be flat, but instead are curved and tilted, some at 45 degree angles, and some curving to a crazy 65 degree angle. The meteorite that streaked out of the sky here hit with such force as to turn the flat earth nearly vertical.

In the last stop on our journey through this varied landscape, McKay takes me to the Decorah Fish Hatchery, most likely the source of all those trout breaching the surface of the river in town. Here we walk past long cement raceways filled with cool water fed by nearby Siewers Spring, roiling with trout of various sizes, climbing over each other in the water to show themselves to us. These chases seem to be more trout than water—the hatchery produces approximately 130,000 rainbow and 20,000 brook trout per year.

As we head south out of Decorah, I promise myself to come back some day. And if I can’t bring a geologist next time, I will surely bring a kayak and fishing gear. 🐟





An ancient meteorite crater is shown as a pocket-shaped structure extending 650 feet below the Decorah area. It formed 470 million years ago. Later, a shallow sea covered the area, leaving a sediment layer on top of the crater. It later hardened into shale and fossilized rare marine life.

Decorah's Deep Secret

Last winter, a meteorite slammed into Russia, shattering windows and causing injuries. Widely captured on video, the footage was shared worldwide. That rock was about 55 feet wide. Here in Iowa, an ancient (but newly confirmed) meteor that struck what's now Decorah was perhaps as large as a city block. It blasted a crater roughly 650 feet deep and nearly 3.5 miles wide. But that is just the beginning of the story.

In 2008, scientists from the DNR's Geological and Water Survey had a hypothesis—a crater lay buried deep beneath the city of Decorah. The initial clues stemmed from oddities found when drilling wells for water. The scientists found a unique greenish-brown to dark-gray shale layer beneath the city. More drilling found similar shale—now known as Winneshiek Shale—and when plotted on a map, it was found in an area 3.4 miles across in an unusual circular pattern.

Later, Bevan French, a scientist with the Smithsonian's National Museum of Natural History, identified shocked quartz—considered strong evidence of an extra-terrestrial impact—in samples taken from within the crater. Microscopic deformities can form in quartz crystals when they are hit with massive, high-pressure shock waves. Only two sources are powerful enough to create shocked quartz—a hypervelocity meteorite impact or an atomic weapon detonation. The validation of shock quartz was further evidence of meteorite crater.

And earlier this year, the U.S. Geological Survey flew aircraft over northeast Iowa to assess mineral and water resources using ground-penetrating electronics. As a bonus, their sensitive equipment provided a new view deep underground that gave final confirmation of the crater.

But discovery aside, the Decorah crater holds other stunning secrets of worldwide importance.

An oddity of the crater is a 100-foot deep shale deposit within the crater, near the top, like a cap. The meteor hit about 470 million years ago during the mid-Ordovician period—so early that land animals had not yet appeared and little if any land vegetation existed. Life was mostly limited to the seas.

Eventually, much of Iowa would be covered by shallow seas, its marine sediments filling the crater. The odd and unusual life of the time which either lived in the sediment or died and settled in it eventually fossilized. After the seas retreated, the sediments eroded away—but sediments within the protective crater remained and compressed into shale.

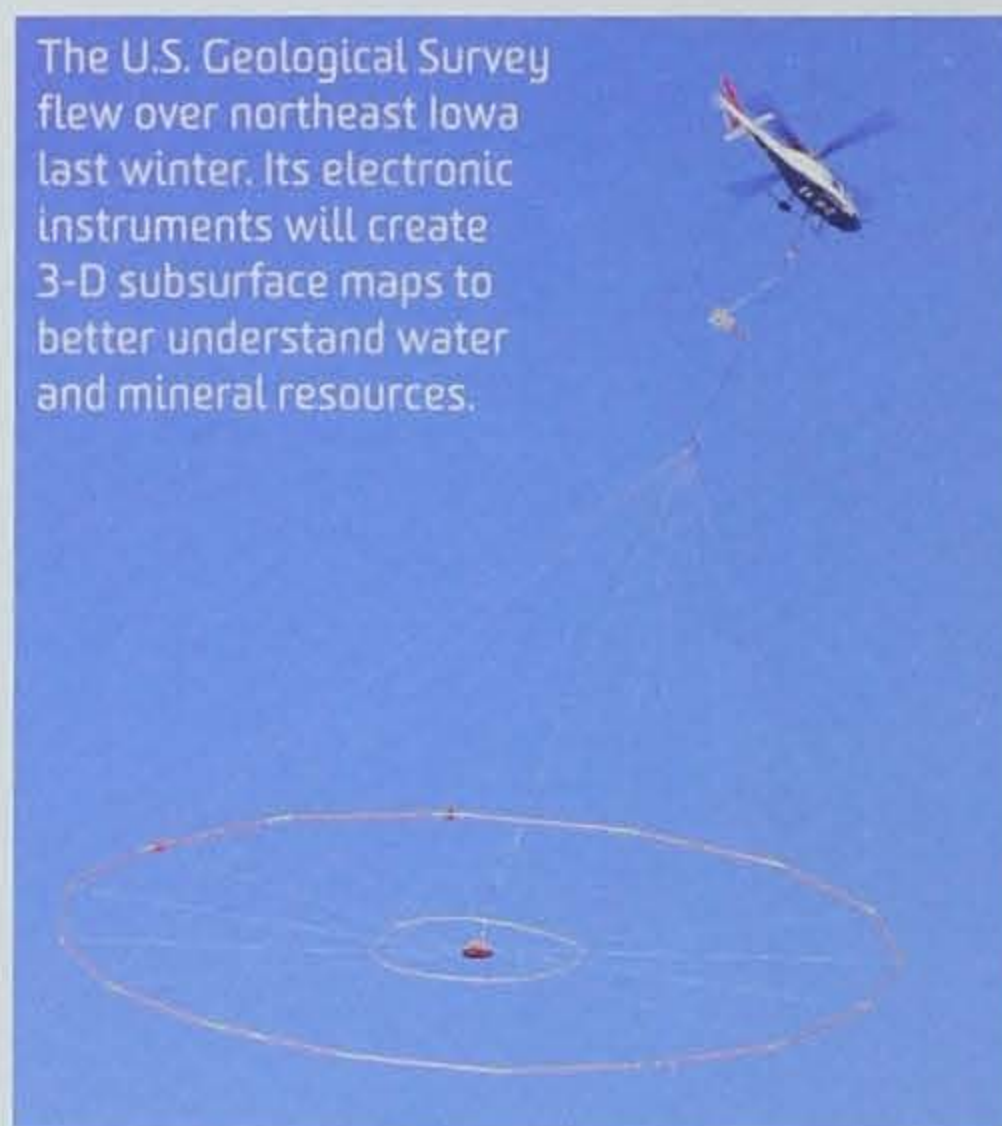
This shale holds some of the world's highest quality and abundant fossils from the mid-Ordovician. The bizarre and bewildering creatures are extraordinarily well preserved and in many cases contain both bone and soft tissues.

At that time, invertebrates, such as mollusks and arthropods, ruled the seas. Fish with jaws likely had not yet appeared on Earth. In the shale, researchers have found jawless fish, tiny eel-like conodonts, worm-like vermiforms and eurypterids—miniature shrimp-like animals and a number of poorly understood fossils. The fossil site was not excavated and investigated until being awarded National Science Foundation funding in 2010.

As a final secret intrigue to what is now called the Decorah Impact Structure, some researchers, noting that roughly 20 percent of all known meteorites on Earth fell during the mid-Ordovician, speculate a massive collision in an asteroid belt beyond Mars about 470 million years ago pelted our planet with rock fragments. The newly confirmed crater and its odd, ancient fossils could be the direct result of this interplanetary rock. It is something to think about the next time you cast a fly in Decorah's coldwater streams.



Buried deep below Decorah rests a meteorite crater some 470 million years old. The crater filled in with sediments from ancient seas which later compressed to form Winneshiek Shale. It holds perfectly fossilized bones and soft body tissue from early marine life—jawless fish, odd and tiny eels and miniscule shrimp.

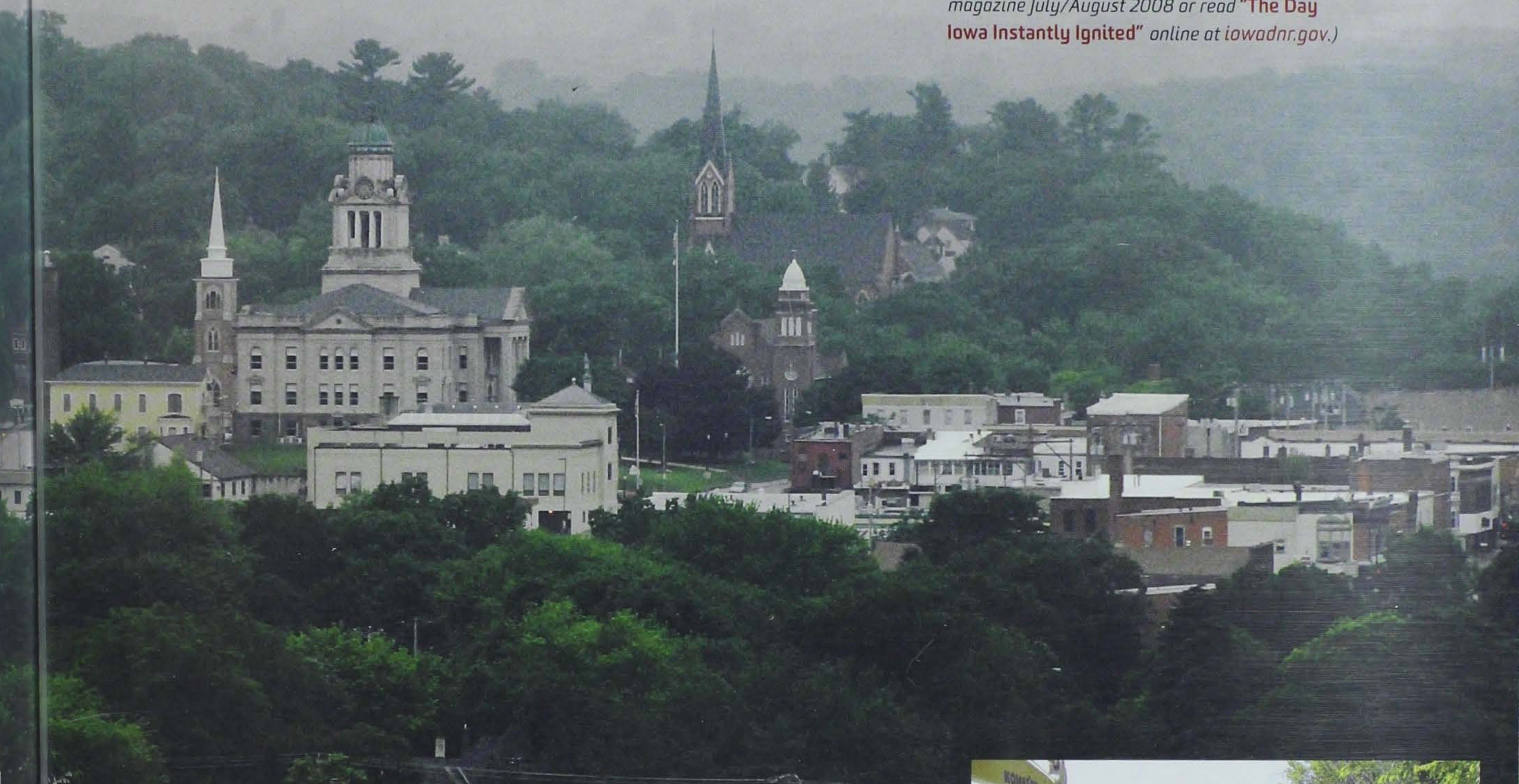


The U.S. Geological Survey flew over northeast Iowa last winter. Its electronic instruments will create 3-D subsurface maps to better understand water and mineral resources.

DECORAH PHOTO BY JAKE ZWIBOHMER

DID YOU KNOW?

The Decorah Impact Structure is the 185th confirmed crater on earth. It is Iowa's second known crater. The other is the Manson Impact Structure that occurred 74 million years ago. (See *Iowa Outdoors* magazine July/August 2008 or read "**The Day Iowa Instantly Ignited**" online at iowadnr.gov.)



FOSSIL PHOTOS: Tiny long-extinct eel-like animals, called conodonts, are widespread in the shale. The "teeth" were probably used for filter-feeding.
AT RIGHT: An area with Winneshiek Shale just underground is excavated to obtain samples. The shale contains the world's highest quality fossils from the mid-Ordovician period.



IOWA'S GREATEST (AND CHEAPEST) OUTFITTED ADVENTURE

Each year the DNR chooses a portion of an Iowa river to clean, then dispatches a massive troop of volunteers on Project AWARE (A WATERSHED AWARENESS RIVER EXPEDITION). Over the course of seven days, something magic happens.

BY JENNIFER WILSON PHOTOS BY CLAY SMITH

Maybe you've heard of Project AWARE, the DNR's annual weeklong expedition in which volunteers paddle and clean part of an Iowa river.

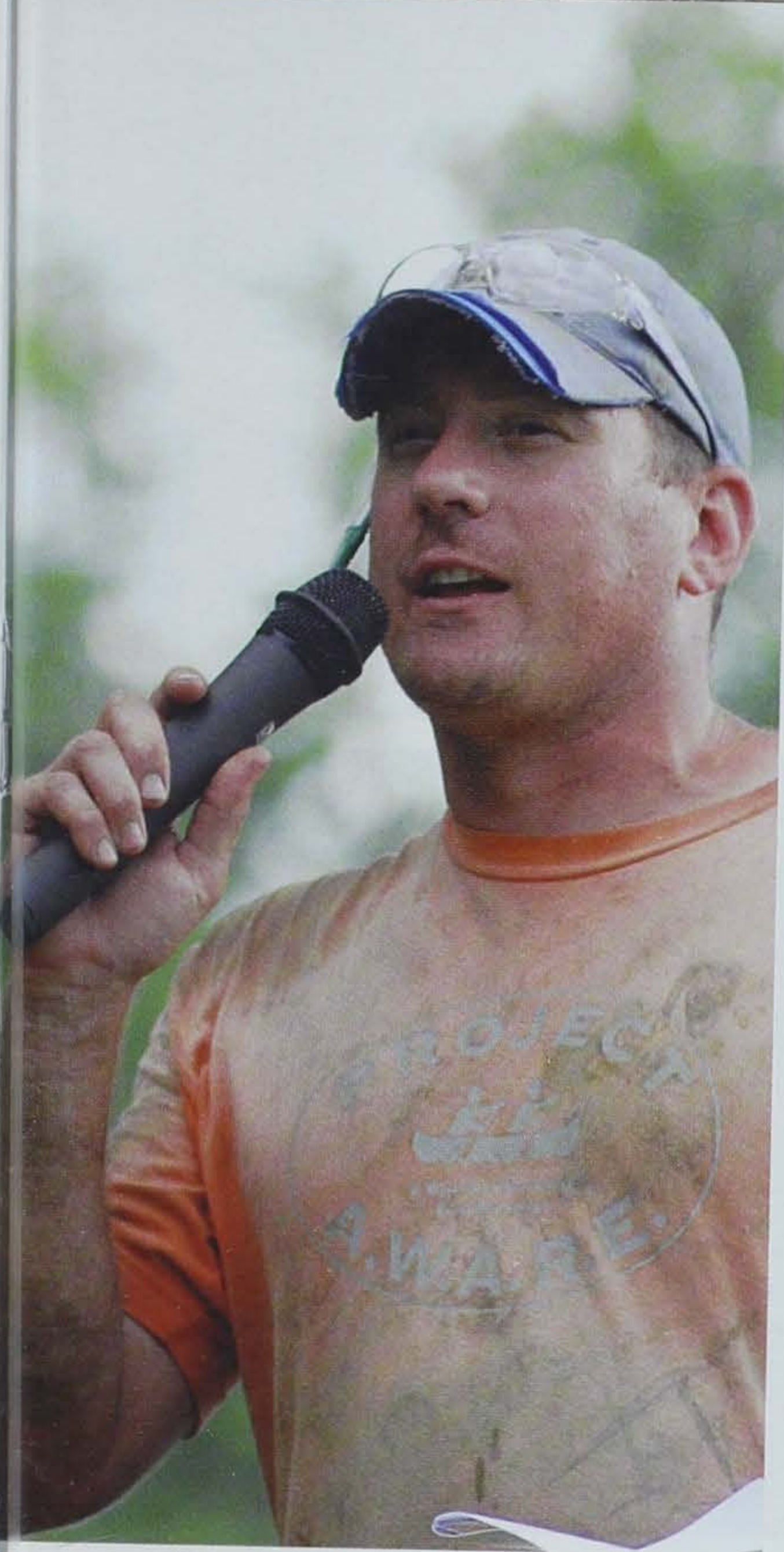
It's been called "RAGBRAI with a purpose" (and without the party): The state has 72,000 miles of streams, 18,000 miles of which are considered "navigable." So far, Project AWARE has removed trash from 786 of them.

It's a great volunteer project, yes. I will tell you all about it. But first, as a travel writer, I have to point out that it's also a terrific outfitted adventure. For a pittance—in the neighborhood of \$155, which covers the catered food costs (less if you bring your own food)—the

DNR provides everything except the hands you'll use to pull debris from the water.

But the work stuff is only part of the day. In less than 12 hours, I took a hayride, built a birdhouse, partook in a very civilized wine tasting, listened to an eco-talk about river life and made a few friends.

