



MISSOURI. Conservationist

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[NOTE TO OUR READERS]

Conservation Trails

By land or water, by foot, boat, or wheels, you are sure to find adventure and discover nature on a Missouri trail. Our state has hundreds of trails to explore, including more than 700 miles on 136 conservation areas

and 10 nature and education centers statewide. In recognition of this great public resource, Missouri was named the “Best Trails State” by American Trails, a national, non-profit organization, at the International Trails Symposium in April.

There is no easier path to outdoor recreation and wellness — for all ages and levels of ability — than following a trail near you.

Conservation-area trails provide recreational and educational opportunities as well as access to your conservation lands. They range from paved, level walkways to challenging hikes. Whether you are looking for an urban escape, hunting or angling hotspot, or a rambling rural trek through prairies, woodlands, glades, and wetlands, we have a trail for you. Bicycling and horseback riding are allowed on select designated trails, as well.

The Department also maintains a growing number of disabled accessible trails. Learn more about how we are working to remove the barriers that prevent people with disabilities from enjoying the outdoors and search our database of disabled accessible facilities on our Accessible Outdoors page at mdc.mo.gov/node/15283.

Find Department of Conservation trails near you by using our interactive trail map at mdc.mo.gov/node/3392 or contact a regional office (see Page 3).

If you prefer a paddle to hiking shoes, read Finding Flow on the Mighty MO, on Page 10, Brett Dufur’s tale of paddling the MR340, the 340-mile Missouri River Marathon — arguably one of Missouri’s most challenging trail adventures. Then plan your own voyage of discovery on the Lewis and Clark Water Trail, which spans more than 500 miles of the lower Missouri River. We have improved Missouri River access along the trail by expanding the number of boat ramps and public lands within the river’s corridor.

For additional water trails on the Missouri River and beyond, we have updated our popular Paddler’s Guide to Missouri. Detailed sections include northern streams, the



Missouri River, and floats from all corners of the state. Each waterway includes easy-to-read maps, descriptions of access points, camping, and conservation areas along the way. (Available for \$8 from Conservation Department Nature Shops, online at mdcnatureshop.com, or by calling toll free 877-521-8632.)

I invite you to join the Governor’s 100 Missouri Miles Challenge to complete “100 Missouri Miles” of physical activity by the end of this year. This initiative is a great opportunity for fun and fitness and to celebrate our outdoor and conservation heritage. Visit 100missourimiles.com to learn more.

Missouri’s conservation-area and water trails enrich our quality of life and economy, and they are accessible to all. Whether you join family and friends, or choose to trek solo, find your own path to adventure this year on a Missouri trail.

Robert L. Ziehmer, director

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📷 24-70mm lens • f/2.6 • 1/200 sec • ISO 80

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WHAT IS IT?

Our photographers have been busy exploring the intricacies of the Missouri outdoors. See if you can guess this month's natural wonder. The answer is revealed on Page 7.



NIGHT BIRD

I loved Danny Brown's photo of the yellow-crowned night heron [May; Page 30]. I used to regularly see two of these herons feeding in a swampy area near Blue River in south Kansas City. Alas, the swamp was drained. I've not seen the herons since.

Mac Houston, Kansas City

FROM FACEBOOK

We were down by Peck Ranch and were sad to see that it was not open. That was one of the reasons we went down to that area last week.

Lana Evans Hill

Missouri Dept. of Conservation: We are sorry about that. While part of Peck Ranch is still open to the public, the Refuge Area is closed into July to give elk in the area a chance to birth calves, and to give the elk we just placed there a

chance to acclimate without a lot of human disturbance. Here is a link to more information: mdc.mo.gov/node/22455.

My maple tree is covered with tar spots. Isn't it a little early for this?

Ruby Ann Kellems Kelsey

Missouri Dept. of Conservation: We have seen a lot of disease and insect problems this spring, given the cool and wet weather. One of these diseases is called Anthracnose, which is a fairly common problem each year, but some years (including this one) it is more severe. This type of disease can affect different species of trees, but is most common on sycamore, maple, and ash trees.

The black spots on the foliage are a sign of Anthracnose disease on your tree. Some leaves may drop, but a re-flush

of leaves will occur shortly after. This is not a deadly disease, but rather just a slight setback in development. The only help that you can provide is to rake up what leaves do fall and dispose of them off-site, or by burning. This will reduce the amount of disease/fungal spores in the area and reduce the spread and severity of infection in the future. There are fungal sprays that you can apply to trees, but they are costly and unnecessary for this specific disease. Here is a website with more information: nicolewarduk.blogspot.com/2013/05/anthracnose-diseases-of-shade-trees.html.

Is pole spearfishing the only legal spearfishing method allowed in Missouri streams? I've been reading nongame regulations on the website and that's what I thought, but I wanted to make sure.

Keith Jackson



Reader Photo

REFLECTIONS

Andrew Conroy captured this image at Powder Valley Conservation Nature Center in St. Louis. Conroy lives about 10 minutes from the area and visits frequently. "Usually, I go to Powder Valley the most in the spring and fall because of the interesting colors and cool scenes," said Conroy. "When I go, I always have my camera and a couple of lenses." Conroy said that he sometimes goes specifically to photograph birds, but other times he hikes deeper into the woods looking for scenes like this photo. "I liked the way that the rocks on the sides of the photo framed the reflection of the trees in the water," said Conroy.

Missouri Dept. of Conservation: You may use an underwater spear for nongame fish. You may also use a gig or atlatl. See Page 10 of our Fishing Summary booklet. Here is a link: mdc.mo.gov/node/11414.

Will my 9-year-old need a fishing permit?

Dawn Whitlow Pehle

Missouri Dept. of Conservation: He won't need a fishing permit until he is 16, but you'll need one if you plan to fish with him. If you are going trout fishing, he will need a permit for trout. Other exceptions apply, please see the fishing regulation summary at mdc.mo.gov/node/11414 for more info.

I just got my fishing permit, but I need to change my address. Is there a place I can do it online?

Sharry Murphy

Missouri Dept. of Conservation: You can't change that online, but you can call Permits at 573-526-4115, ext. 3549, and they will help you.



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Phone: 573-751-4115
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Southeast/Cape Girardeau: 573-290-5730
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 Northwest/St. Joseph: 816-271-3100
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Equal opportunity to participate in and benefit from programs of the Missouri Department of Conservation is available to all individuals without regard to their race, color, national origin, sex, age, or disability. Questions should be directed to the Department of Conservation, PO Box 180, Jefferson City, MO 65102, 573-751-4115 (voice) or 800-735-2966 (TTY), or to the U.S. Fish and Wildlife Service Division of Federal Assistance, 4401 N. Fairfax Drive, Mail Stop: MBSP-4020, Arlington, VA 22203.