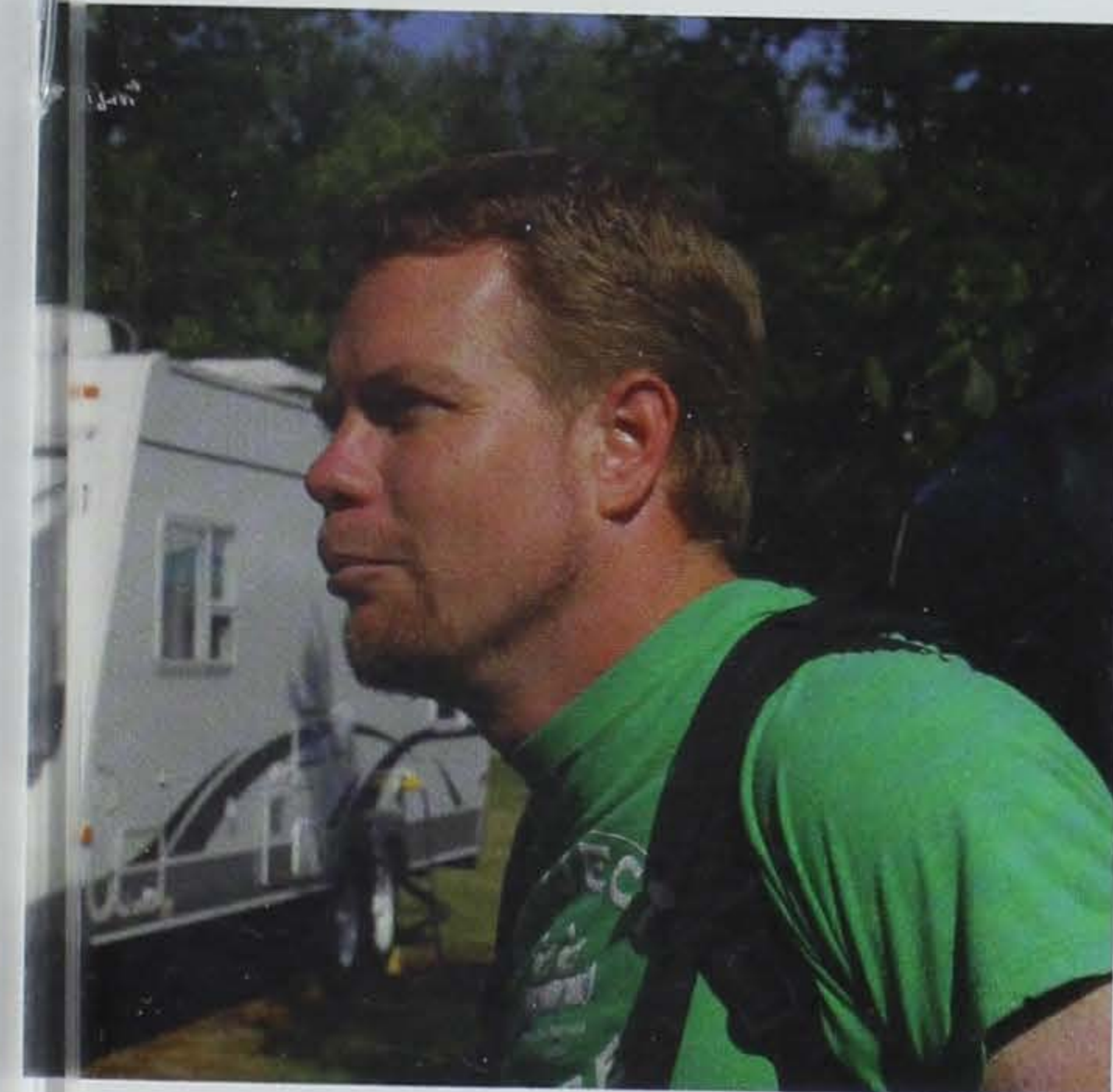
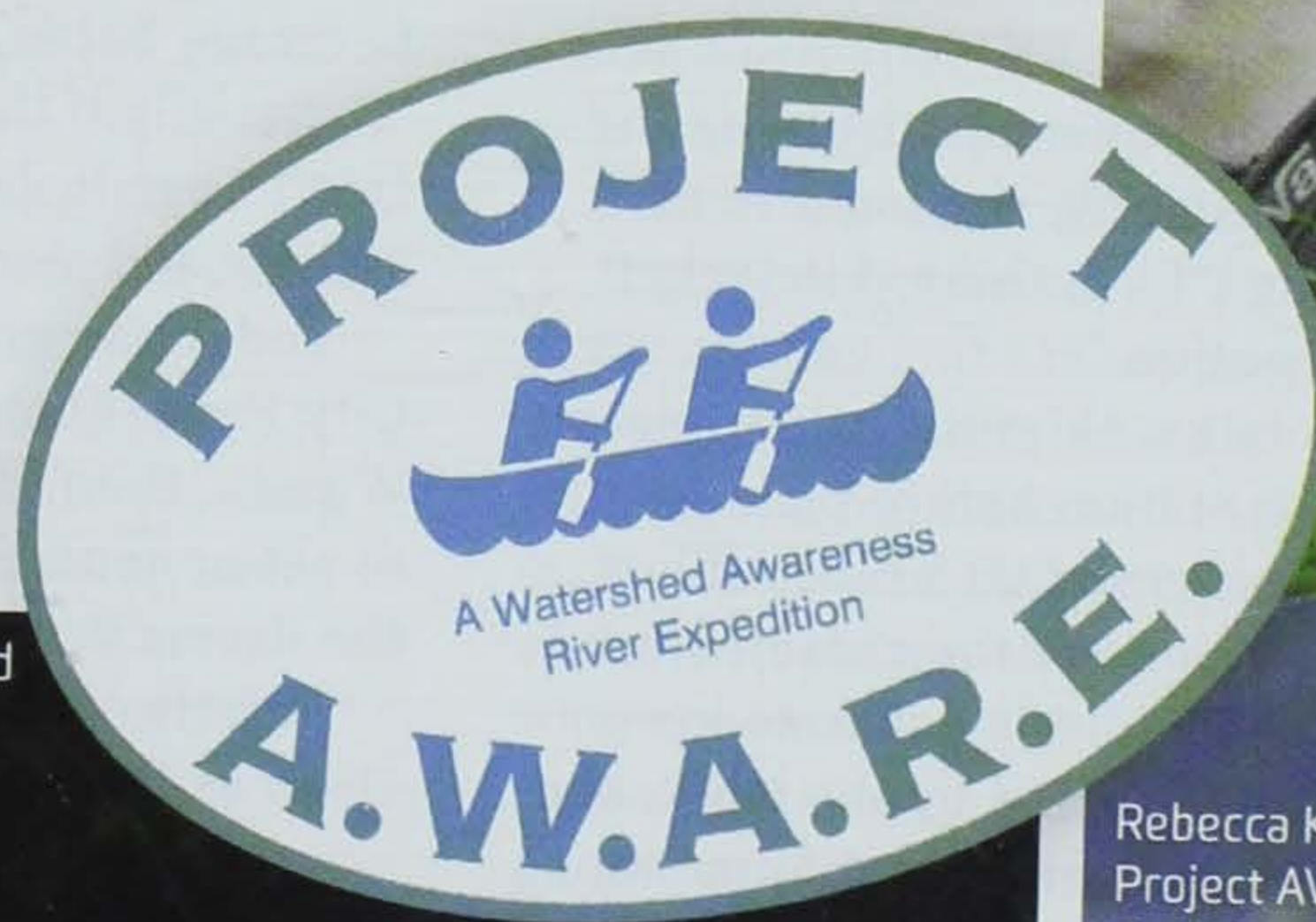
I will say that the work unifies the group, though. It lends a common cause that volunteers tell me forges strong bonds—people return year after year because of it. I found on Project AWARE a temporary community that radiated a generous spirit and effusive goodwill. I pulled all sorts of weird stuff from the water. But it's the hope that sincere intentions and hard work can still change things that stays



Volunteers Greg Elin of Waverly and Dustin Elin of North Liberty.



Brian Soenen (upper left) gives morning instructions to the throng of volunteers signed up to clean an 85-mile stretch of the Iowa River from Dows to Marshalltown during last year's Project AWARE. Hundreds of volunteers tag team to remove any unnatural debris from the river. Soenen founded Project AWARE in 2003 and was its coordinator until leaving the post last year. Nate Hoogeveen (left), DNR River Programs Coordinator, has been on the Project AWARE team for nine years.



Low water levels in 2012 resulted in some walking of heavy loads.



Rebecca Kauten, Project AWARE Staff for 5 years.



Grace Ceynar, of Iowa City, is a 4-year Project AWARE volunteer as is her family.

with me. A gift from the volunteers and the river itself.

Join me for a day with Project AWARE 2012—a sample from the week that covered an 85-mile stretch of the Iowa River, Dows to Marshalltown—to see what I mean.

Paddling trash warriors

It's early on a Tuesday morning, July 10, 2012.

Yawning campers pack up tents after a night on the Riverbend Middle School football field in Iowa Falls. Sleepy grown-ups in sports sandals gravitate toward the line for hot pancakes and sausages dished up by Camp David restaurant. Kids in dirty swimsuits run feral as their parents pack sack lunches.

The school's locker rooms and field are spotless, despite hundreds of footprints in the previous hours—this is a group that appreciates returning chaos to order.

They are the 387 paddling trash warriors of Project AWARE.

A voice beams over the portable PA system: a strapping guy in water socks, giant sports watch and wraparound sunglasses hanging from his neck. This is Brian Soenen, the founder and driving force behind Project AWARE since it started in 2003. He retired as coordinator in 2012.

"Today's announcements!" he begins, addressing the group gathered in his general vicinity, sipping potent coffee, smearing on sunscreen. "First thing: Lifejacket use is mandatory. It's not an option."

People finish eating as he talks, skimming their plates and utensils through the wash station before picking up extra equipment, such as cut-resistant black rubber gloves, lifejackets, dry packs or one of the carabiners marked with a keytag for each paddler's name, to keep track of their whereabouts. All provided by the DNR, and the individuals, organizations, companies and foundations that support this work and the volunteers who do it.

On an outfitted trip, it's the little things that take it from good to great, and all the little things are in place here. Without worries such as a forgotten toothbrush (handled, today, by freebies from the Iowa Falls Chamber Main Street businesses), the schedule is open for friendly conversation and camaraderie.

Soenen scrolls through the day's business: Birthdays,

lost and found, portage information. Reminders about what constitutes river trash (essentially, everything non-natural) and what doesn't (things like wood or bricks). Three kids get Junior Naturalist badges.

There's a brief tutorial on meth labs.

"If a hose is coming out of a one- to two-liter plastic beverage bottle, that's a clue right there," he says. "Especially if there's milky, foggy, nasty stuff inside: Don't open it. Leave it alone. We'll document the illegal activity and alert officials."

Today the group will paddle a few miles to Eagle City Park. They'll end the day with a tour of Eagle City Winery, then off to Pine Ridge Park in Steamboat Rock to set up tents, eat dinner and maybe catch the bus to the drama production in town.

In between, volunteers paddle the river, swabbing it clean as they go.

A team of helpers

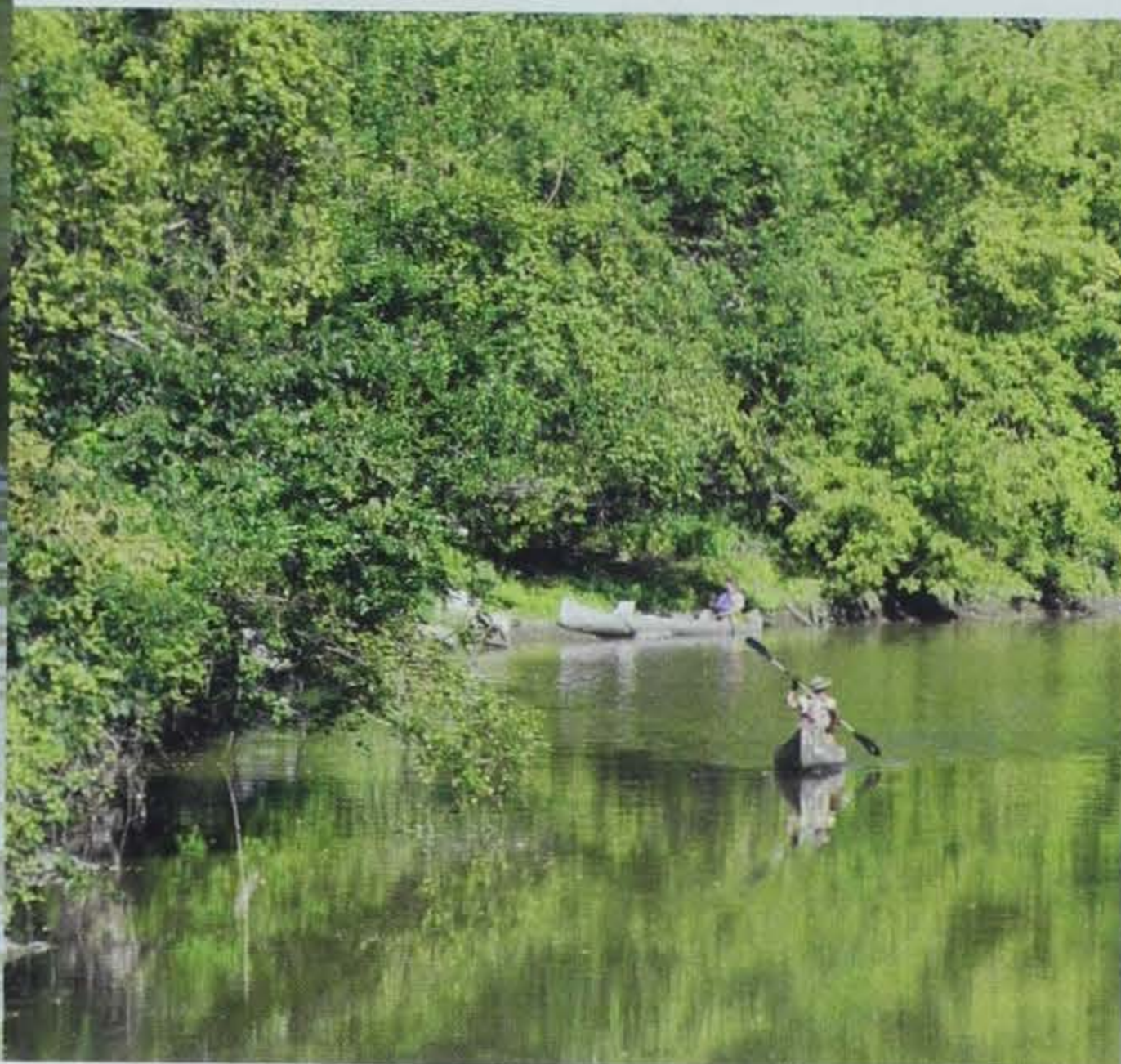
"Green means go!" whoops a bristle-faced guide pointing volunteers toward green DNR canoes.

It's hard not to feel spoiled on this trip, despite the fact that it's largely about trash pick-up. You're driven to a put-in point, buckled into a lifevest, directed to the canoes, nudged from shore. For breaks and meals, you're waved down, escorted from your boat and the guides





Sarah Hawkins, Ryan Ceynar
and Katherine Soenen



Volunteers come from all walks of life, all ages, and from all over, such as Jerry and Marie Swenson (far left), who hail from Kingston, Ark. Many volunteers say the good times, sense of purpose and achievements are why they keep coming back. Many have several years of participation.

(DNR employees, plus a few borrowed staffers from the State Hygienic Laboratory at the University of Iowa) empty your trash while you grab a soda from the coolers and listen to experts explain river phenomena.

Alannah Atley, a curly-haired 62-year-old Hy-Vee employee in flip-flops, has been on AWARE eight times.

"I love it," she says, waiting for the bus to the put-in point. "It's like a camping vacation where all the details are taken care of: the staff is super; the educational programs are really good; the food is catered; the canoes are provided. All you have to do is bring yourself."

I'm in the boat with Melissa Jacobsen, another eight-year veteran. Project AWARE inspired her to start the Lower Wapsipinicon Clean Up, just as Soenen was inspired by Chad Pregracke's Living Lands & Waters work. "We've gotten 26 tons out of the river since 2006," she says proudly.

Jacobsen is a strong paddler with a wide smile, the kind of personality that knows everyone on the water, or soon will. She lugs her tools—a 5-gallon bucket that sits in the canoe for trash, a small shovel, fence pliers, grabbers and a sharp knife "to cut rubber tires off trees," she explains.

Mel and her husband were expecting their daughter on the trip four years ago. Macailah receives her five-year medal this year.

In the canoe, Mel's a fearless retriever. Within a few minutes on the water, she's submerged to her chin, helping others cut a length of ancient farm fence from the murky depths.

Nick Gaeta skims by, a short and muscled FedEx driver with a jangle of medals on his bare chest and a bike horn attached to his canoe. He's honking in celebration of some sheet metal he just hauled aboard.

This is his ninth AWARE, too.

"I get crazy," he says. "I get physical. I see the results of my actions and I meet people of the same mindset as me—other paddlers who care about the environment. Folks come out here and they see what we're doing and maybe they'll know better next time to properly dispose of their trash and take it to a landfill or reuse it or reduce what they use."

He floats away, calling over his shoulder. "If I can't do any other vacation all year, this is what I gotta do. Normal people do Disneyland. The beach. New York City. I do what I enjoy most: helping people."

We all live downriver

We take so long to get the fencing out that the sweep comes up from behind—the final paddler who keeps the party moving. He hops from his boat and helps finish the job.

"Sweep is basically the river time keeper," says Mel.

Mussel Revival

There are 12 mussel species in the stretch of Iowa River visited by Project AWARE—up from three species found in a 1984 study, says Jennifer Kurth, biologist in watershed improvement for the DNR. The site is cleaner, yes, but there's much room for improvement. Current species, and here's hoping for more, if only for the fantastic names:

- Fluted shell
- Monkey face
- Pimple back
- Plain pocketbook
- Fat mucket
- Mucket
- White heelsplitter
- Creek heelsplitter
- Giant floater
- Creeper
- Elk toe
- Wabash pig toe





GET INVOLVED

Project AWARE welcomes volunteers and financial backing. To provide muscle-power, food, funds or more, visit iowadnr.gov or **319-335-1598**. AWARE is tackling 94 miles of the Des Moines River from Algona to Lehigh July 6-13, 2013.

ODDITIES REMOVED FROM RIVERS DURING 10 YEARS OF PROJECT AWARE

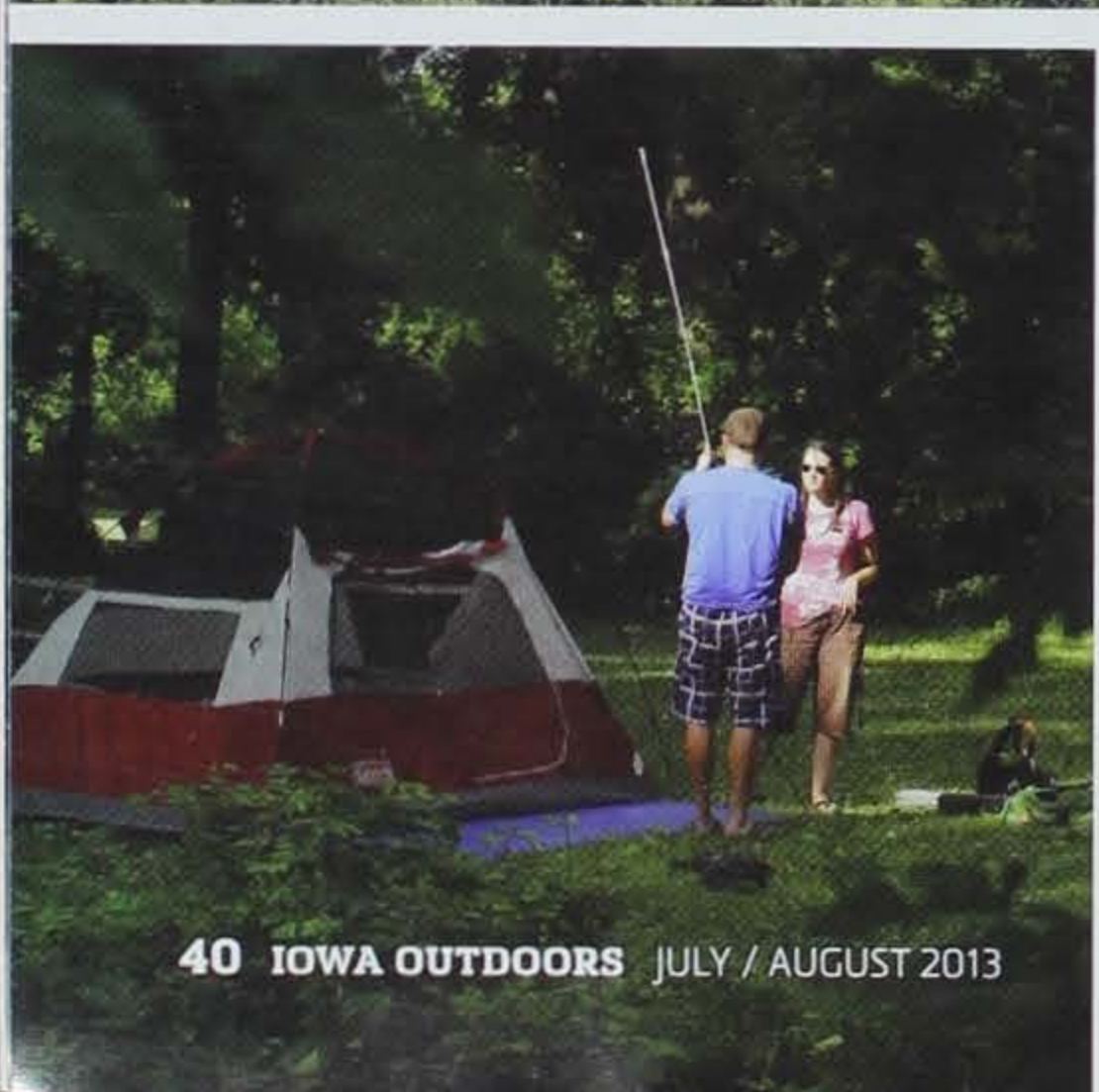
- Ceramic moonshine jug
- Crutches
- Sunken flatbottom boat
- Washing machine
- Stove
- Motorcycle
- A harp from an upright piano
- Ornate iron picnic table
- Bison skull
- Cultivator parts
- Bowling pin
- Message in a bottle
- Canoe bow
- Old-fashioned metal wagon wheel
- Car door with 1940s tire company logo
- A Goetz Beer sign (*pristine condition, out of existence since 1934*)
- Snowmobile
- Stolen moped
- Freezer
- Clothesline pole (with catfish hiding inside)



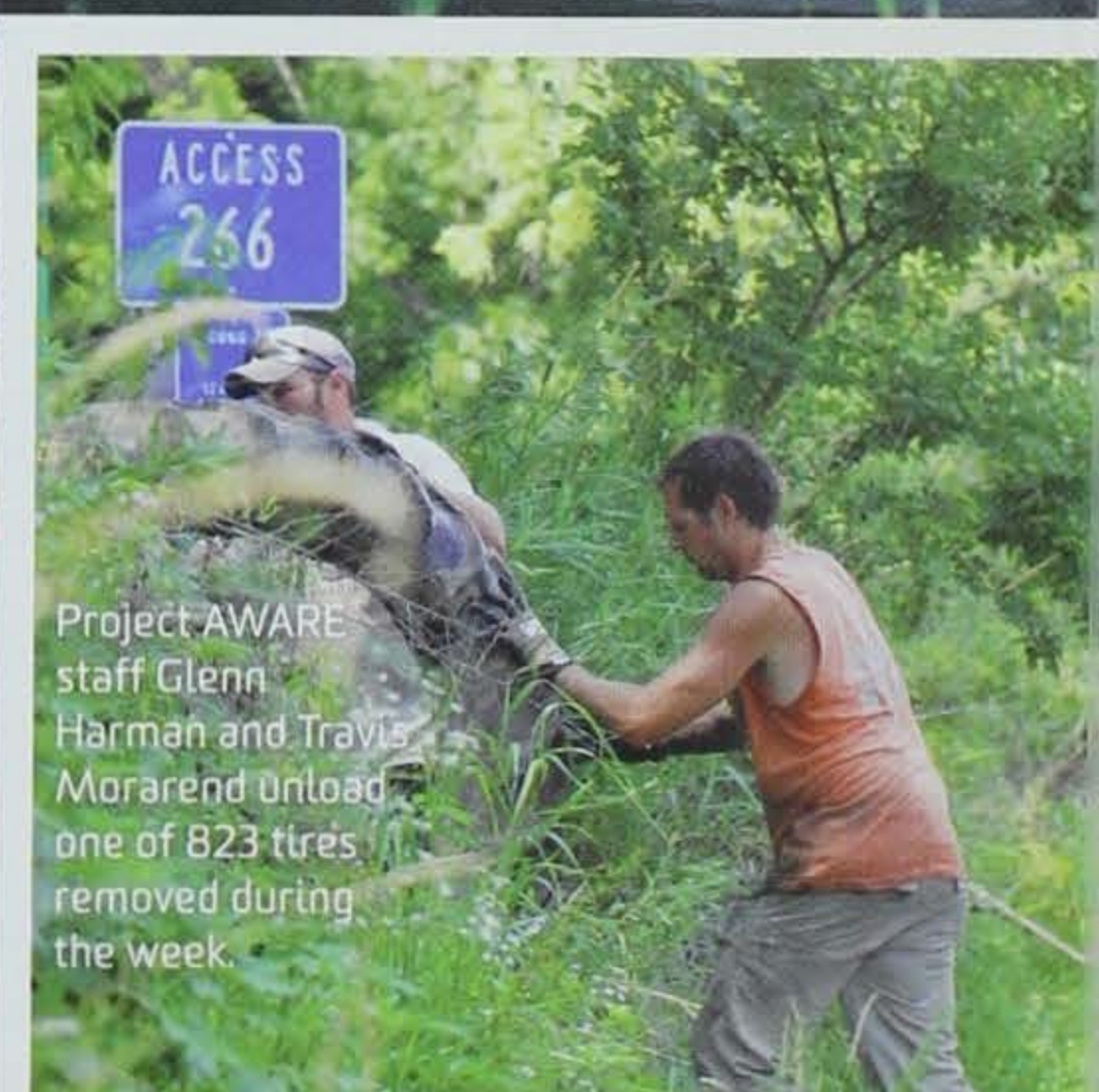
More families are making AWARE part of their summer plans, like Katherine and Greg Soenen of Goldfield (upper left). Greg is the only volunteer to have participated on all 10 trips. Many others have two to five years under their belts. Along with the army of volunteers, it takes a crew of staff (orange shirts) to pull off such extensive, sometimes difficult, cleanups. The State Hygienic Laboratory at the University of Iowa has sponsored AWARE nine years. *Iowa Outdoors* magazine is also a sponsor. Lab staff, like Seth Zimmermann (far left) makes sure participants have a safe, enjoyable and memorable experience.



Janann Abels of Ogden (left) and Sheila Kenny of Sioux Rapids (right) have participated on Project AWARE two years.



A hearty meal is welcomed after a long day on the water.



Project AWARE staff Glenn Harman and Travis Morarend unload one of 823 tires removed during the week.

We paddle on toward some conservation corps students and Mel asks if they need a hand. It seems to be Project AWARE etiquette to offer help to anyone working on something big.

"This is a blast!" one of them calls, working to free a piece of rebar. "We're good! I just wish I had a welder!"

We pass a group digging out a metal barrel. Some women comb the shore for junk. An 11-year-old boy paddles past with his dad. "Melissa, we found a toy car!" he hollers.

Two 65-year-olds troll for beach trash. "We're here because we all live downriver—every one of us," says the one named Del, who's also a member of IowaRiverFriends.org.

There's a vocabulary for each of these volunteer styles, Mel says. Skimmers pick only what's in reach of the boat. Combers walk the beaches. Jammers climb logjams.

"And there are excavators," she says, pointing at Nick and some other guys wielding shovels and axes against a submerged front-end of a car.

The water is shallow and the scenery is pretty, with bluffs and cliff swallows flitting around their mud homes. Two guys in a canoe-maran (two canoes tied together) pass us, hauling a pile of tractor tires. There will be 823 tires recovered from the river this week. Bridgestone has volunteered to recycle them all through the company's spent tire program (oneteamoneplanet.com/Americas).

Despite the massive amount of trash hauled this year (60 tons of it, 50 of which will be recycled), the river appears to be fighting back for its health. One of the most surprising things the volunteers find is the number of live mussels along the bottom. They're fairly plentiful, and they're big.

An Iowa River survey in 1984 found only three types of mussels remaining in this waterway once known for an abundance of them. The most recent survey found 12 species.

"At least the river is getting better," says Jennifer Kurth, DNR biologist in watershed improvement, her eyes scanning the water. "There has been improvement."

The volunteer numbers are growing, too—there are more than four times as many people on Project AWARE this year than when it began in 2003.

Through the generations

At lunch, we stretch out on a field of grass and visit with other boaters while staff empty our 5-gallon buckets and lay out snacks.

There are several multigenerational groups on this trip and more kids than ever. One couple met on AWARE and later married. It all adds to the feeling of community.

Judy Imgrund of Marshalltown, white-haired with dark glasses in a bucket hat, dines on a blanket with her granddaughter. They've taken the past three Project AWARE trips together.

"It's a great big scavenger hunt for us," Judy says, nudging Emma. "I took her on the first trip because I'm not going to bake her cookies. I'd much rather have her say in years to come: 'You know what I did with my grandma?'"

Emma grins. "I've never really gotten a chance to

canoe outside of here," she says. "I really enjoy it."

"I feel very privileged to share this with her," Judy says. She pulls her hat down on her head, hard. "Oh, that almost made me cry."

Teenager Sara Mildenstein is spending her fourth year on Project AWARE with her dad. She came home from Paris the day before. Still, she says, "It's one of the best things I do every summer."

Soenen says there's just something about gathering like-minded people, intent on leaving the world better than they found it.

"Somewhere between morning announcements and picking up a bunch of trash in a river, magic happens," Soenen says.

A ways to go

I could tell you all sorts of things about the rest of the day. How we paddled on down that river, even shot some easy rapids. I was a picker, a skimmer, I even tried my hand at excavating. It scared the heck out of me, being submerged to my middle, trying to get a handle on a deeply mucked-in barrel. Though I am not the kind of person who is comfortable sinking into soft river mud, Mel talked me through it. A few other volunteers stopped to cheer me on. It felt pretty great, getting that old thing out of the water and into our canoe. It's the story I tell people when they ask about Project AWARE.

I could end my story with a typical travel-writer wrap-up, including a peppy end quote and a typical rolling-hills conclusion.

But I'd rather not. There were just these people. I saw them work together untwining barbed wire from tree roots, or laughing at the massive "pop!" from a tire unsucking from sludge, or crouching alone on a bank spooling up old fishing line. I saw them at night, tired and happy and friendly with each other, gathering around small fires in Pine Ridge Park, eating roasted chicken and corn, some playing guitar, some helping their kids into sleeping bags.

I saw them living together well, doing this difficult thing all week, working with gratitude.

They gave me hope.

In the 387 volunteers on Project AWARE, I saw that maybe we can rectify some of the damage we've done to the land, to the water. We can collect the cans and the tires and the junk and the fishing line. We can try to restore things. Make amends. The mussels will try to return.

"Haven't you just found these people something else?" said the grandmother, Judy Imgrund.

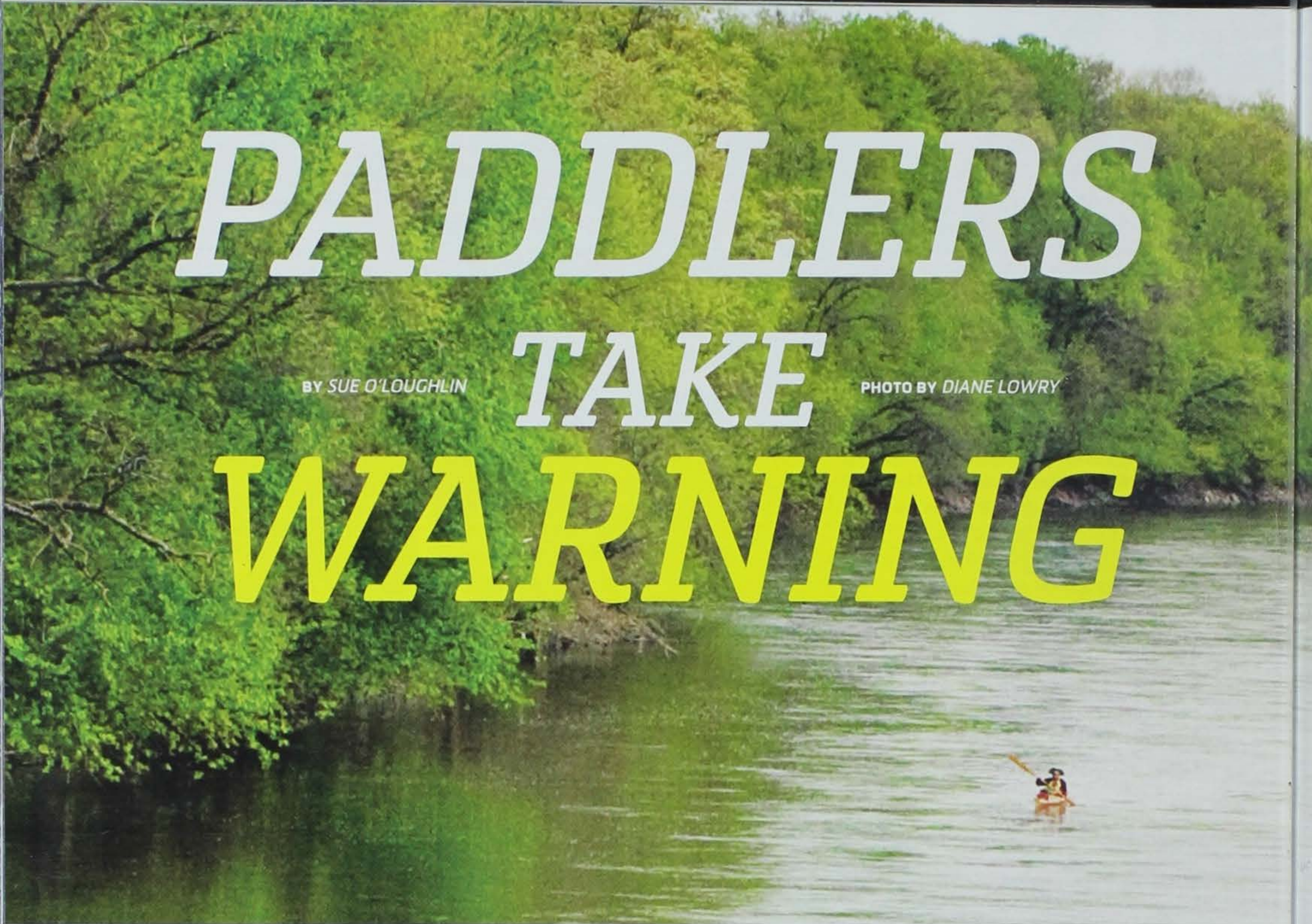
Yes, I have. And I hope to join them again. If you're the type who doesn't mind a week of dirty fingernails, I hope that I'll see you, too.

We pulled almost 10 tons of trash from the river that day.

Filled nearly five 30-yard containers of scrap steel.

Dug out 259 tires.

But, in the words of biologist Jennifer Kurth: "We still have a ways to go." 🐼



PADDLERS TAKE WARNING

BY SUE O'LOUGHLIN

PHOTO BY DIANE LOWRY

After sending the youngest of our four children, Paul, off to college last fall, my husband and I are enjoying more leisure time. Being empty-nesters brings back some freedom of our early dating years and throughout this past winter, we looked forward to kayaking the Wapsipinicon River near our home.

While away at college, Paul befriended a sweet "big city girl" from Des Moines. Wanting to share our love of paddling, we arranged a short float of the Wapsi River above Independence. The previous weekend, we fished and floated a backwater area, but for this outing, we picked a stretch we hoped would be a one- to two-hour float to introduce Chelsea to the river and its abundant wildlife.

Unfortunately, our introductory kayak trip was more than we bargained for.

The trip began as planned. Waiting for us to shuttle vehicles, my husband watched a bald eagle circle lazily overhead. Upon our return, we quickly gave Chelsea the fundamentals of kayaking and assured her that the most danger we had ever experienced was getting into and out of our kayaks.

We shoved off, sitting on our lifejackets for extra comfort, and were at once surrounded with the sounds of nature. From a distance, we could hear Canada geese

honking and the mating calls of birds. We floated by a log where a northern water snake was sunning. He did not appreciate our presence and slid silently into the water, lost from view. Bluebells along the river were in full blossom and we kept our eyes open to spot the many snapping turtles we had seen the previous weekend.

I was silently congratulating myself on such a wonderful idea to get to know Chelsea better and to introduce her to our quiet, laid-back way of life that we love.

About one mile down from the Otterville access, we were pleased to see a narrow portion of the river was open. It had been blocked with downed trees and debris. Unfortunately, the scattered logs and downed trees appeared again a short stretch downstream. They narrowed the river channel and increased the flow.

I bounced my kayak against my husband's kayak and headed sideways into a log as he wove his way through the narrowed opening. Paul and Chelsea followed my path and tried paddling backwards against the current in their tandem kayak.

They were upstream of me when they turned sideways. The current shoved them against a partially submerged log. They rolled. Paul stayed with the kayak, but the current shot Chelsea downstream toward me. She grabbed the bow of my kayak. As she made her way toward my outstretched



hand, I tried to figure out how to get her out of the water. Sitting in my kayak, I couldn't offer much more than moral support and a reassuring grip of her hand.

Suddenly Paul lost control of the kayak he was holding and both were headed toward us. As Paul and the kayak hit us, he reached up to try to stop from being swept under my kayak and instead flipped the kayak I was sitting in.

I opened my eyes in the murky water to see arms, legs and kayaks above me. Lifejackets were afloat and I wished we had used them for their real purpose instead of as cushions. My first attempts at surfacing were unsuccessful until I followed the current under the log and out the other side. As I gulped air and grabbed the first log I found, I turned to see Chelsea still underwater, but being carried toward me. She came up for air and went under again just before getting to the main logjam I was now holding onto. Blood was coming from her nose and cut lip. We reached for each other and managed to pull ourselves onto the logjam and walk toward shore.