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Scientists are concerned that trail cameras may be causing changes in animal behavior.

Agent Notes

Explore Conservation Areas



SUMMER IS A great time of year to load up family and friends and explore the outdoors. The forests are in full bloom, the birds are singing, and the fish are often biting. Why not try exploring one of the Department's conservation areas? Public conservation areas are located all over the state. Each area is unique.

The Conservation Department manages these areas so that folks from all over can enjoy the remarkable wonders of Missouri's outdoors. Each conservation area has rules and regulations. All areas are closed from 10 p.m. to 4 a.m. daily; however, hunting, fishing, trapping, dog training, camping, launching boats, and landing boats are permitted at any time in areas where these activities are authorized. Be sure to read the information boards posted at the entrances of each area or check the website beforehand (mdc.mo.gov/atlas) to read about the rules and regulations that apply where you will be visiting. If you plan to camp, make sure all fires are kept in designated areas and that you leave the area cleaner than you found it. If you happen to witness a violation while visiting a conservation area, please contact your local conservation agent immediately.

Conservation areas are just one way the Department helps people discover nature. If you're looking for a weekend getaway or a one-day adventure in the outdoors, try a conservation area near you.

Lucas McClamroch is the conservation agent in Washington County. If you would like to contact the agent for your county, phone your regional conservation office listed on Page 3.

HUNTING AND FISHING CALENDAR

FISHING	OPEN	CLOSE
Black Bass from Ozark Streams	05/25/13	02/28/14
Bullfrogs and Green Frogs	Sunset	Midnight
	06/30/13	10/31/13
Nongame Fish Giggling	09/15/13	01/31/14
Paddlefish on the Mississippi River	09/15/13	12/15/13
Trout Parks	03/01/13	10/31/13

HUNTING	OPEN	CLOSE
Coyote	05/06/13	03/31/14
Deer		
Archery	09/15/13	11/15/13
	11/27/13	01/15/14
Firearms		
Urban	10/11/13	10/14/13
Early youth	11/02/13	11/03/13
November	11/16/13	11/26/13
Antlerless (open areas only)	11/27/13	12/08/13
Alternative Methods	12/21/13	12/31/13
Late Youth	01/04/14	01/05/14
Doves	09/01/13	11/09/13
Furbearers	11/15/13	01/31/14
Groundhog	05/06/13	12/15/13
Pheasant		
Youth (North Zone Only)	10/26/13	10/27/13
North Zone	11/01/13	01/15/14
Southeast Zone	12/01/13	12/12/13
Quail		
Youth	10/26/13	10/27/13
Regular	11/01/13	01/15/14
Rabbit	10/01/13	02/15/14
Sora and Virginia rails	09/01/13	11/09/13
Squirrel	05/25/13	02/15/14
Turkey		
Archery	09/15/13	11/15/13
	11/27/13	01/15/14
Firearms		
Fall	10/01/13	10/31/13
Waterfowl	see the <i>Waterfowl Hunting Digest</i> or mdc.mo.gov/node/3830	
Wilson's (common) snipe	09/01/13	12/16/13
Woodcock	10/15/13	11/28/13

TRAPPING	OPEN	CLOSE
Beaver and Nutria	11/15/13	03/31/14
Furbearers	11/15/13	01/31/14
Otters and Muskrats	11/15/13	02/20/14

For complete information about seasons, limits, methods, and restrictions, consult the *Wildlife Code* and the current summaries of *Missouri Hunting and Trapping Regulations* and *Missouri Fishing Regulations*, *The Spring Turkey Hunting Regulations and Information*, *the Fall Deer and Turkey Hunting Regulations and Information*, *the Waterfowl Hunting Digest*, and *the Migratory Bird Hunting Digest*. For more information visit mdc.mo.gov/node/130 or permit vendors.

ASK
THE

Ombudsman



Q. We have a male cardinal that frequents our “bird garden.” What is unusual is that he is bald! He seems to be healthy, but could this be from an illness or a predator?

A. I receive several contacts each year on the subject of bald-headed birds, usually cardinals or blue jays in the summer or fall, just after the nesting season. The condition is usually related to a bird scratching its head because of irritation by mites and lice after being on the nest for several weeks. There is a normal molting of feathers after raising young birds in a nest, which usually rids the birds of the infestation. The scratching removes all of the ready-to-molt feathers all at once. A normal molt would consist of the new feathers pushing out the old feathers without leaving any areas unfeathered. Nutritional deficiencies have also been suggested as a possible cause.

Fortunately, the birds usually regrow the feathers and regain their normal appearance in a few weeks.

Q. I have recently seen hundreds of dragonflies swarming near my home. Are they migrating?

A. Swarms of dragonflies may be migrating or feeding. Migration is not well understood but is more likely to occur in late summer or early fall. It can involve many thousands of the insects moving in the same general direction. Some dragonfly migrations cover greater distances than the annual monarch butterfly migration. In mid-summer, feeding swarms of hundreds of drag-

onflies can occur where a recent hatch of smaller flying insects has emerged, often over grassy areas. Dragonflies are predatory on smaller flying insects (flies, mosquitoes, midges, mayflies, etc.). They are often found near water, where they lay their eggs and where their aquatic larval stage develops. Swarms are often short-lived and not commonly observed.

Q. I apply for a managed deer hunt every year but I’m never selected. What are my odds of being selected?

A. The odds of being selected depends on the hunt for which you applied. Some hunts are more popular than others and attract more applications. Last fall the odds of being selected for a hunt ranged from 1 percent to 100 percent. If you are having no luck by applying for a very popular hunt, try applying for a hunt that doesn’t attract so many applicants. Our website provides the results from last season’s managed hunts, including the chance of an applicant being selected in each hunt. See this link: mdc.mo.gov/node/22101. Anyone can apply each year and have a chance of being selected. Hunters with accumulated preference points have better odds of being selected, but luck is still a factor. Keep in mind that deer hunting on public lands is available all over Missouri without entering a drawing. The managed hunts provide an additional hunting opportunity for the lucky hunters who are drawn, but they are not the only way to have a great deer hunting experience in Missouri.

Ombudsman Tim Smith will respond to your questions, suggestions, or complaints concerning the Conservation Department.
Address: PO Box 180, Jefferson City, 65102-0180
Phone: 573-522-4115, ext. 3848
Email: Ombudsman@mdc.mo.gov



Plan Now for Hunting Seasons

As summer heats up, do you find your thoughts drifting to autumn weather and hunting seasons? If not, maybe they should, especially if you want to take part in a managed deer hunt or need hunter-education certification.

Deer hunters have until Aug. 15 to apply online for most managed hunts. For more

information, see the *2013 Fall Deer and Turkey Hunting Regulations and Information* booklet, which is available wherever hunting permits are sold. You can find the online version at mdc.mo.gov/node/3867.

If you are a new hunter, or if you plan to mentor a novice hunter this fall, now is the time to

take care of your hunter-education certification requirements. Hunters who were born on or after Jan. 1, 1967, and are 16 or older, must successfully complete an approved hunter education course to qualify to buy firearms hunting permits. Some mentors also are required to be hunter-education certified. Details about this and other exceptions to the mandatory hunter-education rule are listed on Page 2 of the *2013 Summary of Missouri Hunting and Trapping Regulations*, also available from permit vendors or at mdc.mo.gov/node/11416.

Hunter education classes fill up quickly as hunting seasons approach. Enrolling early will ensure against the disappointment of not getting into a class and not getting to hunt.

Hunter education class participants can look forward to a new experience this year. The curriculum has been revised to enhance student convenience and emphasize mentorship and hands-on training. Unlike the old, 10-hour classroom program, the new, more flexible version is divided into two parts.

Step 1 — Acquire the necessary knowledge about hunting equipment, safety, and ethics. Participants can do this any of three ways:

Option 1: A convenient and fun online course that provides information in written form, augmented with illustrations, graphs, audio, videos, and interactive animation.

Option 2: Obtain a student manual online at mdc.mo.gov/node/3095 or by calling or visiting one of the Conservation Department regional offices listed on Page 3, and complete the course at your own pace.

Option 3: Register and attend a 4-hour instructor-led classroom session.

Step 2 — After completing Step 1, obtain your certification by attending a four-hour skills session that fits your schedule. These sessions consist of instructor-led, hands-on exercises designed to help students put their knowledge into practice. After the session, students take a 35-question multiple-choice exam. To find a course near you, visit mdc.mo.gov/node/3095 or call or visit one of the Conservation Department regional offices listed on Page 3.

Don't wait. Hunting season is closer than you think!

Stocking Boosts Striper Fishing

Fans of the hard-fighting, heavyweight striped bass soon will enjoy increased opportunities at Bull Shoals Lake.

This summer the Conservation Department will stock 16,000 "striper" fingerlings on the Missouri side of the reservoir, which spans the Arkansas-Missouri state line. Supplemental stocking is planned every other year thereafter, using fish reared at Conservation Department hatcheries.

A stocking by the Arkansas Game and Fish Commission in 1998 started what has become a nationally known trophy striper fishery at Bull Shoals Lake. This one-time stocking yielded a 56-pound, 5-ounce fish in 2008, a 58-pound, 10-ounce fish in 2010, and a 60-pound, 9-ounce fish in 2011. All were state records at the time they were caught. Earlier this year, an angler on the Arkansas portion of Bull Shoals caught

a potential world-record 68-pound striper. The regular stocking schedule will produce a consistent striper fishery that will thrill anglers with adrenalin-inducing action year-round.

Striper regulations on the Missouri part of Bull Shoals are a minimum length limit of 20 inches and a daily limit of three fish. For more information about striped bass at Bull Shoals, call 417-256-7161 or visit fishing.mdc.mo.gov.

Deer Doggers Pay Fines

State and federal courts have levied fines totaling \$67,425 on dozens deer poachers swept up in the "Pulling Wool" undercover investigation.

The Conservation Department and the U.S. Fish and Wildlife Service (USFWS) cooperated in the investigation of an organized ring of poachers who used dogs and marine-band radios to take deer illegally. Forty-six defendants were

found guilty by trial or plea in Federal Court for hunting deer with the aid of dogs on Mark Twain National Forest land. Six other defendants were charged with violations in state court in Ripley County and received fines and court costs totaling \$1,909. The poachers also lost their hunting privileges for periods of one to three years.

Hunting deer with dogs, commonly called deer dogging, has long been illegal in Missouri. But poachers, particularly in the Ozarks, use hounds to run deer toward shooters. The use of radios, automobiles, and all-terrain vehicles gives hunters an unfair advantage over deer. It also creates dangerous situations as poachers race down narrow roads to intercept deer and shoot at animals crossing roads. Dogging disrupts legitimate hunting.

Catching poachers is one way conservation makes Missouri a great place to hunt and fish.



WHAT IS IT?

Flag-tailed Spinyleg Dragonfly

Dromogomphus spoliatus

On Page 1 and left is a dragonfly. There are many species of dragonflies in Missouri, ranging from very common to in danger of disappearing. Adult length is from 1 to 3½ inches (varies with species). The dragonfly's six legs are poor for walking but good for perching and hunting (also called hawking). In flight, their legs make a basket shape that is perfect for grasping small flying insects. Dragonflies are important predators of mosquitoes, midges, and other small insects. Males will patrol their territories, driving away rival males and trying to mate with females. The female usually deposits eggs on the water's surface. Larvae (nymphs) are aquatic. Most of a dragonfly's life is spent as a nymph. The nymphs are important food for fish and other aquatic insectivores. —photo by Noppadol Paothong

(continued from Page 7)

WNS Found in Eastern Missouri

The U.S. Geological Survey (USGS) has confirmed the presence of white-nose syndrome (WNS) in bats in public caves in Crawford, Washington, and Franklin counties. All affected caves are closed to the public, and cave names are not being disclosed to prevent disturbance of remaining bats.

WNS was first discovered in New York in 2006. Missouri's first confirmed case came in 2012. Since then, the disease or the fungus that causes it has been found in seven Missouri counties, all in the eastern part of the state.

Affected bats typically have white fungus growing on their faces and wings. WNS spreads mainly through bat-to-bat contact and has not been found to infect humans or other animals. The fungus that causes WNS may be inadvertently carried between caves by humans on clothing, footwear, and caving gear.

Bats with WNS show unusual behavior, such as flying outside in daylight and clustering near entrances of caves and mines during the day in cold winter months when they should be hibernating. This abnormal activity uses up fat reserves needed to get the bats through the

winter, making them more susceptible to freezing or starvation.

People should never handle bats and should contact their local MDC office or conservation agent if they find dead bats, or see bats flying outside during the day in cold winter months.

Bats provide natural pest control for farms and forests and play an important role in controlling mosquitoes and other insects that can spread disease to people. According to the USGS, the number of North-American bats estimated to have died from WNS so far could consume up to 8,000 tons of insects per year.