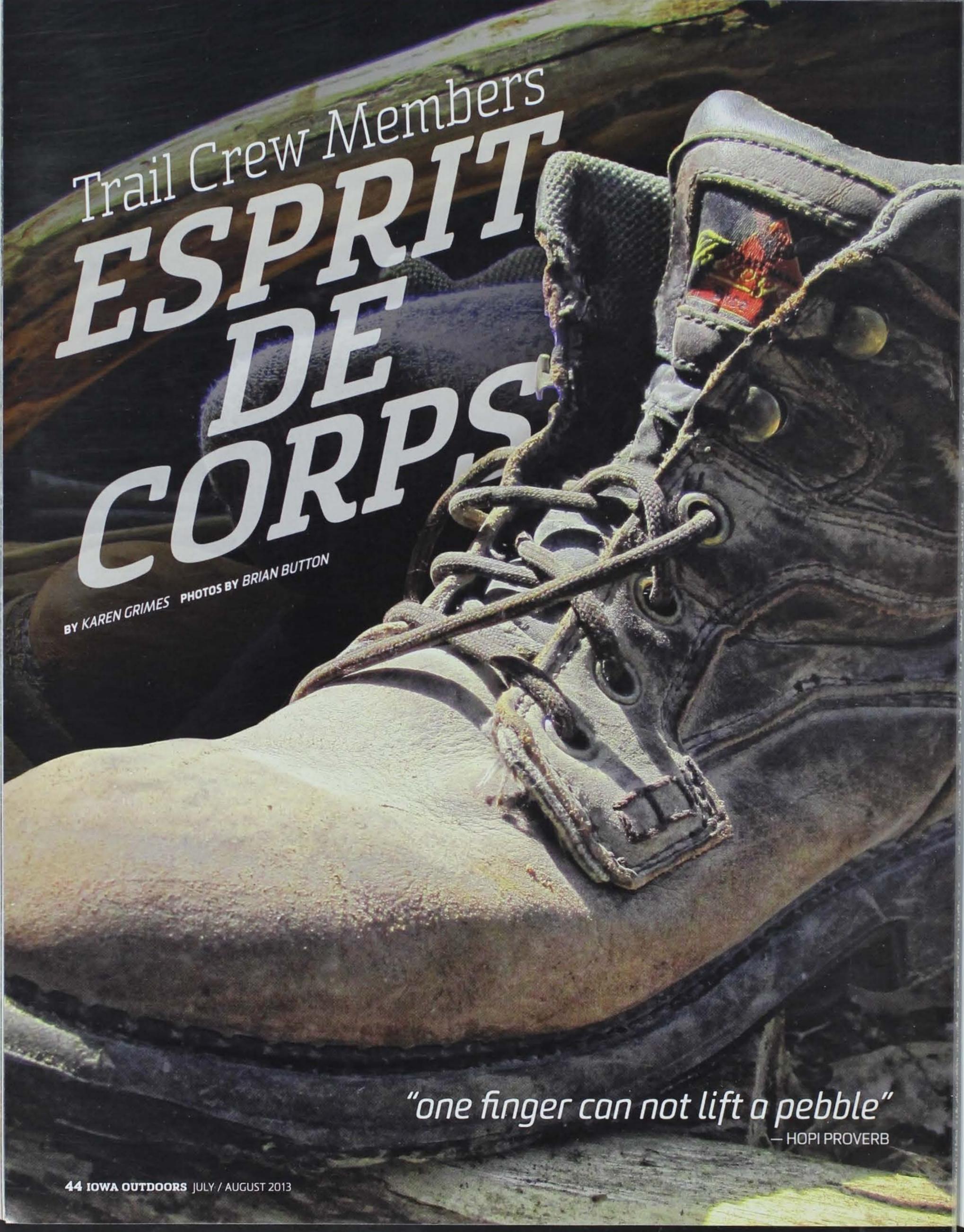
It took some time to recover the kayaks, dump the water and then portage around another logjam that spanned the width of the river, but we were back on the water to finish our journey—colder, but wiser.

Paul talked about not being able to breathe when they

flipped because the water was so cold. I have no memory of the water temperature; my only thoughts were of the articles I had read of anglers falling into the river and being trapped under debris piles. I also remember hearing from a mother whose 12-year old daughter had almost drowned when she was caught under a logjam after their canoe tipped on the Upper Iowa River.

What would we do different? First, we shouldn't have taken a novice kayaker on a river when we have backwater areas and lakes with little or no current. Even though the Wapsipinicon was not flooding, the current was faster than normal. Second, we should not have taken a new kayaker on a river stretch without having first paddled it ourselves. Rivers are living things and hazards appear and disappear in both high and low water conditions. Third, we now *wear* our lifejackets instead of using them for cushions. We learned a hard lesson—you don't have time to grab them when you are flipping over.

Will Chelsea ever be willing to risk another lazy float trip with Paul's parents? The jury is still out, but we know how lucky we were to have only lost a paddle and a few clothes. We gained a few bumps and bruises. We will be back on the river soon and hope to recover the missing paddle, but we will also be more careful and respectful of the power of the river. 🐼



Trail Crew Members
**ESPRIT
DE
CORPS**

BY KAREN GRIMES PHOTOS BY BRIAN BUTTON

"one finger can not lift a pebble"

— HOPI PROVERB

Muscles strain. Sweat drips. Grunts resonate through the air.

The crew works 10-hour days, four days a week, hauling 300-pound boulders and 400-pound railroad ties up and down hills. By hand. On foot.

No, it's not a chain gang or *The Biggest Loser*. It's the DNR's AmeriCorps Trail Crew.

The work is tough. Living conditions are tougher. July temperatures soar to 100-plus. There is no air conditioning, no soft mattress waiting at day's end. No computers, no television and no cell phones (at least during the day). Just a shower and outdoor dinner followed by a tent and a bedroll. And then move camp every few weeks to the next park.

Many would describe it as hell on earth.

But team membership is a badge of honor—highly sought after and won through competitive interviews. Trail crew leader Whitney Davis sees the team as an elite group, and she recruits the best of the best.

"The 2012 crew was the best I've seen yet," Davis says. "We had a mix of majors—theatre, journalism, natural resources. We had a mix of backgrounds with one in the military reserve, one from a landscape company, one a baker, several college students or recent graduates."

A Day's Trail Toil—Pine Lake

On a still July morning a rosy glow breaks the haze at Pine Lake State Park. The day starts much as it did for the Civilian Conservation Corps here three-quarters of a century before. AmeriCorps members crawl out of their makeshift homes. Some head for the restroom, toothbrush and comb in hand, others for the coffee pot.

By 7 a.m., they've formed a rough circle in the campground. Beams of sunlight break through the tree trunks. Workboots adorn every foot. As team members divvy up tasks, one encourages everyone to stretch.

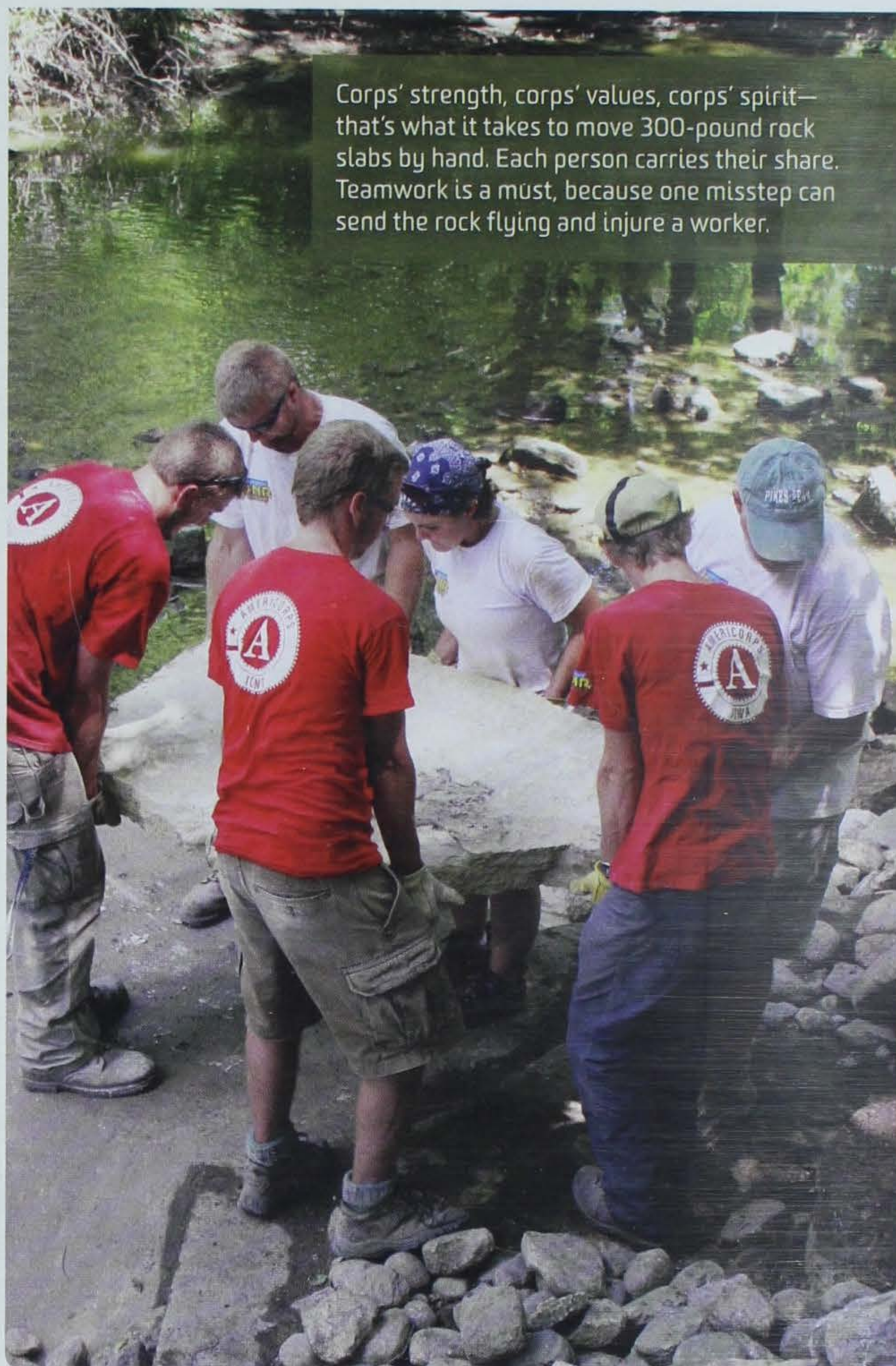
Limbered up, the circle breaks with a last minute scramble for the tool trailer. Each person signs for the tools they need, checks for sharp edges, hones dull edges, cuts steel rerod to size and tests handles.

They pile tools, lunches, backpacks and water bottles into a DNR pickup, then crowd into the king cab, destined for the trailhead on Lower Pine Lake.

The sharp acrid odor of creosote permeates the air as six members drop off at the boat ramp. They are soon joined by Rob Carey, one of the crew leaders. His dark olive Jeep sports two signs in the side windows: "I still play in mud puddles," and "Buckle Up, I Want to Try Something."

But Carey takes safety seriously as he dons chainsaw chaps, a heavy apron of canvas fabric lined with fibrous material. Next comes a long-sleeved shirt, then a folded kerchief across the nose and mouth—bank robber style—followed by earplugs, earmuffs, a hard hat and

Corps' strength, corps' values, corps' spirit—that's what it takes to move 300-pound rock slabs by hand. Each person carries their share. Teamwork is a must, because one misstep can send the rock flying and injure a worker.



a facemask. Creosote is nasty stuff and Carey's had one bitter experience with burns on his chest after sawing on a hot day sans shirt.

"We're always working around dangerous tools," he says. "We've got to do everything right for safety."

His saw bites into a railroad tie. The creosote stench grows stronger. The saw cuts cleanly, and in seconds, he's done. Each cut makes a tie the perfect size to replace the rotted ones in the u-shaped box steps that climb many hilly stretches around the lake.

Four crew members come back from dropping off their lunches and tools, ready to move ties.

"The yellow is the rock sling," says DeeAnn Oldsen, a recent Iowa State grad with a forestry major. She is bubbly and talkative, explaining the gear. "The black sling with handles is the Feldman. We use both to cradle and lift ties."

It takes two to four people to move a half tie and six to move a full one. They roll a half tie onto the slings. It's almost a ritual. You can see a visible hardening of will and muscle as they get ready to lift the beast. They bend in unison at the knees, then count "One. Two. Three," and lift. The 200-pound half tie leaves the ground.

Despite the weight and awkwardness, the four walk at a brisk pace. But hands soon tire. And they stop. Maybe switch sides to give a different hand a chance to cramp up.

The tie haulers start up a long series of stairs. "Hold on." Joel Schwichtenberg's end of the rock sling is dragging on the ground and tripping him up. The team takes a short breather as he unhooks a carabineer holding the sling, repositions it and ties up the dragging end. "One. Two. Three." Lift. And up the steps they go. An eighth of a mile up the trail, they drop the log and head back to the pile of ties at the trailhead. And repeat.

A senior at Simpson College in Indianola, Schwichtenberg is majoring in environmental science. This is his third stint with the DNR. "I love it. We all get along really well. We all have the same kind of mentality—just get things done."

Claire Newman from Cincinnati, Ohio, joins them. Newman graduated in 2011 with a psychology degree. "I knew I didn't want to pursue it as a career," she says. Instead, she plans to transform her concern about the environment and desire for philanthropy into a job.

"I applied on a whim. We've been working two months, living in a tent. Everyone else has a chance to go home for a weekend." She grins, a wide engaging smile. "I keep hoping someone will adopt me for the weekend." And they do. She's been home with several crew members, with a chance to sleep in a bed in air conditioning, eat at a table and do laundry.

While most DNR supervisors look for people who want a natural resources career when hiring, this is the place an English major can sign on for hard labor. "When we recruit, we look for a balance between male and female, with a good mix of academic backgrounds," says Davis. "We believe environmental stewardship is critical to all."

The result—a motley crew of young adults who make and repair trails in Iowa's state parks. High morale and esprit de corps is not by accident. Some might say it's Davis' wisdom during the selection process that melds a great team—people who want to work hard, and feel satisfied with what they've accomplished. She might say it's science, social science.

They lift another tie.

"Certain tasks are monotonous, but necessary," Newman says. "Like carrying logs. But we make it fun. I'm getting fairly fit, a benefit of hard labor." Appreciative comments from park users make her happy, too.

Carey, too, loves hearing of their accomplishments from people in the park. "It's kind of a tough job to do, plus camping all summer and moving from place to place." After a second year on the job, he's hoping to become a permanent employee. "I joined for the adventure. I like hard work and seeing what we've done."

He's proud of the projects at Pine Lake and their complexity: retaining walls, native wood hand rails, a 40-foot half log bridge with bench, replacing box steps built from railroad ties and adding drainage.

As the crew hauls tie after tie up and down the trail, they drop them where needed only to later grub out rotted ties, replace with new ones, drill holes and pound reroed into the ground to hold the ties in place. Of course, the old rotted material has to be carried out by hand.

More than 10 miles of trail surround the lake. This section is a mere 1.4 miles long, but it's steep and mostly shaded by white pines nearly 250 years old.

By 9:28 a.m., one might see a blue heron alight in a dead pine, a casualty of the storms in 2009. Two catbirds call, their scratchy voices distinctive amidst the background cacophony of the morning bird chorus.

The breeze is cool out of the northwest, blowing across the lake, which ripples as waves lap the shoreline. The low of 63 and high of 84 are welcome after the exceedingly hot 100-degree-plus weather the preceding week.

The trail wanders down into the draws. With short, small bridges crossing the dry creek beds, the ground is thirsty and dusty. The vegetation is dry, looking more like mid-August than early July. On the right is a picnic table next to a retaining wall, laden with backpacks and cooler. It's a long time until lunch.

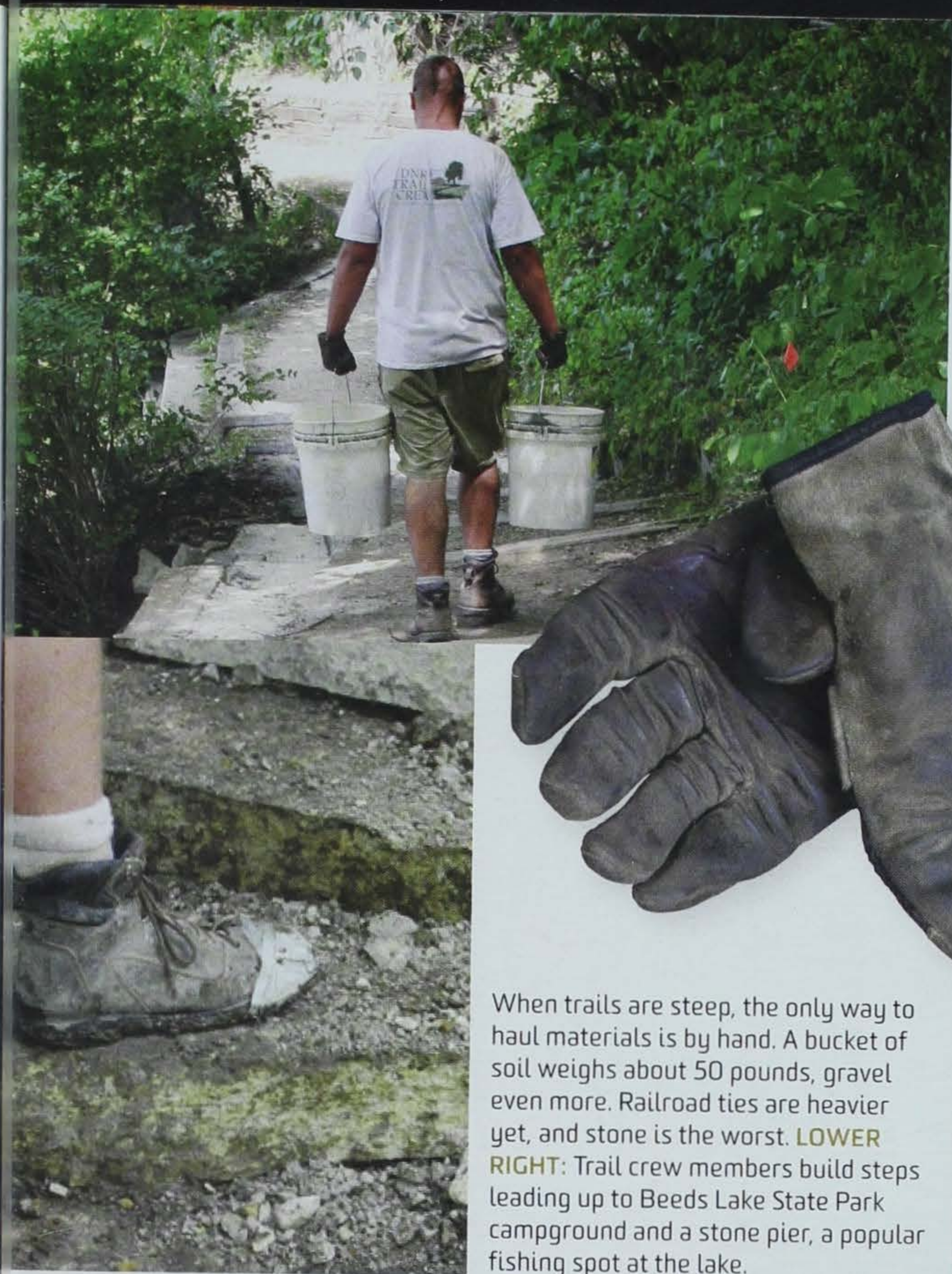
Covered in lichen, remnants of stone steps and wall mark the trail built in the 1930s by the CCC when the park first opened. The CCC was one of the New Deal public works efforts to employ young men in a nation that faced phenomenal unemployment levels after the 1929 stock market crash.