More information on WNS is available online at whitenosesyndrome.org.

Tree Care Tips

Ice storms, tornadoes, flood, drought, disease, and insect pests have taken a serious toll on trees across Missouri in recent years. Here are some tips for nursing stressed trees back to health or replacing those that are too far gone to save.

- After floodwaters recede, examine trees to see if they are leaning and if their roots have pulled free of the soil. Check trunks for bark damage from floating debris. Extensive damage indicates the need for replacement.
- Small trees toppled during floods sometimes can be reset and saved. Pruning dead branches also helps stressed trees recover, but avoid "topping" trees by cutting off all but the main branches.
- Sediment deposited by floods can suffocate tree roots. You may be able to remove sediment, but be careful not to damage roots in the process.
- To help drought-stressed trees, water weekly, soaking soil under the drip line.
- Apply a balanced, slow-release fertilizer sparingly.
- Select replacement trees carefully. Native species are best, because they are adapted to Missouri growing conditions.
- The threat of the emerald ash borer makes ash trees a poor choice for replacement trees. Similarly, the weak wood of silver maples and Bradford or other varieties of fast-growing, flowering pears makes them poor choices in areas subject to ice storms or wet snow. Decorative pears also are highly invasive and threaten Missouri's natural ecology.
- Missouri's state tree, the flowering dogwood, is an excellent choice for decorative landscape planting. So is the native redbud tree.
- Native red or white oaks and red or sugar maples are excellent choices to replace declining shade trees.
- Avoid the golden rain tree, tree of heaven, and princess tree. These all are imports that drop lots of litter on the ground and can be invasive. Exotic Norway maples and Amur maples are also highly invasive.

For more information about tree planting and care, visit mdc.mo.gov/node/5947.



Redbud tree

Zebra Mussels Found at Schell-Osage

Schell-Osage Conservation Area (CA) is the latest toehold for the invasive and ecologically destructive zebra mussel. Workers conducting a fish survey at the conservation area in Vernon and St. Clair counties this spring found several small zebra mussels in Barber Lake, a shallow oxbow lake in an old channel of the nearby Osage River.

Invasive Species Coordinator Tim Banek says it is likely that the zebra mussels originated from Melvern Reservoir and floated down the Osage River system in their larval stage. Truman Lake backs up onto Schell-Osage CA during high water, and zebra mussels already have been found in Lake Melvern, which is farther up the Osage River drainage in Kansas.

Zebra mussels entered the United States in ship ballast water in the Great Lakes. They have caused billions of dollars of damage in the Great Lakes and Mississippi River systems. The mussels reproduce in huge numbers. Adults attach to hard surfaces like pipes, docks, rocks, boat hulls, and even native mussel shells. They form dense colonies. The sharp-edged shells can cut fishing line or the feet of swimmers.

In recent years, the mussels have continued to spread to new waters. In Missouri, they were found in Lake of the Ozarks in 2006. Since then, they have also been found at Smithville Lake and Lake Lotawana in the Kansas City area, and in upper Bull Shoals Lake and Lake Taneycomo in southern Missouri. They are also in the Mississippi, Missouri, and Osage rivers.

DID YOU KNOW?

Conservation makes Missouri a great place to hunt.

Boaters and anglers can help stop the spread of zebra mussels and other aquatic invasive plants and animals. The mussels can move to new waters when adults are attached to docks or boat hulls, as they can survive for some time out of water. Also, water in boats, motors, bait buckets, and live wells can transport the microscopic larvae, called veligers.

A few simple precautions can help protect Missouri waters from zebra mussels.

- **Clean** — Remove all plants, animals, and mud, and thoroughly wash everything, especially live wells, crevices, and other hidden areas. If a boat doesn't have a week to dry out before the next use, wash boat bilges, trailers, motor drive units, and live wells with hot water of at least 104 degrees. Most commercial car washers meet this standard.
- **Drain** — Eliminate all water before leaving the area, including live wells, bilge, and engine cooling water.
- **Dry** — Allow boats and other equipment to dry in the sun at least five days before launching in other waters.
- **Dispose** — Put unused bait in the trash.

For more information, see mdc.mo.gov/node/8434 or on.doi.gov/flpdIK.

Taking Applications for Agent Trainees

The Conservation Department is accepting applications for the next class of conservation agent trainees. Selected candidates will undergo 26 weeks of intense training in all facets of law enforcement and resource management.



Scheduling Youth Hunts

» **One of the Conservation Department's goals is to provide quality hunting opportunities for Missouri's youth.** The

Department strives to minimize conflicts among youth hunts and holidays, but conflicts are sometimes inevitable for a number of reasons.

» **Youth hunting seasons must be held on weekends** so youth can participate without missing school.

» **There are many opportunities, but limited weekends** for fall and winter youth hunting seasons, including those for deer (early and late), pheasant and quail, and waterfowl (in three different zones).

» **To maximize the chance of successful harvest**, youth hunting seasons are typically scheduled prior to the opening of the "regular" season.

» **Several holidays occur within the brief time available** for fall and winter hunting, including Halloween, Thanksgiving, Christmas, and New Year's Day.

» **Fall 2013 and winter 2014 youth hunting seasons include:**

Season	Opens	Closes
Deer Early	11/02/13	11/03/13
Deer Late	01/04/14	01/05/14
Pheasants (North Zone Only)	10/26/13	10/27/13
Quail	10/26/13	10/27/13
Waterfowl North Zone	10/20/13	10/21/13
Waterfowl Middle Zone	10/27/13	10/28/13
Waterfowl South Zone	11/17/13	11/18/13

Those who make the grade will receive county assignments and become the face of conservation in their assigned communities — enforcing the *Wildlife Code of Missouri* and helping the public with such issues as nuisance wildlife and land management.

To qualify, applicants must have a bachelor's degree in a field related to the natural sciences or criminal justice. For more information, including salary range, duties and responsibilities, degree requirements, qualifications, and special-ability requirements, and to apply, visit the Job Openings section at mdc.mo.gov/about-us/careers. The application deadline is July 19. Contact MDC Protection Programs Supervisor Cheryl Fey at 573-751-4115, ext. 3819, or Cheryl.Fey@mdc.mo.gov with questions.

Smallmouths Need Anglers' Help

Anglers can help ensure optimal management of smallmouth bass by taking part in a research project on selected Ozark streams. All you have to do is report catches of tagged smallmouth bass. This is the second and final year of the tagging effort on the Black, Castor, Current, and North Fork rivers, and Courtois Creek. Each tag has a phone number printed on it where anglers can call to report the following information: tag number, date of catch, length of bass, approximate location of the catch, and if the fish was kept or released. This information will help biologists devise management strategies to maximize fishing opportunity. Anglers don't have to keep the fish. They can simply clip the tag and release the fish if they wish.



Kansas City's Kaw Point, the confluence of the Kaw and Missouri rivers, marks the starting point of the annual MR340 race.



Finding Flow

ON THE

Mighty MO

by BRETT DUFUR

One paddler's journey across the Show-Me State in the world's longest, nonstop ultramarathon paddling race

I'M 250 MILES INTO A 340-MILE KAYAK RACE. It's Day 3. The intense July heat is taking its toll. I'm drifting slowly, my paddle motionless in my hands. The tension is unbearable.

"This is ridiculous!" I finally holler, with an air of finality.

"Then get out," comes the terse reply.

I'm arguing out loud with myself. Some part of me is done. Drifting past the boat ramp at Portland, I finally give that pesky little voice in my head the boot.

Moments like this become the new normal — the MR340 normal. My body, now free from my internal critic, finds a perfect paddling pace. Everything else falls away. The line blurs between me, my boat, and the river. The next 40-mile stretch becomes effortless and one of the highlights of the trip.

BRETT DUFUR

It's before dawn on a Tuesday morning in July. Nearly 500 chiseled athletes, misfit paddlers, weekend warriors, and river rats from 37 states look fresh and eager to take on the MR340 — the world's longest, nonstop ultramarathon paddling race.

We're at Kansas City's Kaw Point, at the confluence of the Kaw and Missouri rivers. Under the whirring rotors of Kansas City news helicopters, the scene is a commotion of boats, biceps, and blades (paddles). Beat-up old aluminum canoes sit next to pedal-powered kayaks, high-dollar Hawaiian-style catamarans, stand-up paddle boards, tandem kayaks, canoes for six paddlers... it's all here.

The race is about to start. Paddlers, many already with 1,000-mile stares, rummage through huge gear piles in one final frantic push to ditch some weight. There are true racers, cruisers, bucket listers, lifers, newbies, and race veterans returning to beat their best time. Cheering ground crews buoy them up with hugs and smiles, as well as some last minute taping up of hands.

I paddle my 18-foot kayak to the starting line. All of the competitors are in their boats now, with a mixture

On the morning of Day 3, the author (right) and Dave Shook, from Aurora, Mo., glide into the Jefferson City checkpoint to resupply, 223 miles into the race.

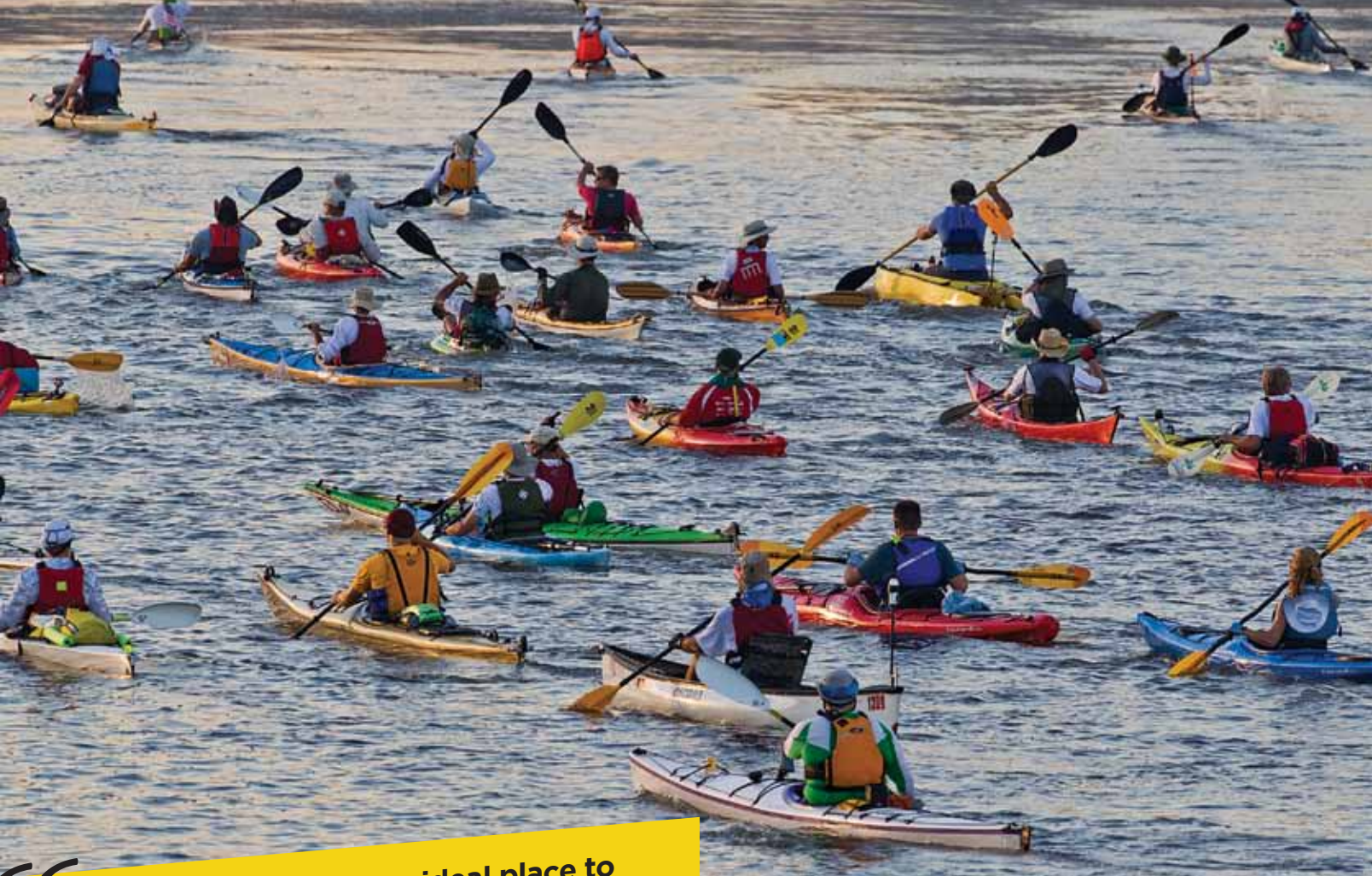


Family and friends shout words of encouragement as each paddler goes by. In the past 10 years, ultramarathon paddling races have exploded in popularity.

of smiles, concentration, and relief to have so many months of training and planning done. Now we can just lean forward and paddle. A blissful simplicity — enjoy the camaraderie of paddlers from all over the country and make miles.