About 6,000 men built 1,000 structures in 43 Iowa parks, including some of the dams, shelters, bathhouses, park officer's homes and trails. They were called the Cs, tree army, dollar-a-day boys, wood ticks and roughnecks. They earned \$30 a month, keeping \$5 for expenses and sending \$25 home—at a time when \$6 would pay rent, \$2 would buy a pair of leather shoes, and \$0.25 would fill you up with a roast beef sandwich, mashed potatoes and gravy.

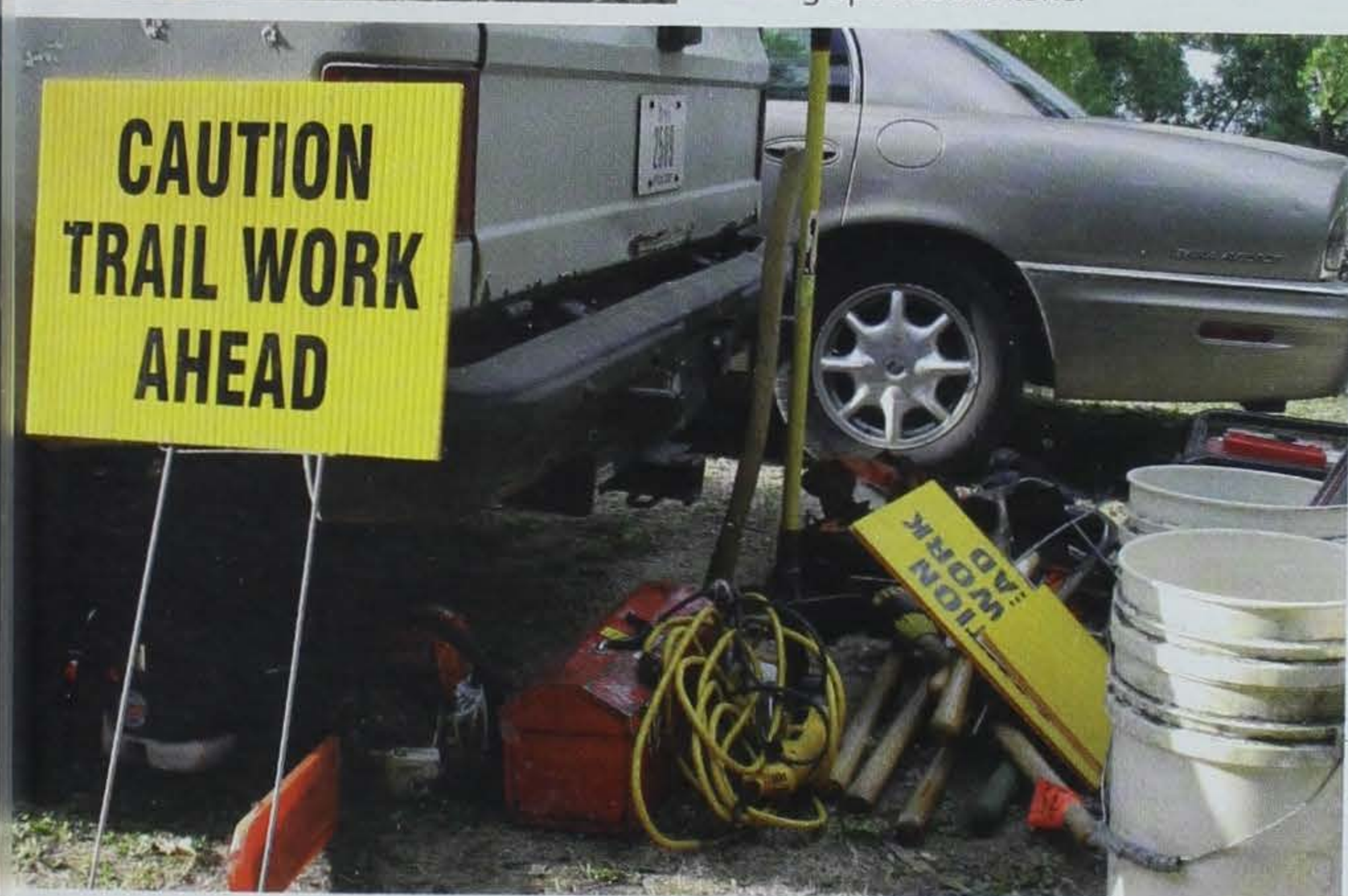
Today, at the top of a hill, two AmeriCorps members grade the trail so it will drain properly, minimizing future repairs. They add gravel bars to direct water to the side, not down the middle of the trail.

Mitch Ahrendsen is from Cedar Rapids, studying environmental studies in Colorado. "I wanted to come





When trails are steep, the only way to haul materials is by hand. A bucket of soil weighs about 50 pounds, gravel even more. Railroad ties are heavier yet, and stone is the worst. **LOWER RIGHT:** Trail crew members build steps leading up to Beeds Lake State Park campground and a stone pier, a popular fishing spot at the lake.





Taking a cue from the national trails system, this path shyly zigzags down the Mississippi River bluff at Bellevue State Park. DNR trail designers Whitney Davis and Pete Englund work hard to lure hikers to the next bend in the switchback, gently guiding them down the slope on this sustainable trail. Creating aesthetic interest and finding routes with the least impact on the land are key. This meandering trail replaces one that ran directly downhill, causing severe erosion. This trail will gently sheet water and its meanders are more pleasing to hikers.

back to Iowa for the summer. I wanted to give back," he says. "This is exactly what I wanted. We get to move around. We get to do a wide variety of things. It's the fastest flowing job I've ever had."

His trail partner is Audrey Keith, a senior at the University of Iowa, studying social work and theatre. She sports a sophisticated blonde Mohawk and says she's learned a ton this summer: safety, trail anatomy, terminology, teamwork and tools. "Hand tools are important when you are working the landscape as they

did 77 years ago in the CCC," she says.

Tools in their repertoire include a draw shave, a bladed tool with two handles to remove tree bark and a pick and a mattock to shave trail, cut trenches or pry. Then there's the McLeod and the Reinhart. Each has a different, specific purpose.

"Tools are important. If you break one, you must carry the 'blue tool'—the painted, heavy head of a long-ago broken Pulaski," Keith says. "We have a ceremony for it."

A mother and two children pass Ahrendsen and Keith with



a quiet comment on how much their work is appreciated.

Davis attributes success of the trail crew to a recent hire, Pete Englund, DNR construction technician and veteran of stints on the nationally prominent Wisconsin Ice Age and Pacific Crest trails, and to Tim Wermers.

"Pete has a strong personality, and a lot of trail experience. He's worked with diverse people—even disadvantaged youth. He brings new structure to the trails program. And he's done a lot of team building.

"Tim's in the field most of the summer, but he's also

in charge of getting supplies and running the shop," she says. "He is wonderful about offering his home to crew and picking up out-of-staters at the airport."

Further along the trail, the steep slopes are studded with stair steps—either original CCC-placed stone or more recent AmeriCorps-placed railroad ties. Davis and Englund do not favor the railroad ties. They are too ephemeral, breaking down in a mere 20 or 30 years. Where four-wheeler access is limited, keeping up the trail is labor intensive. Some areas are so inaccessible,

the crew float in railroad ties on canoes, then haul them up the hills. But joggers who use the 4-foot wide trail for exercise appreciate the trail crew's work. And ties are quicker and cheaper to place than stone.

Davis, Englund and Wermers constantly evaluate materials and techniques. It's always a trade-off between longevity and installation time, functionality, cost and aesthetics. They do approve repurposing black locust, a nuisance and invasive tree, into handrails. The handrails are dual purposed. They help hikers climb steep slopes and gently encourage them to stay on the trail. In two weeks at Pine Lake, the trail crew peeled bark from 350 feet of black locust, using the rot-resistant poles to build 80 feet of handrails. On the negative side, the handrails aren't as hefty and impressive as stone or other materials.

The coup d'état of the Pine Lake work is a 40-foot half log stringer bridge that replaces an old, damaged stone dock built by the CCC. Shaping, splitting and placing the log with primitive tools was a challenge. Few who traverse the log bridge to cross the gully can resist stopping to rest on its finishing touch, a wooden bench.

Crafting Stone

At Beeds Lake, 30 miles to the north, a third of the team worked two weeks to remove concrete steps and an old dock and walkway also built by the CCC. Damaged and undercut after flooding in 2008, the structure could not be repaired. But it was a favorite spot for anglers.

When Davis and Englund offered to build steps down to the fishing hole, park ranger Terry Manning quickly accepted. Up went 45 feet of rock retaining wall, 13 steps up to the campground and 20 feet of flagstone and a bench.

Each 60- to 300-pound rock had to be hand-carried 120 feet over a lowhead dam. The final steps are drilling holes in the rock and pounding rerod through the hole and into the ground. These rocks are going to stay a while.

Bubs, Bags, Jaws and the Decorah Twins are on this crew. Also Thomas Olmstead of Granger and Jess Adam of Iowa City. Olmstead prides himself on having the boots with the greatest longevity. Adam plans a future in landscaping.

The nicknames are apt and well earned. Bubs is Charles Larner, a bubbly guy proud of how much he can lift. Bags is Bradley George from Runnels, who earned his nickname after working at Fareway. Jaws is James Volbrecht of Waterloo. Everyone had trouble reading his nametag the first day, so James truncated to Jaws.

The Decorah twins are Logan Langley and Charlie Parrish-Siggelkow. They enrolled together. One is from Decorah, the other from Zumbota, Minn.—both attend Luther College. Both are music majors and entertain the crew after dinner with guitar and singing.

By the end of the day, everyone is tired, hungry and filthy. Two people split off early to head for camp and cook a communal dinner—new this year—one of Englund's suggestions to improve efficiency. Everyone rotates as cooks and on clean-up crew.

"We all pitch in money and the menu planners go shopping on Monday morning," says Keith. "Before, a lot of us would be fighting for a stove or fire," she adds.

Trail Building at Bellevue

The last two weeks of summer find the trail crew building a sustainable trail at Bellevue State Park in Jackson County on the bluffs high above the Mississippi River.

The crew is challenged to create a new trail where rampant rains eroded out a straight-down-the-hill section. This is where Englund shines—replacing a washed-out four-wheeler trail with a two-foot wide hiking trail, reminiscent of national trails where he gained his experience.

Scouting the woods is the first step. Davis and Englund look for interesting rocks, great views, unusual spots—anything to make the trail attractive to hikers. They also aim for a flat grade, preferring a zigzag pathway down the bluff. Then, the trail crew goes to work. It is brutally hot—103 degrees—the kind of day where the crew would normally return to camp and wade into a lake, clothes and all. But there's no lake here.

The next day, crew members are scrabbling out dirt along a zigzag path through the woods, using Pulaskis and shovels to scrape soil from steep hillside. The discerning hiker will notice the path slants slightly to the downhill side—a planned way to gently sheet off rainfall.


The carved out dirt has to go somewhere. Each person fills two five-gallon buckets, then carries it off the trail, hiding the excess soil behind a tree or rock. Each bucket can hold about 50 pounds of soil, so even if half full, team members clambor around the hillside like pack horses.

Shannon Petersen, a grateful park manager, brings candy and thanks to the crew for the trail improvements. The next day, she joins them in hard labor.

While some supervisors look for similar personalities, Davis seeks the right blend. Differences help the team gel. She hires those who will benefit from the experience and who bring skills to the trailhead—artists and intellectuals, those with strength and with enthusiasm.

"One crew member had been taking care of a parent, another was recovering from a serious accident. Another was painfully shy during interviews. One wants to teach music, another runs seven miles after a 10-hour day in the sun," she says.

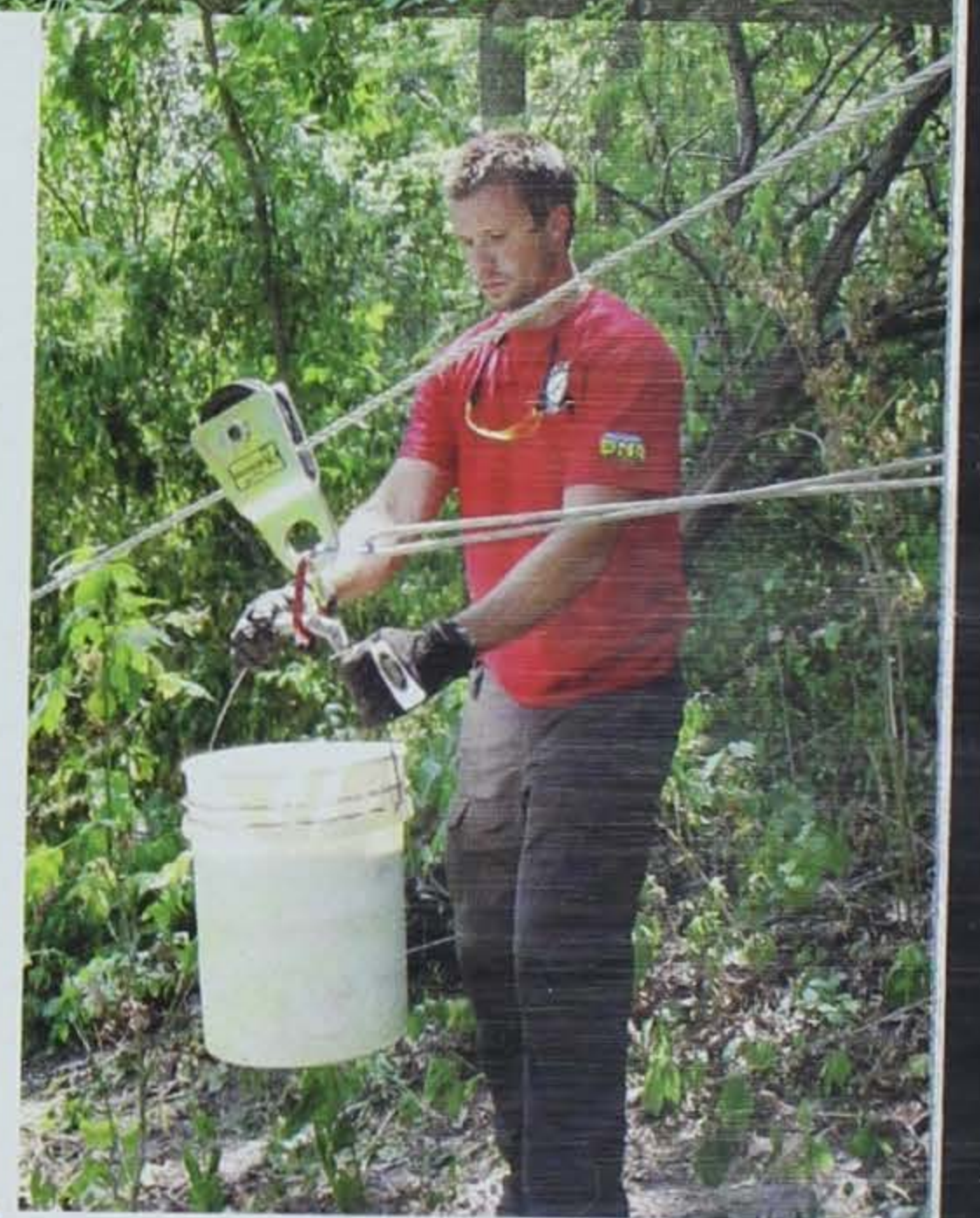
What they share are enthusiasm and valuing the team—qualities that help people commit to hard work for low pay and not much glory.

Forging esprit de corps—pride, loyalty and identity—amongst a sundry group of college-age kids is a tough assignment. The labor is harder. But Davis, Englund and Wermers are up for the task. 






Today's trail crew mimics their 1930s CCC predecessors: hot, dirty, wet and sweaty. Sore muscles, bruises and blisters are inevitable. They work hard, accomplishing much, like a three-tiered retaining wall or a half-log bridge. They carve a trail out of bluffsides and pound steel rerod to hold structures in place. By the day's end they are filthy, hungry and sleep outdoors through storms and hot nights. Yet many crew—all from a "computer generation"—say the experience is a highlight of their young lives.



One Foot in the Water

The animals that inhabited the pearlescent shells left by raccoons after a tasty meal are far more fascinating than their pretty, empty shells. **Mussels purify our rivers, cast off food for fish and use surprising reproductive strategies.** They make no sound, cannot see and seldom move from a secure spot, yet their populations move upstream.

BY MINDY KRALICEK PHOTOS BY CLAY SMITH



Three light-colored fragile papershell mussels (*Leptodea fragilis*) lay in a pile of pink papershells (*Potamilus ohioensis*). Mussels are found in major rivers or streams oxygenated by riffles and runs and with a high mineral content. They need a stable bottom of sandy mud or gravel as well a variety of fish populations. Mussels use fish as a host for their larvae.

DNR fisheries biologist Scott Gritters robustly greets the 20 or so volunteers who have gathered at 9 a.m. for the annual mussel blitz in eastern Iowa. He greets returning volunteers and shakes hands with other DNR biologists who help each year. It's not long before Gritters focuses the group on their mission. He passes around various mussel shells the volunteers are likely to find. DNR biologists Kelly Poole, Vance Polton, Chad

Dolan and Jen Kurth point out species' shell differences and their common names like pigtoe, floater, pocketbook and wartyback. The newbies learn that shell shape, color, size and texture have a lot to do with mussel names.

The group carools to the first stop on the Skunk River. Poole is fully equipped to pollywog, wearing a long-legged wetsuit, polarized sunglasses, ball cap, gloves and mussel net bag. She's brought extra gloves and bags for new volunteers, so no one is ill-equipped. Jen Kurth ties a pink

kerchief around her head to keep her hair out of the way.

Wearing wading boots or water shoes and net bags tied to belts, the group walks from the parking lot down to the low lying, sandy river bank. It looks more like a beach than a bank, except for the marooned tree trunks and branches scattered about. Islands of sand peek above the water surface beside the meandering current-scoured river bed. The newbies enter the shallow river unsure of how to begin.

Poole wades in and bends down to crawl in the water, feeling the bottom for bumps or edges of mussels. Soon she is floating on her stomach with her legs stretched out, looking much like a pollywog or tadpole grubbing through sand and gravel beds. It takes several minutes, but she cries out, "I found one," and holds a fragile papershell mussel high for others to see.

That stirs the group to start searching seriously.

With only a few mussels in her bag, Poole crosses the current to where some tree branches are stuck on the river bottom. In a few minutes she calls out again. "I'm finding juvenile mussels," an important discovery that means mussels are reproducing here, a sign of healthy mussel habitat.

But it's a bit up and down with finding mussels here. Some volunteers are finding heelsplitters, wartybacks and fragile papershells. Others have empty bags and rubber boots filled with mud. After about an hour, Gritters calls it for the area and the volunteers bring their findings to a firm sandy area to sort, measure and count.

Nine different species are sorted, but the total number—about a hundred—is disappointing and far less than the average 20 mussels per workhour found during other blitzes. The mussels are measured for shell length then tallied by diversity, age class and presence of juveniles before a gentle return to the river bed.

After a short lunch break, the trucks head to another location several miles upriver. From the parking lot, the group tramps down the boat ramp to the water. A couple of mussel shells lay open on the cement just above the waterline. On the left bank a lot of empty shells lay open. The largest have beautiful pink interiors, smaller ones have lavender, others are white pearlescent. Stranded by the drought, these mussels provided a feast for local raccoons, possums or skunks.