A number of paddlers in wrestling masks and capes add to the carnival feel of the moment. We wave our





“The Missouri River is an ideal place to experience a wilderness adventure close to home thanks to dozens of communities and conservation-area boat ramps along the way.

Besides men’s and women’s solo, other divisions include men’s tandem, women’s tandem, mixed tandem, team, voyageur, dragonboat, stand up paddle boards, and pedal-driven boats division.

goodbyes and thumbs-ups to family and friends on the bank. A Civil War cannon fires and we’re off. It’s simple, really. Paddle like crazy for 340 miles across Missouri from Kansas City to St. Charles in less than 88 hours. Nine checkpoints. Miss one and you’re disqualified.

The pack of boats soon stretches out over 5, then 10 miles of river. The front of the pack quickly disappears out of sight, at a paddling pace unfathomable even to many Olympic paddlers. The stifling July heat flexes its muscles early. The mercury rises to 108 degrees, with a heat index of 120, and stays there throughout the week of the race. The headwinds are relentless. Even for seasoned MR340 veterans, this is new territory. Due to the drought, we’re on a low, slow river, further stripping us of much-needed momentum.

Those looking for glory of breaking records or personal bests resign themselves to the new reality of simple rewards like staying hydrated and slowly making headway on a race that alternates between agony and ecstasy.

My goal for Day 1 is to keep a 7-mile-per-hour pace, and to stay in the boat as much as possible. Dawdling around at checkpoints adds precious time to the clock. I remind myself that the hurt doesn’t get worse after Day 1. I may be lying to myself.

Soon we’ve paddled beyond Kansas City’s skyline and have entered the solitude of the countryside. An occasional town dots the otherwise forested banks. I make it to the Lexington boat ramp, 50 miles into the race at 2:15 p.m. Lexington is the first of nine checkpoints. In contrast to the solitude of the river, the checkpoint is another carnival of colors and commotion as ground crews lean in to assist their paddlers. I stay in the boat and check through as quickly as possible in an effort to bank some time that will help me further downriver. My mom quickly drops two bags of ice into my lap to help keep my core temperature down and I’m off again. I see many boats out of the water, already loaded up for the drive home. The heat is taking its toll.



“Eight Blades of Fury” team boat #2123 included father-son duos Lohn and Drake Weber, both of Independence, and Kevin and Lee Swearingen, both of St. Charles. Linda Weber provided ground crew support. They finished the race in 74 hours and 59 minutes, placing 10th in the team division.

Lewis and Clark Made Me Do It

Why am I here? Lewis and Clark made me do it. Being raised on stories of Lewis and Clark, John Colter, and Daniel Boone, paddling across the state has always been a childhood dream. The Missouri River is an ideal place to experience a wilderness adventure close to home thanks to dozens of communities and conservation area boat ramps along the way, which make the river incredibly accessible for paddlers and also easy for ground crews to meet up with paddlers throughout the race.

The Missouri River has long been a testing ground for man against nature. This dates back most famously to the Lewis and Clark Expedition, with their stories of trials and tribulations. John Colter, one-time member of the Lewis and Clark Expedition, became a legendary mountain man traveling its headwaters. Daniel Boone is credited with opening up the Missouri River valley for pioneers. He used the conduit of the Missouri River for both living a life full of exploration and for exploits that further refined his character through wilderness epics and challenges overcome there. Later waves of explorers were also defined in part by the river.

Author John Niehardt wrote, “In the history of the Missouri River there were hundreds of these heroes, these builders of the epic West... They thirsted in deserts, hungered in the wilderness, froze in the blizzards, died with the plagues, and were massacred by the savages. Yet they conquered. Heroes of an unwritten epic! And their pathway to defeat and victory was the Missouri River.”

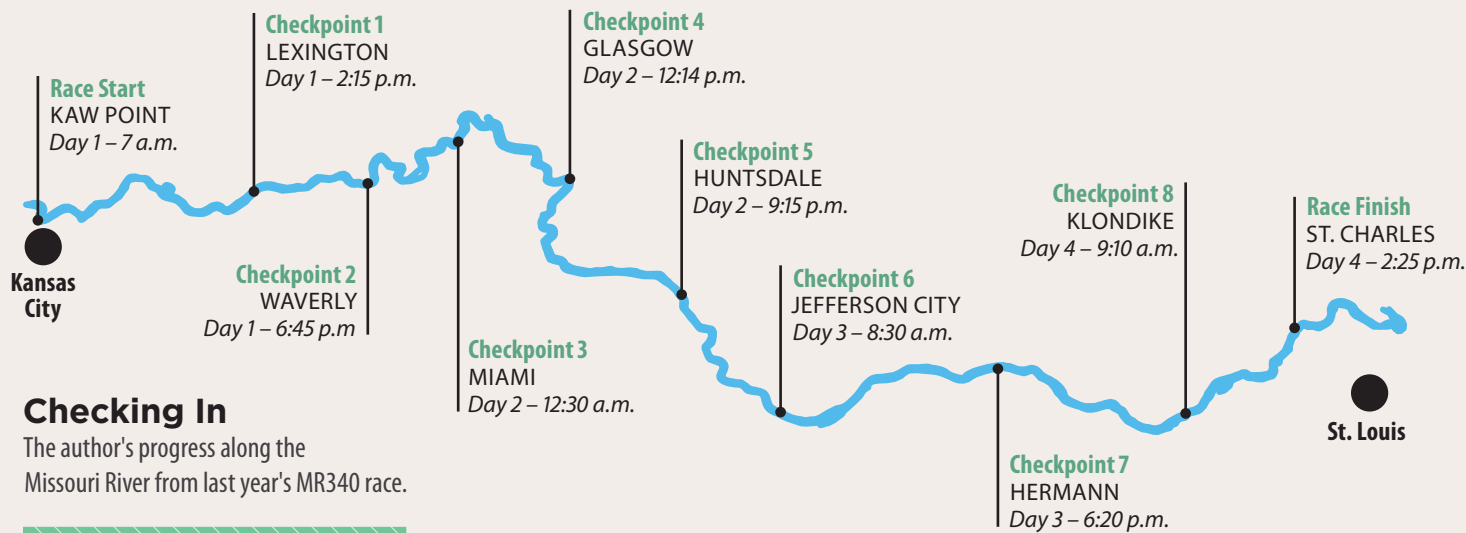
This wild river has changed since those early days, but our need to test ourselves on wild rivers has not. Today the Missouri River still offers a wilderness setting to sharpen your mettle. Niehardt wrote, “If you wish to have your epic spiced with the glamour of kings, the history of the Missouri River will not fail you.”