The stream is shallow at the boat dock and easy to wade, but mussels are few and far between. As the group wades upstream, feet hit sharp and cobbled rock. Ahead at a bend are toppled rock structures on each bank, remnants of an old bridge. The water moves swiftly over the cobbled shallows and the rocks are slippery. Alongside the closest bank it looks safer, but the river bottom is a muddy, mucky mess. It sucks in boots and more than one person is pulled off balance.

Eureka!

Walking along the grassy bank for 30 yards, the edge and the river bottom firm up in an eddy, where the water is only

1 to 2 feet deep along a sandbar. The relatively small area is loaded with mussels buried a few inches in the muddy sand. Mussels of every size of at least a half dozen species are found—the river here is supporting a healthy population.

There's nothing like sitting in a refreshing stream under the hot sun squishing your fingers down into a cool mix of mud and sand to feel for the edge of a mussel, and tug out a seven-inch heelsplitter, a five-inch pistolgrip or an inflated wartyback.

One of the volunteers tells another, "Normally I'd be embarrassed to have people see me wading in a stream feeling around in the mud, but doing this with a group—it's really fun."

On the sandbar, the collection of mussels is building; Kurth is excited to find monkeyface among the wartyback, pimpleback and mapleleaf.

A man's voice calls out, "Look at the size of this pistolgrip!"

The volunteer is holding something straight out in front of him. Those who overhear the remark are taken back for a second and then laughter carries downriver. He is holding the blackened vestige of a real pistol pulled from the river. With the other hand he pulls a black pistolgrip mussel from his net bag to compare the two.

When it's time to sort, count and measure, there is a job for everyone. Some pass mussels to the biologists who measure the animals. Occasionally a mussel squirts water out of a siphon as they are handled.

Gritters does recordkeeping. Another sweeps fresh water over the mussels with his hands to keep them wet. Others put the measured mussels in net bags to pass to those wading out to set the mussels back in deeper water—out of reach of hungry landfast critters.

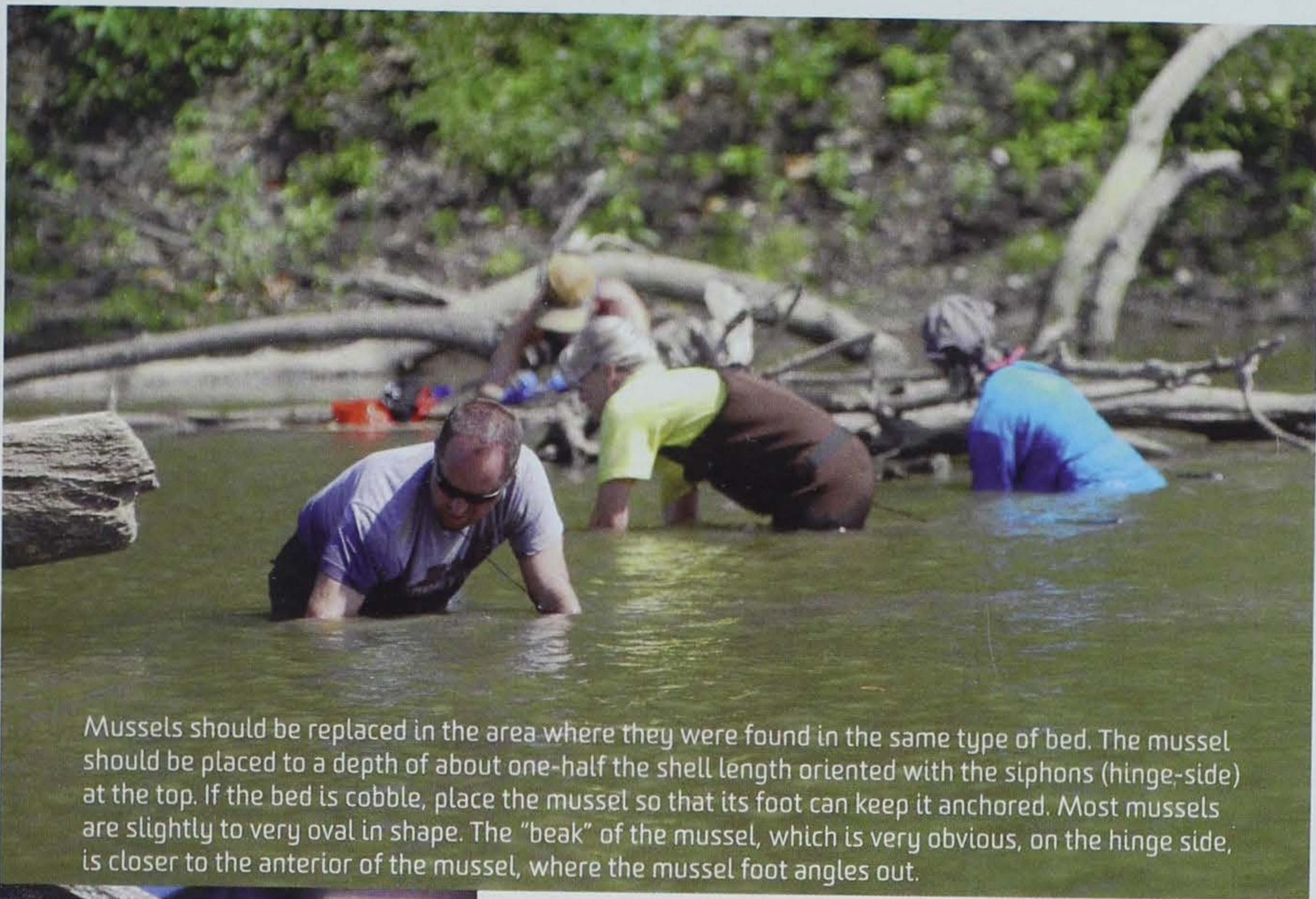
"Look, look!" Poole points excitedly at a mussel pile as a mussel rights itself and pulls itself along with its foot. It's not the only one to try to escape. Several mussels have moved from where they were put to deeper water.

"Where'd you get that orange foot?"

One mussel sits by itself. The biologists agree it looks like a creeper, but none have been found this year, so there is doubt. "If it's a creeper, it will have an orange foot," says Kurth. The group silently studies it, waiting for the foot to extend. Minutes pass. Then a collective "whoop" by the group announces it's a confirmed creeper when they spot the telltale orange foot extending.

In all, 12 species were found in this stretch: pistolgrip, wartyback, pimpleback, Wabash pigtoe, pink heelsplitter, pink papershell, mapleleaf, fragile papershell, monkeyface, white heelsplitter, deertoe and one creeper. The total count for the day: 1,070 mussels!

Over the period of two weeks last August, mussel blitz volunteers counted 1,411 mussels of 17 species at Lytle's Creek in Jackson County, Mineral Creek in Jones County, Iowa River at Iowa City, Cedar River mainly south of Cedar Rapids, the Wapsipinicon River at Anamosa and the Skunk River in Washington County. Creeper and cylinder species,



Mussels should be replaced in the area where they were found in the same type of bed. The mussel should be placed to a depth of about one-half the shell length oriented with the siphons (hinge-side) at the top. If the bed is cobble, place the mussel so that its foot can keep it anchored. Most mussels are slightly to very oval in shape. The "beak" of the mussel, which is very obvious, on the hinge side, is closer to the anterior of the mussel, where the mussel foot angles out.



DNR biologist Vance Polton.



TOP: Volunteers "grub" the river bottom for mussels. **RIGHT and BOTTOM:** Mussels are sorted, counted, weighed and returned to their habitat. **BELOW:** A hand holds three 2-year-old juvenile wartybacks. **LEFT:** In the bag are mapleleaf, fragile papershell, pimpleback and deertoe mussels.



State Endangered Mussels

Spectacle case, *Cumberlandia monodonta*

Slippershell, *Alasmodonta viridis*

Buckhorn (pistil grip), *Tritogonia verrucosa*

Ozark pigtoe, *Fusconaia ozarkensis*

Bullhead, *Plethobasus cyphus*

Ohio River pigtoe, *Pleurobema sintoxia*

Slough sandshell, *Lampsilis teres teres*

Yellow sandshell, *Lampsilis teres anodontoides*

Higgin's-eye pearly mussel, *Lampsilis higginsii*

State Threatened Mussels

Cylinder, *Anodontoides ferussacianus*

Strange floater, *Strophitus undulatus*

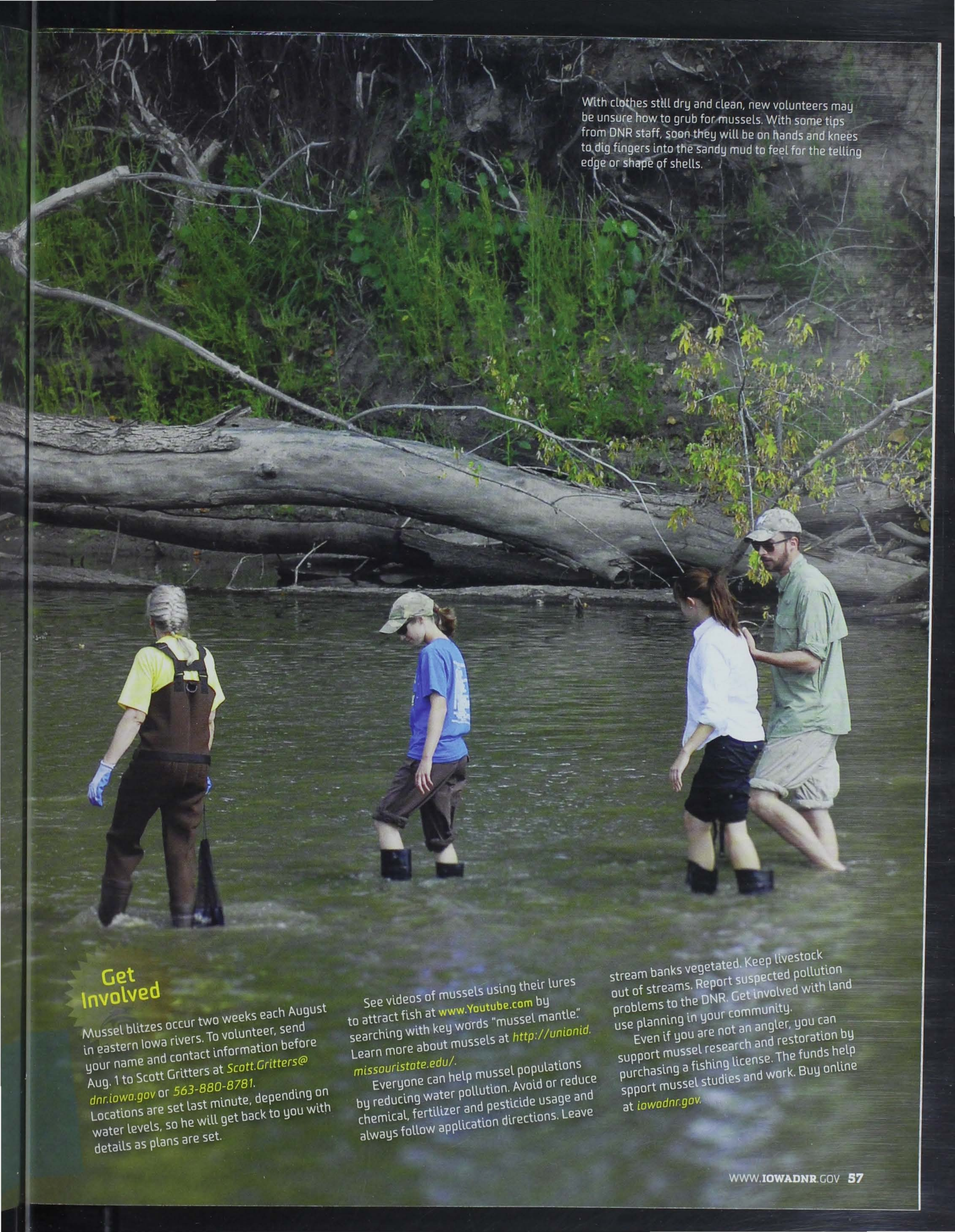
Creek heelsplitter, *Lasmigona compressa*

Purple pimpleback, *Cyclonaias tuberculata*

Butterfly, *Ellipsaria lineolata*

Ellipse, *Venustaconcha ellipsiformis*



A photograph showing four people wading in a river. On the left, a person in a yellow shirt and brown waders is seen from behind. In the center, a person in a blue shirt and brown pants is walking. On the right, a man in a green shirt and khaki shorts is talking to a woman in a white shirt and dark shorts. They are all wearing boots and wading in shallow water. In the background, there is a large fallen log and a steep bank with green vegetation.

With clothes still dry and clean, new volunteers may be unsure how to grub for mussels. With some tips from DNR staff, soon they will be on hands and knees to dig fingers into the sandy mud to feel for the telling edge or shape of shells.

Get Involved

Mussel blitzes occur two weeks each August in eastern Iowa rivers. To volunteer, send your name and contact information before Aug. 1 to Scott Gritters at Scott.Gritters@dnr.iowa.gov or 563-880-8781. Locations are set last minute, depending on water levels, so he will get back to you with details as plans are set.

See videos of mussels using their lures to attract fish at www.YouTube.com by searching with key words "mussel mantle." Learn more about mussels at <http://unionid.missouristate.edu/>.

Everyone can help mussel populations by reducing water pollution. Avoid or reduce chemical, fertilizer and pesticide usage and always follow application directions. Leave

stream banks vegetated. Keep livestock out of streams. Report suspected pollution problems to the DNR. Get involved with land use planning in your community.

Even if you are not an angler, you can support mussel research and restoration by purchasing a fishing license. The funds help support mussel studies and work. Buy online at iowadnr.gov.



A pink papershell mussel.

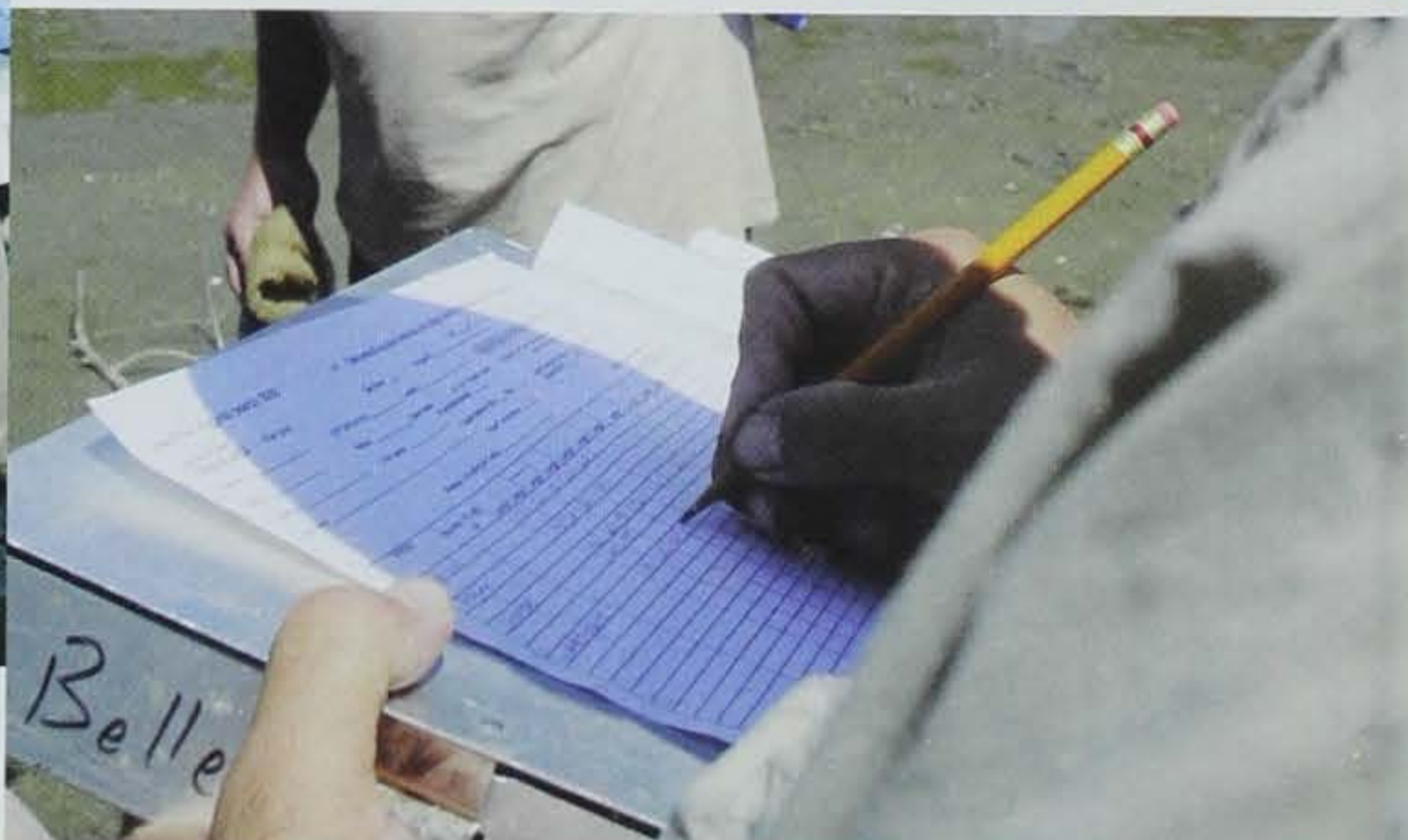
Measuring a mapleleaf mussel.



ABOVE: As aquatic animals, mussels need to be kept wet while biologists gather data. Doing their work while minimizing stress to the animal is a continual goal, so a constant source of fresh water is fanned over the mussels.

RIGHT: Volunteers sort mussels by species and place them in piles so biologists can gather data. Records are kept for each site to track where mussels are abundant, reproducing or missing as well as habitat conditions.

BELOW: Before hitting the river, volunteers gather around DNR biologist Scott Gritters (in white cap and sunglasses) to get a briefing on shell identification.



threatened in Iowa, were found, as well as the pistolgrip. Other species found include three-ridge, a single butterfly, yellow sandshell, hickorynut, ellipse, Higgins' eye, fat mucket, mucket, black sandshell and plain pocketbook—several are listed on the state threatened and endangered list and one is federally endangered.

The blitz started in 2005 so the DNR could document Iowa's mussel species in eastern Iowa, monitor their populations and help assess what is happening to rivers and streams where mussels thrive, decline, disappear or are never found.

To date, the count from Gritters' mussel blitzes totals 21,670 mussels and 33 species. Eight rivers have been combed at 305 sites.

Imperiled numbers and species

Prior to European settlement, widespread and dense mussel beds greatly benefitted water quality for Native Americans and wildlife. Sadly, beginning with the 20th century, Iowa's mussel populations have greatly diminished.

Land erosion and siltation from deforestation and agriculture have had the biggest impacts. Dams, dredging and stream channelization have also changed mussel habitat. Shifting, unstable stream bottoms are a hostile environment if you are a mussel. Silt buries mussels. Dams stop host fish from swimming upstream. Channelized streams scour the bottom.

As one of the most sensitive of all species to water pollutants, decades of chemical spills, pesticide exposure and heavy metals have wiped out mussel populations, too. Mussels absorb the history of what was in the water, so long after mussels die, their shells remain to tell the story of what happened.

Mussels have also been heavily harvested. First it was for freshwater pearls, then by the button industry and most recently for the cultured pearl industry in China.

The most recent challenge is the invasion of non-native zebra mussels in Iowa waters. The non-native shells attach to Iowa's largest mussels, such as the washboards in the Mississippi River, and cover them until the mussel can't feed or attract fish to its larvae, called glochidia.

Seeking Mussels in New Places

Biologist Jen Kurth works in the geological and water survey bureau of the DNR. Her affection for mussels is evident in her office. Mussel shells are on every flat surface, some are rare and given to her, others were found during her biological studies and on mussel seeking trips. In a report to the EPA designating the quality of Iowa's waterways, Kurth encouraged mussels to be used as a biological indicator, an abundance meaning the water is good quality, and declining populations as a sign of water degradation. That criterion from Iowa impressed the EPA. Later, Kurth was awarded an EPA grant to assess freshwater mussels statewide in interior streams and rivers.

"Historically Iowa had 54 species of freshwater mussels," says Kurth. "In surveys conducted in 1984-85, only 34 species were found living and 6 percent of the surveyed sites had no living mussels. In 1998, biologist Kelly Poole surveyed the same sites, finding only 27 living species and 47 percent of sites had no mussels."

The EPA grant will fund a seven-year project, which Kurth began in 2011. She will survey at least 120 sites each year to total 700 sites in six years. Her first priority is to resurvey sites in the Maquoketa, Upper Iowa, Iowa, Cedar and Wapsipinicon rivers. A few sites are also on the Des Moines, Skunk and Boyer rivers.

Next Kurth will survey Iowa's unresearched rivers and streams, using sites that overlap where fish surveys have been done and those adjacent to land in conservation such as parks, wildlife areas and Conservation Reserve Program plots.

The work will help the DNR determine watershed priorities, policy options and strategies and actions for watersheds and mussel restoration and protection.

After her second year of sampling, the good news is Kurth has found 34 different live species.

The bad news is the North Fork of the Maquoketa River does not seem to have any mussels—not even a shell on its banks. Six or seven species had been surveyed in the past. The winged maple leaf, which historically was surveyed in Iowa, has not been found yet.

Unfortunately, an adult zebra mussel—an invasive, harmful species—was found in the Winnebago River downstream of Mason City. Zebra larvae have been found in the river courtesy of a zebra mussel population growing in Clear Lake. The belief had been that the river's current was too strong for zebra juveniles to survive.

The 2012 drought made it easier for Kurth to find mussels than it had been the year before, but land predators took their toll on stranded mussels as river and stream water levels dropped.

Protected in time?

Now all native mussels in Iowa are protected wildlife. If people pick up a mussel to examine it, the mussels must be returned to the water as they were found. People often collect shells, but shells, as part of protected wildlife rules, cannot be sold for economic gain. And possession of threatened or endangered species is prohibited.

Regulatory action to protect water quality and voluntary actions by rural and city populations are cleaning watersheds. Projects to turn low-head dams into riffles and runs are occurring. Riparian zones keep soil in place. Chemicals are kept away from water sources and drainage areas. Farm animals are fenced away from grassy streambanks to prevent erosion.

Can Iowa's mussel populations rebuild? It's too early to tell, but biologists are gathering data to track what happens. 🐌

My Backyard

BY ALAN FOSTER

Five ways to make your life safer, simpler AND save money



JUNK YOUR JUNK MAIL

Tired of unwanted credit card applications, catalogs, coupon books and fliers clogging your mailbox? Get the app and opt out.

According to the U.S. Postal Service, in 2005 roughly 100 billion junk mail pieces were mailed, or more than 300 pieces for every man, woman and child. According to the Center for a New American Dream (CNAD), a Maryland-based nonprofit organization that helps people consume responsibly to protect the environment, that's the equivalent of about 1.5 tree's worth of junk mail per household, per year, or roughly 100 million trees per year.

An estimated 44 percent of the mail is thrown away unopened, CNAD says, and only half of that is recycled. That means some 5.6 million tons of catalogs and direct mail pieces end up in landfills every year, at a cost of \$370 million annually for disposal.

Now there is a free, easy way to cut unwanted mail with your smartphone. PaperKarma installs in minutes and takes seconds to stop unwanted mail. Simply take a photo of the sender's address and tell PaperKarma to unsubscribe you. They take care of the rest.

PaperKarma will stop mail generated from a customer list,

but not those "carpet-bombed" across zip codes, like those addressed to "Homeowner" or "Current Resident." The unsubscribe process can take up to 24 hours, however you may still receive mail up to three months since companies often print commercial mail in bulk. Users can submit as many scans as they want.

Of course, if you don't have a smart phone, you can use other online options like 41pounds.org, catalogchoice.org or optoutprescreen.com, or you can contact each individual sender. For more information, visit PaperKarma.com.

BLUE-GREEN ALGAE

The return of hot weather brings the possibility of algal blooms, some of which can be toxic to humans and pets.

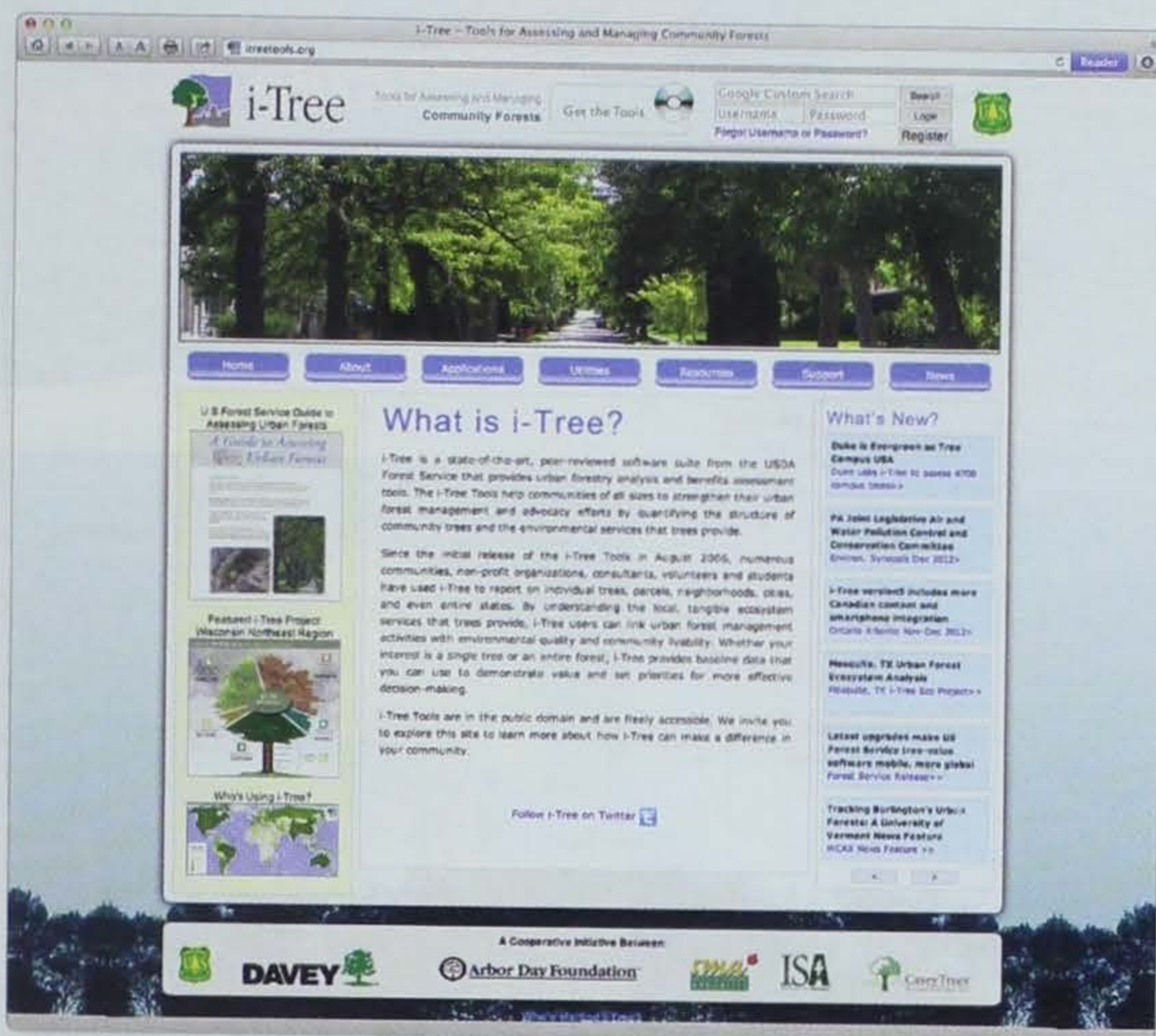
The worst of them—blue-green algae—prompted warnings at several lakes last summer as low water conditions and warm temperatures persisted. Blue-green algae thrives in those conditions and can grow quickly, giving a pea-green, blue-green or reddish-brown color to the water. It may appear as scum, foam or a thick mat on the water's surface.

The main risk to humans is skin irritation and rashes, but if the water is ingested, symptoms could be worse. Headaches, nausea, abdominal pain, seizures, liver injury and respiratory problems are some of the symptoms.

During algal blooms, do the following:

- Don't swim, water ski or boat
- Don't let pets or livestock swim or drink where the water is discolored or where there is foam, scum or mats of algae
- If you come in contact with algae, rinse off with fresh water as soon as possible
- Don't let pets, especially dogs, lick algae off their coats
- Don't irrigate lawns or golf courses with water that looks scummy or has a bad smell
- Don't drink the water—boiling it will not make it safe.

i-TREE



It's no secret trees add value to homes, protect the environment and save energy, but species selection and proper placement will determine if that tree gives back \$50 a year or \$100. Thanks to the state-of-the-art, peer-reviewed i-Tree software suite, that information is available with just a few clicks of a mouse.

Using Google satellite imagery, i-Tree lets you select your species, size and location to determine where the best spot to plant is to maximize return on investment. The program estimates economic benefit based on how much stormwater the tree will intercept, how much electricity and heating fuel it will conserve, how many pollutants it will absorb and how many pounds of atmospheric carbon dioxide it will reduce.

Developed by the USDA Forest Service and numerous partners, i-Tree also helps communities of all sizes strengthen their urban forest management and advocacy efforts by quantifying the environmental services trees provide and analyzing current urban forest practices. By understanding the value trees provide, urban forest management activities can be linked to environmental quality and community livability.

"It lets communities set their urban forestry goals and gauge where they are currently at," says Laura Wagner with the DNR's Forestry Bureau. "It's the best scientific data out there."

While not as interactive or detailed as i-Tree, the National Tree Benefit Calculator will also estimate much of the same benefits, factoring in property value increase as well.

For more, go to itreetools.org and treebenefits.com.

BUCK(ET)

Is your water bill leaving you wet with anger? Then buck(et) up. If your shower requires a few moments to heat up, collect that wasted H₂O and use to water indoor or outdoor plants. Raining outside? Set buckets out to collect free water.

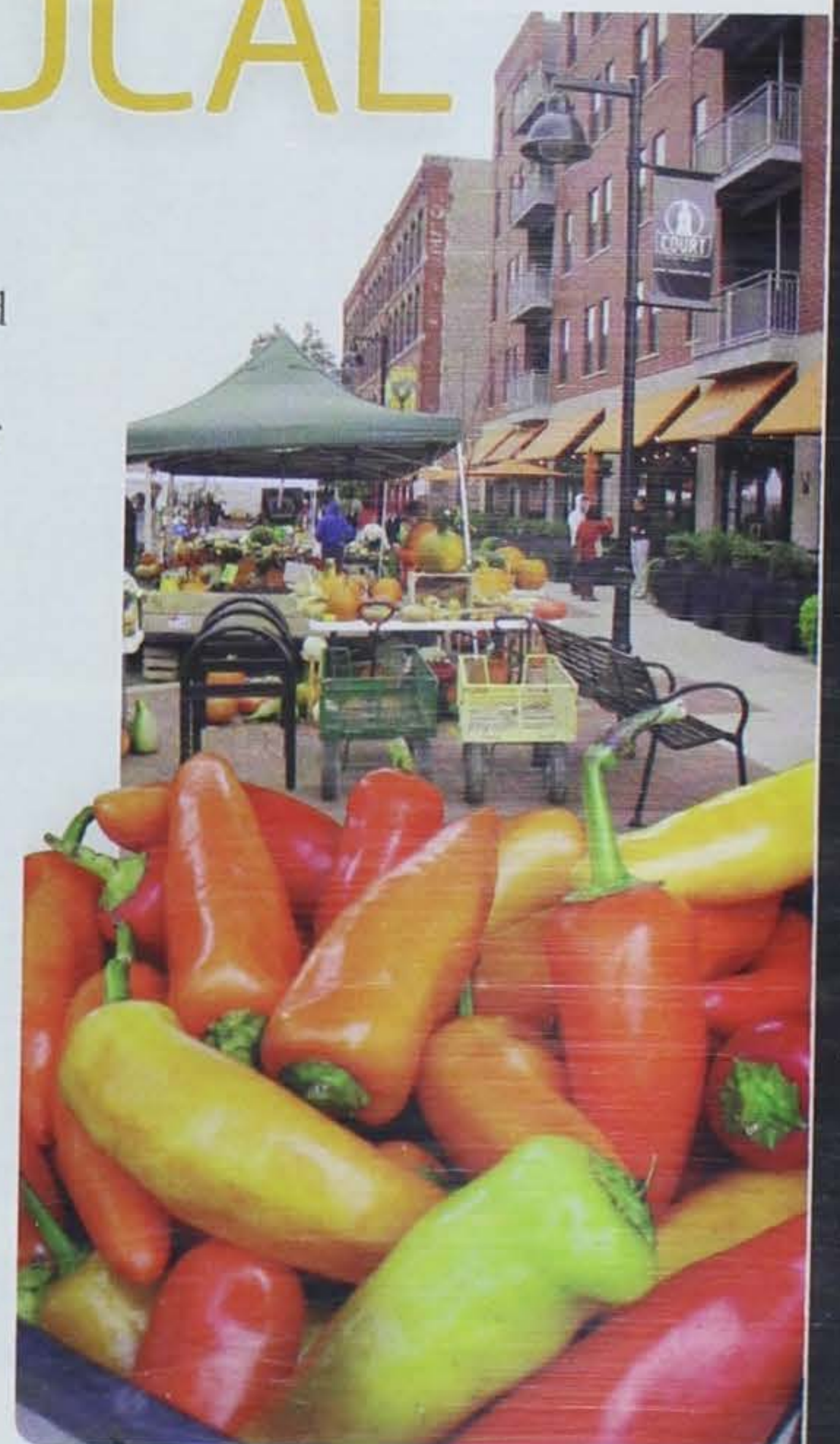


BUY LOCAL

Most American produce travels a minimum of 1,500 miles—guzzling gas and choking the air with harmful emissions—just to get to your grocer. Support your local farmers and economy, save energy and protect the air all at the same time—buy local.

BETTER YET: buy organic. Supporting organic farmers helps cut down on water pollutants, soil erosion and the expense it takes to produce synthetic fertilizers and pesticides.

EVEN BETTER: BYOB. Bring your own reusable cotton, canvas or hemp bag to take home those organic goodies.



Wild Cuisine KITCHENSIDE

BY ALAN FOSTER



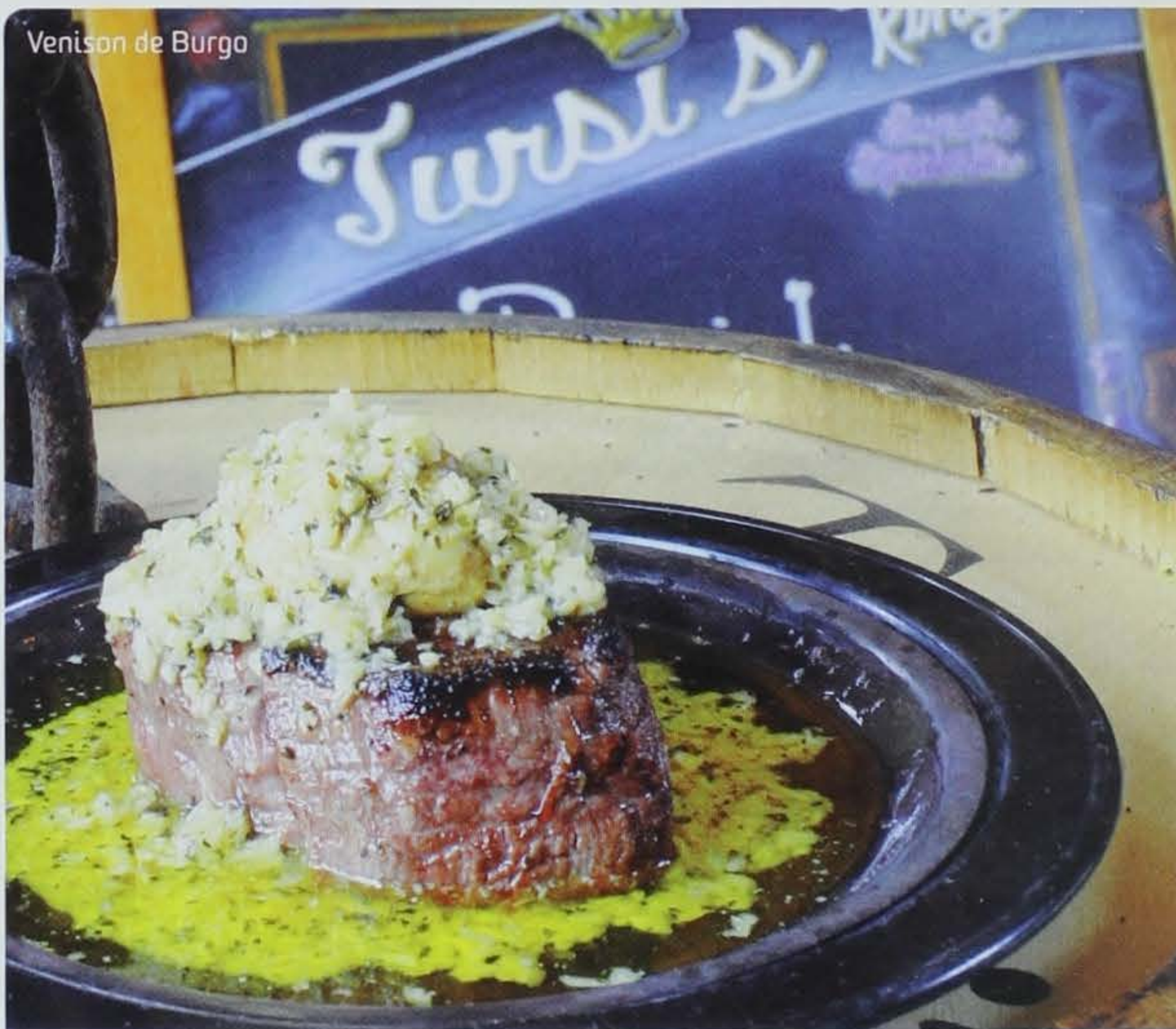
Walleye Riviera



Chef Pat Morris



Situated just minutes from the Iowa State Fairgrounds, Tursi's Latin King has been a Des Moines Italian mainstay since 1947. If you can't find authenticity and history in this iconic eatery, you won't find it anywhere. Every room radiates romance and ambiance, from the softly-lit lounge, to the warm, inviting smaller dining room to the larger, formal seating, illuminated primarily by natural light. Even the entrance, often just an uninviting reception podium in other restaurants, welcomes diners with sunshine cascading down on the reception area, bottles of wine on the counter for take-home and examples of the food choices that await. If it's nice out, take your glass of wine, bruschetta and toasted ravioli out on the secluded patio.