MR340 paddlers are dipping into a deep river, indeed.

The Real River Comes Out at Night

At 6:45 p.m., I paddle through the Waverly checkpoint, and push on to Miami. I reach Miami just after midnight, 105 miles into the race. Day 2, I pass through the Glasgow checkpoint at noon, and am back in the boat within 45 minutes. I’m 141 miles from Kansas City, and all my thoughts are on reaching Jefferson City 82 miles downriver today if possible.

Just past Glasgow, a megaphone blasts, “Brett from Rocheport, number 1024, go get ‘em!” From a shaded porch high on the forested bank, someone is cheering us on. They find our boat numbers on the race roster and shout words of encouragement as each paddler goes by. Whoever you are, thank you!



Checking In

The author's progress along the Missouri River from last year's MR340 race.



Near dusk on Day 2, the heat of the day is finally gone, and I drift for quite some time as I float past Rocheport at mile marker 186.5 — virtually the halfway point of the race. An eagle lands in its nest in high trees on the right bank. Numerous turkey vultures ride the thermals above the bluffs. Maybe they're eyeing me as their next meal, I muse. At many points along this stretch, cyclists on the Katy Trail State Park seem to appear out of nowhere from behind forested banks. The Rocheport to Jefferson City stretch is one of the most scenic, with 100-foot-high bluffs along one bank, making it an unforgettable float with the moon as your guide.

The sky soon cascades into deep blues and purples with a sunset I will never forget. A full moon throughout the race allows paddlers to make miles until 3 a.m., or for some paddlers, to paddle all night long.

The navigation lights on the kayaks far ahead and behind me look like a faint string of Christmas tree lights curving their way down the river. The evening paddling on tranquil stretches under full moons renews

After making it to the sandbar by 2 a.m., a quick three-hour nap allows the paddler to be up by 5 a.m., back in the boat by 5:15 a.m., and to make the Jefferson City checkpoint by 8 a.m. A full moon throughout the race allows paddlers to make miles until 3 a.m., or for some paddlers, to paddle all night long.

spirits and elevates us. The slow meanders of the river seem to pull us along, with promises of new discoveries around each bend.

Soon, we ride atop the moon's silver tongue on a river of black ink. My mind struggles to put a name to the blackened banks, the blackened river, the different shades of black, the empty spaces that are vacuum packed with absolute darkness. As the miles meander by, the only constant becomes the flow of this artery of the planet's life force, immeasurable force flowing down deep, flowing forever, largely enveloped in silence.

This is a fleeting moment of disconnectedness with man's worship of hurry, man's constructed world of not enough time. But it is a palpable connection to what is real. Here, life around you has reached equilibrium. Life is stripped to its simplest level of appreciation, where dipping a paddle into a silent, sleeping river is enough.

It's 2 a.m. and the moon is dipping low. I make it to a broad sandbar at Marion Bottoms, mile marker 160, just above Jefferson City. A quick three-hour nap allows me to be up by 5 a.m., back in the boat by 5:15 a.m., and to make the Jefferson City checkpoint by 8:30 a.m. to meet up with my ground crew. I've been paddling for about 48 hours with some stops, and have covered 223 miles. I team up with Dave Shook, from Aurora, Mo., to start pacing ourselves for the slog to the finish. Day 3 takes us to Hermann by 6:20 p.m.

The scenery of the Missouri River valley is punctuated by blufflines along the last two-thirds of the race. Due to an intensely dry summer last year, tinges of color, similar to fall's display, were already beginning to appear.

The Final Push to St. Charles

Day 4 starts early with the alarm clock going off before dawn at the boat ramp in Washington. Snoozing paddlers are draped across picnic tables and on any available patch of grass. Not your typical cup of morning Joe. Despite being only 50 feet from the train tracks, we catch three hours of zzz's, and continue to hit the snooze for another hour. What's the rush? The heat has cooked us from the insides out. Our bodies are moving deliberately to conserve energy. "Slowly but slowly" becomes our new mantra.

Forty miles to go. Dave and I make early miles to beat the heat and to enjoy some placidly smooth river before the headwinds re-emerge by 8 a.m. I cringe as we pass several canoes being paddled solo with their bows high in the air — obvious signs that partners have dropped out of the race for reasons unknown. The headwinds send the canoes in a haphazard zigzag down the river.

We paddle past the Klondike boat ramp at 9:10 a.m., the final checkpoint before the finish. We stay in our boats, feeling strong after a few hours rest. With less than 30 miles to go, Dave and I find ourselves suddenly surrounded by the jovial River Ramblers flotilla, a touring group of 100 paddlers enjoying a leisurely multi-day float from Jefferson City to the confluence of the Missouri and Mississippi rivers. They are talkative, fresh, and paddling fast — exactly what we needed to make the final push into St. Charles. They treat us like rock stars and we do little to dispel that myth.

At 2:25 p.m., with overwhelming relief, we reach the finish line, the sandy beach in front of the Lewis and Clark Boathouse and Nature Center in St. Charles — 79



hours and 25 minutes since leaving Kaw Point. By the end of the week, more than 100 have dropped out. Those that make it to the finish line in St. Charles are changed, transformed. Many, still shaky with exhaustion, are already talking about next year as they eat a celebratory meal, held in bandaged, blistered hands.

Bandaged, blistered hands. Sunburns. Numb hands and feet. Dehydration. Heat exhaustion. Elation. Huge smiles and hugs with cheering ground crews — the ones who make it all possible.

I have always been more of a float-trip guy, happy to drift with a cold beverage in hand. I entered the MR340

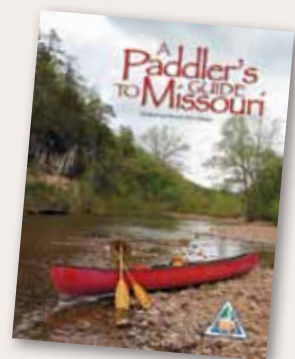
Plan Your Own Missouri River Adventure

If you are interested in floating the Missouri River for an afternoon, or even from border to border at your own, self-guided pace, visit the Missouri Lewis and Clark Water Trail website, developed by the Department of Natural Resources

and the Department of Conservation. It includes maps, tips, and other useful information for planning your Missouri River paddling adventure: dnr.mo.gov/water-trail.