Venison de Burgo

EXTERIOR, PATIO AND SIGN PHOTOS COURTESY OF O32 COMPANIES; RECIPE AND CHEF PHOTOS BY CLAY SMITH; INTERIOR PHOTOS BY JAKE ZWIBOHRMER

Des Moines Icon Serves Up Venison, Walleye Italian-Style

Anyone who has driven Des Moines' east side at night no doubt has the brightly-lit neon "The Latin King RESTAURANT" sign stamped in their memory. Anyone who fancies themselves an Italian food connoisseur likely has the taste of its renowned chicken spiedini, creamy garlic house dressing and tiramisu embedded in their taste buds.

The spiedini—chicken marinated in a house concoction, breaded, cooked and served with amogio sauce—is a chef Pat Morris-inspired specialty, adapted from a 1994 lunch encounter with friends at a Kansas City restaurant specializing in chicken, beef and veal spiedini. Greatly modified, it's been the top selling dish...every day...ever since.

The same can be said for the house dressing and the espresso-soaked tiramisu layered with a cream cheese blend and spiked with Kahlua.

Latin King has been a local Italian hotspot since 1947, when owners Jim and Rose Pigneri opened it, and continues today under Bob and Amy Tursi, who took over in 1983. You can feel the Italian heritage the moment you enter. Both the Pigneri's and Tursi's parents hailed from Terravecchia, Italy before immigrating.

Longevity also can be found in the kitchen, where the self-taught Morris has been a mainstay since the Tursi's took over. Fresh out of business school, Morris was asked to serve as general manager for "a couple years" as Tursi got his new business running. That was three decades ago. "Looking back, I am glad I stuck around," Morris says.

Almost every signature dish has a story, often more compelling and intriguing as the dish itself. Steak de Burgo is no different. Although there is dispute as to who first brought it to the table, those in the know give credit to Johnny Compiano, the creative chef and owner of one of Des Moines' original eateries, although a couple other local restaurants lay claim to the recipe. How it's prepared is equally arguable. Some pan-sear a choice cut of beef in olive oil, others in butter. Latin King charbroils theirs, and serves it with a giant button mushroom and loads of butter and garlic. Others add cream. Regardless, when the buttery, garlicky, silky components come together, everyone knows. The sharp, pleasantly pungent aroma of cooked garlic envelops the restaurant.

VENISON DE BURGO

One 1 1/4- to 1 1/2-inch-thick venison steak per diner

2 pounds salted butter

20 garlic cloves, finely chopped

1/8 cup olive oil

4 tablespoons dry basil

2 teaspoons white pepper

Remove steaks from refrigerator and let sit, covered, for 20 to 30 minutes. Pat dry. Season to taste. Combine remaining ingredients in medium saucepan and slowly warm over low heat, just to melt the butter. Meanwhile, grill steaks over high heat until browned, four to five minutes. Flip and grill an additional three to five minutes for medium rare, five to seven minutes for medium or eight to 10 minutes for medium-well. Remove from heat, tent loosely with foil and let rest five minutes to allow

juices to redistribute. Top with sauce.

Simple, fresh garden ingredients are what makes this delicate-flavored plate shine. Walleye, an Iowa favorite, is baked, broiled or grilled, then topped with tomatoes, basil, garlic and wine. Although walleye is used here, almost any Iowa fish will work.

WALLEYE RIVIERA

Two walleye fillets

4 Roma tomatoes

6 cloves garlic, minced

1 tablespoon butter

Couple teaspoons white wine

2 basil leaves

1/4 lemon, juiced

salt and pepper to taste

Sauté garlic in olive oil until brown. Add tomatoes. Deglaze with a splash of wine, lemon juice and butter. Add salt and pepper and cook for about three minutes. Grill, bake or broil fish until flesh is firm and flaky. Ladle riviera sauce on top of cooked fillets.

Tursi's Latin King

2200 Hubbell Avenue

Des Moines

515-266-4466

tursislatinking.com

HOURS:

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DINNER: Tuesday-Thursday, 4 p.m.-10 p.m.

Friday and Saturday, 4 p.m.-11 p.m.

Event planning available



Warden's Diary

BY ERIKA BILLERBECK



Cocoa Puffs

My children have eaten Cocoa Puffs for supper. There have been times, in response to my daughter's "Why?," I've responded, "Because I said so." I've looked the other way when the younger one stood up for himself and delivered a punch to the older one. I've snapped at my kid when she spilled her milk. There are days I have secretly breathed a sigh of relief when I dropped the kids off at day care so someone else could deal with them. In short, I'm not in a position to judge other people's parenting skills. After all, I'm not in the running for the mother of the year award myself.

However, of all the mistakes I've made, at least I can pat myself on the back and say that I never did this...

I had just ordered a pizza (again a healthy meal choice for my kids) to pick up on my way home after a long, hot, busy day working the lake when I received a telephone call from the range officer at the Hawkeye Wildlife Area. He told me there was a young couple and their baby at the shooting range. Apparently the couple left the baby in the stroller inside the fence without hearing protection while they sat at a bench a



distance away to pop off a few rounds from their handgun and later, their rifle.

The Hawkeye shooting range is a busy place. During the summer and right before hunting season, there is rarely a weekend when the parking lot isn't near full. The air rings with loud shots, pops and bangs as people sight in rifles or shoot up targets with handguns. It isn't a place where one should bring the newborn baby for an afternoon of fun.

The range officer told me the family had been at the range for about an hour. For the previous 45 minutes, the baby had been crying. And, for the previous 45 minutes, the parents had ignored the baby crying. The range officer

wasn't sure what to do.

By the time I arrived at the shooting range, the couple were just getting into their car to leave. As I walked up to their car to talk to them, I peeked into the backseat to see a tiny baby girl in a car seat sucking on a bottle. The parents were young. Very young.

I started the conversation by kindly informing them

that they should not bring the baby back to the shooting range again. Immediately the father (or at least I assume he was the father) went on the defensive. "There is no sign saying babies aren't allowed here," he said.

The sign argument is one I'm familiar with. I have heard it many times as an excuse for many things...but do we really need to have a sign saying babies without hearing protection are not allowed at the shooting range? I admit that I quickly became angry.

"It is really a matter of common sense. I'm no doctor, but I'm pretty sure that you can cause, and probably already have caused, damage to your baby's hearing. Did *you* wear hearing protection while you were shooting today?" I asked.

He told me "of course" they had worn hearing protection. The father smugly said that the baby didn't need muffs. "I put the blanket over the stroller and I stuck my head inside. It wasn't loud—with the blanket it was pretty much just like she had muffs," he said.

"It is 90 degrees today," I said.

He looked at me blankly.

The mother smiled.

Really? Was it possible that they didn't see a problem here? Anytime someone receives parenting advice from someone else, especially a stranger, it is natural to become defensive. I know from personal experience that when my own mother gives me parenting advice it is much easier to roll my eyes than to thank her for it.

I took a calming breath, as I tried to understand his defensiveness. "OK, I'm going to make this simple. Don't bring your baby back to the shooting range. Period. It is not good for her hearing, and she isn't big enough to make the choice herself," I said.

"Well," the father said with a grin on his face, "it's a good thing you won't be with us at the sprint car nationals next week. I'm sure that won't be good for her hearing either, but she'll be going."

I told this story to a friend of mine who is a police detective. She twisted the saying "It takes a village to raise a child" when she said, "Well, as I always say, it takes a police department to raise a child." Unfortunately I guess sometimes that is true.

When I got home that evening, I put the box of pizza on the kitchen table and sat down with my kids to eat. I looked at their plates filled with pieces of greasy pizza. Then I stood up, went to the kitchen and steamed some green beans. 🐷



Freshwater Mussels, *Phylum mollusca, class bivalvia*

Historically Iowa had about 54 species of freshwater mussels. Today, there are 42, with nine endangered and six threatened. Populations have dropped largely due to dams, erosion and sediment which can cover preferred sand and gravel bar habitat. Mussels are critical components to healthy aquatic ecosystems. Mussels are eaten by raccoons, muskrats, otters, fish, turtles and birds. Native Americans ate freshwater mussels, but generally people today find them quite chewy and unpleasant tasting.

BENEFICIAL FILTER FEEDER

One siphon brings in water, oxygen, fine sediment and food—debris, bacteria, algae and protozoa. On average, mussels filter 9 gallons of water daily. Waste is excreted from an outflow siphon along with cleansed water. The nourishing waste is eaten by fish. Non-digestible particles are bound in mucus and benefit aquatic plants. Mussels spend most of their 10- to 100-year lives buried in sand and gravel where their burrowing releases nutrients and oxygenates the river floor.

PARASITIC NEEDS

Females release tiny larvae, called glochidia, into the water. They must attach to the gills or fins of select species of fish. Here they live as parasites for weeks to months while growing into juveniles. They then fall to the river bottom to begin their life as a mussel. To survive, they must land in the proper depth, stream velocity and on a firm river bed.



FISHING LURES

Mussels use tricks to attract fish so their larvae, or glochidia, can attach and grow into juveniles. Some mussels release a capsule—called conglutinate, which look like insect larvae. When eaten by fish, the glochidia attach to gills. A few species produce “superconglutinates” attached to female mussels by a mucus cord. These masses sway in the current to attract fish. When fish strike the conglutinate, larvae are released. Some mussels even hold the head of the fish between its shells, release glochidia, then set the fish free unharmed.

PICKY HITCHHIKERS

Mussels use specific fish species for hosts. Giant floater mussels have 40 fish species to use, but hickorynut primarily use shovelnose sturgeon. Plain pocketbook and fatmuckets need bass. Pimpleback and pistolgrip use flathead catfish as hosts and may use a chemical stink bait-like attractant to lure them near.

NO FINER SHINER

Shown above, the mantle flap, or soft body tissue, of a plain pocketbook mussel resembles a shiner to attract bass. The lure is complete with fin-like frills, an eye spot and horizontal stripe common to shiners. When the fish strikes, the mussel releases its larvae, which are called glochidia.



A REAL LIFESAVER

LAINEY ARIANS, CLEAR LAKE
 Teen floats some cash for life rings

A Clear Lake teen proves anyone can be a lifesaver. Thanks to 15-year-old Lainey Arians, swimmers at three beaches around the popular lake are safer, with life rings and alarms at the ready. Inspired when she saw similar rings during a trip to Michigan, she thought it would honor her mother's cousin, a drowning victim. At home, she used the idea for a class assignment to develop a project to help the economy and community. While she presented the idea to the city council, Arians wasn't required to put the project into action—in fact, she was the only student to actually go forward. "She's an amazing kid. She's high-energy and has a compassionate

heart, so it didn't surprise her dad and me that she wanted to keep going," says her mom, Lisa. Her teachers, Angela Faber and Emily Hill, encouraged her to complete the project. Arians set out to raise \$2,000 and ended up with \$5,000. "A lot of people thought we should have had them on the beaches earlier," Arians says of the 14 rings she donated to City Beach, State Park Beach and McIntosh Woods. Some rings will go into storage as replacements, and the extra money bought alarms that go off when a case is opened, alerting beachgoers to an emergency. "I was just happy I could make a difference and hopefully save a life someday," Arians says. Teachers also asked Arians to speak at elementary schools about the rings and what they do. "It's pretty amazing for someone that age," says Tammy Domonoske, park manager at McIntosh Woods State Park. "The community got behind it. It's nice to know that there is something there if people need it—it puts them at ease."

HOOKED ON FISHING

CODY RATLIFF, CENTRAL CITY
 Teacher makes fishing a part of kids' lives

Five crappies in five minutes, caught by a fifth grader that had never touched a fishing pole before. A first grader in a David and Goliath battle with a 10-pound carp. Moments like that are why Central City teacher Cody Ratliff takes every Central City student—from kindergarten to sixth grade—fishing at least once a year. "The outdoors has always been a passion of mine," says Ratliff, who grew up in the area. With the Wapsipinicon River, three parks and two camps nearby, Ratliff knew he had the special opportunity to introduce kids to fishing. Now in his fifth year of teaching, Ratliff has included fishing in his lesson plans since his first semester. At school, kids compete in Fish Iowa! casting competitions. On the shore, they learn about the fish species they catch, older students take water samples, and everyone learns patience. "It's a pretty good feeling when you can get them out there for the first time," says Ratliff. "It's not something kids get to do every day." At the annual Day in the Park, students move between different stations, including an obstacle course, nature walk, trail walk and fishing. Ratliff plans to expand those outdoor opportunities by creating summer outdoor recreation and fishing clubs for older students where they'll learn new skills for fishing, rock climbing, survival, canoeing, camping and more. But the heart of his efforts remains with angling. The reward comes when he's out fishing and spots one of his students casting. "I like to hear kids talk about it, how much fun they had," he says.



TREE TIP: Do as these planters did after the photo was taken—pull moisture- and heat-trapping mulch away from the trunk to prevent rot.

KEEPING IT COOL

COOL NEIGHBORS & GET ENERGIZED IOWA
 Programs help Cedar Valley residents save energy

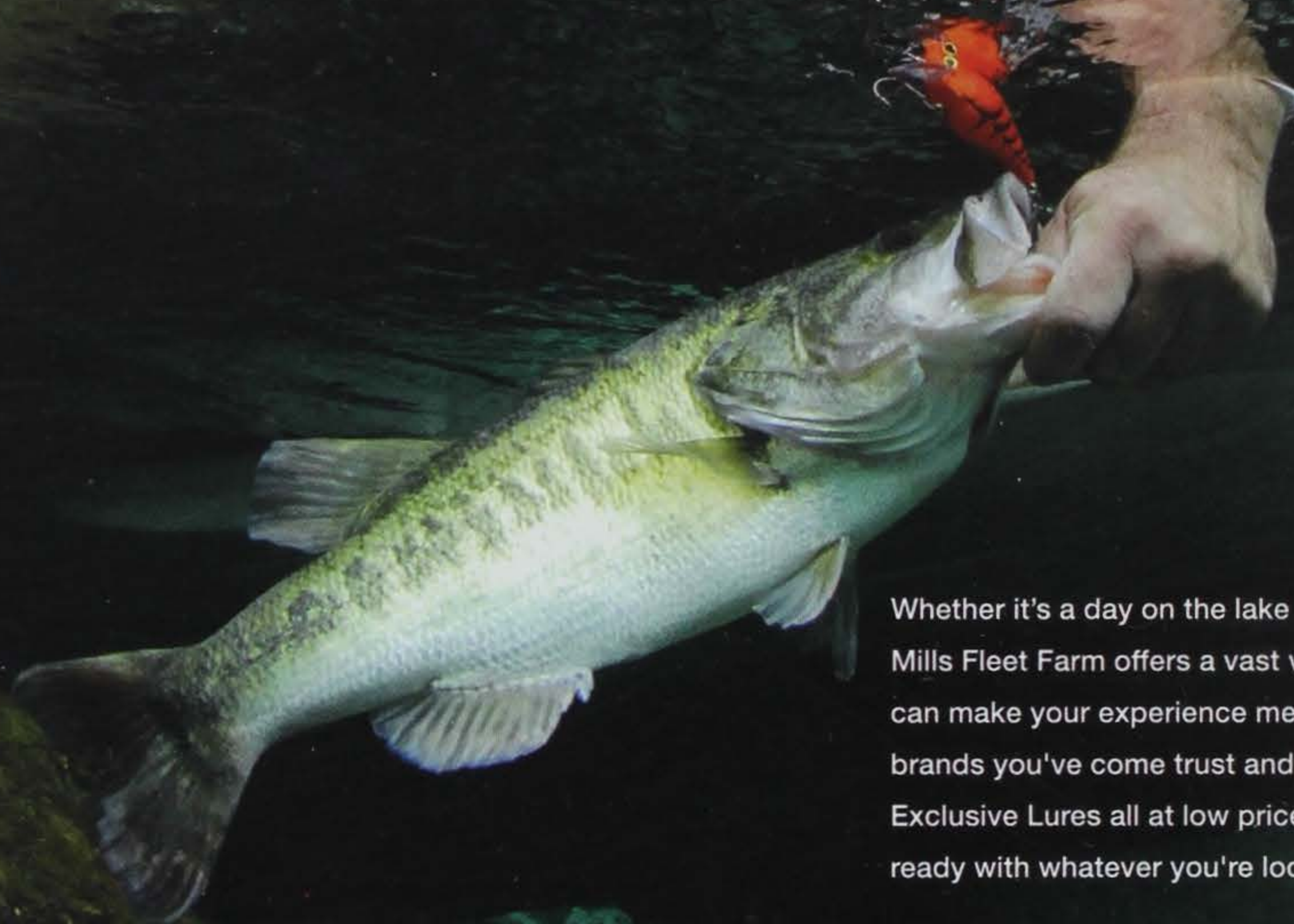
Cedar Valley residents are a bit cooler now thanks to two programs helping them cut energy use. Three Cedar Falls neighborhoods—College Hill, North Cedar and Overman Park—competed in the Cool Neighbors program, where residents used projects from a checklist and reduced their household energy use by up to 13 percent over six months. Nearby towns Hudson, Dike, Readlyn and Fairbank faced off in Get Energized Iowa, where they saw a 6.4 percent reduction in energy use in 2012. "Each community did it their way," says

David Osterberg, who organized Get Energized Iowa. The programs focused on learning about the communities, surveying them before and after the program on people's interest, attitudes and behaviors. "We really believe people want to do the right thing but often they don't know what to do," says Carole Yates, with UNI's Center for Energy and Environmental Education, who developed Cool Neighbors with her husband Jack, a UNI psychology professor. Both worked on Get Energized as well. "We found that just having some interest and a good attitude didn't necessarily equal behavior change. Some people needed a nudge." That push came from neighborly competition, and in the case of Get Energized, high school rivalries and established community groups who got the word out—even in parades. Readlyn and Fairbank, competing

together as Wapsie Valley, saw the largest reduction and won a small solar electric system for its high school. The College Hill neighborhood received a tree planting. Osterberg is working to spread the program to new towns and to larger utilities. "I think we've demonstrated that this works," he says.





The Wilderness is Within Reach



Whether it's a day on the lake or a week in the woods, Mills Fleet Farm offers a vast variety of products so you can make your experience memorable. With the name brands you've come trust and our Mills Fleet Farm Exclusive Lures all at low prices, our store selection is ready with whatever you're looking for.

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