Discover Missouri's rivers and streams with the updated and revised *Paddler's Guide to Missouri*. Detailed sections include northern streams, the Missouri River, and floats from all corners of the

state. Each waterway includes easy-to-read maps, descriptions of access points, camping, state parks, and conservation areas along the way. Gorgeous color photographs in this new, revised edition will make you want to float Missouri's rivers soon. Available for \$8 from Conservation Department Nature Shops and online at mdcnatureshop.com.





“ I find myself going back each year not only to test myself against the river, but to paddle with my amazing river tribe and push myself to extremes seldom explored in daily living.



once because it seemed too insane, too irrational, too, well, right up my alley. My first year, I signed up two weeks before the race and showed up in a borrowed boat. I have been fortunate enough to finish each year since. Now I've just finished my fourth MR340 race. I found out early on that my place in the race is squarely in the middle of the pack — but no matter.

I find myself going back each year not only to test myself against the river, but to paddle with my amazing river tribe, and to push myself to extremes seldom explored in daily living. The MR340 reminds parts of me lying dormant that there are still rivers, indeed deep parts of myself, that remain unexplored, and that pondering unfathomable questions on endless rivers is sometimes better than finding the answers we seek.

What is it all for? Entering the race, let alone finishing it, is not about one thing — it's about surviving the early morning wisps of fog-shrouded doubt, it's about feeling the slow, almost imperceptible, warmth of the day start to build at dawn, it's about embracing the hope to be found before the day's headwinds awaken from their nightly slumber, it's about facing the moments of despair on 108-degree afternoons, the moments of bewilderment that are soon followed by unexpected deep resur-rection, when new-found reserves of mental and physical strength emanate from behind dusty, forgotten doors.

The author, celebrating with his kids, finished last year's MR340 race in 79 hours and 25 minutes, placing him 126th out of nearly 400 paddlers.

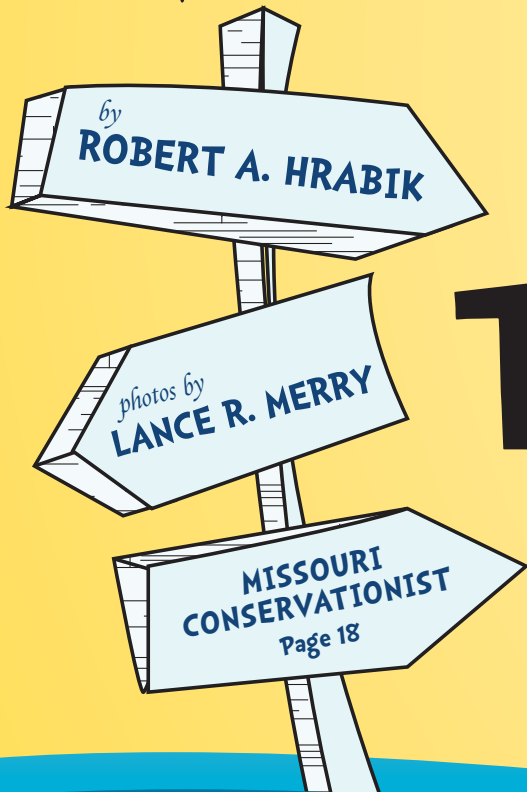
Focusing on simple tasks such as paddling, breathing, hydration, calories, and pace with no distractions from the outside world can be a very liberating experience. The race is about all of that. Not one thing, but many — the chance to face all that is 'to be alive' in a beautiful setting among friends. ▲

Brett Dufur is an editor for the Conservation Department and also guides on the Missouri River. This month he will be competing in his fifth MR340 race.



Say!

What a Lot of Fish There Are.



From there to here, and here to there,
orangethroat darters are everywhere.

Dr. Suess had it right. His famous children’s poem *One Fish Two Fish Red Fish Blue Fish* taught us life lessons about diversity and wonder and that no matter our size, shape, or color, all things are important. This certainly is true of the small, nongame fishes of Missouri, which can also be “*black fish, blue fish, old fish, new fish.*”

About 225 fish species can be found in Missouri. They range in size from giant sturgeons, paddlefish, and catfishes, which may grow to more than 100 pounds in weight, to tiny species, some barely over an inch long (and given appropriately descriptive names like banded pygmy sunfish and least darter).

Most of Missouri’s fishes are rather small and inconspicuous, and they go unnoticed by the casual observer. This is unfortunate, because these are some of the most interesting examples of our fish fauna.



Some Families Have It All


Darters are arguably some of the most colorful and strikingly beautiful of Missouri’s fishes.

They are the smaller members of the perch family, Percidae, which includes the more familiar and sought-after walleye, sauger, and yellow perch. Among the darters, one group in particular is both showy and of great interest to taxonomists (those who study the classification of organisms) and ecologists (those who study the relationship of the organism to its environment); this group is known as the orangethroat darter complex or species-group.






We call this group a “complex” because the populations are closely related, often looking quite similar to one another. Only through careful examination of individual charac-





 teristics (color, pigment patterns, scale counts, body proportions, etc.) and observation of habits (habitat selection, reproductive behavior, etc.) can scientists separate them into bona fide species.

Orangethroat darter and closely related relatives make up a few of the more than 40 darter species known to Missouri. Accurately identifying many of these darters requires some time, patience, and familiarity with fish taxonomic keys. But as the common name of this species-group implies, they all have bright orange gill membranes (the approximate “throat” region) and in some populations the orange color may extend onto the head.




In general, members of this group live in riffles in headwater streams where they are sometimes the only or the most abundant darter. They can be found in medium-sized streams too, usually near riffles or in shallow, gravelly shoals and may occur near populations of rainbow darters (*E. caeruleum*). These two species-groups look similar, possessing a kaleidoscope of colors and bluish bars laced with shades of oranges and reds. The easiest way to tell them apart is in the spring when in breeding colors. Rainbow darter males have red on the membranes of the anal fin while orangethroat darters and their relatives typically have solid blue anal fin membranes. When these species occur in the same stream, rainbow darters are usually more abundant in the larger reaches and in deeper, swift currents, usually over riffles.

Orangethroat Name Game

The orangethroat darter was formally described in the scientific literature from the Osage River, Missouri, in 1854. The scientific name of the

Some people call many sunfishes “perch,” but only one sunfish (family Centrarchidae) has a common name that includes the word perch — the Sacramento perch, which is native to the western United States. The perch family differs from the sunfishes in having only one or two anal fin spines, while sunfishes and other closely related families have three or more anal fin spines. Freshwater drum (family Sciaenidae) also has two anal fin spines, but the first spine (the one positioned forward or toward the head of the fish) is very short. In perches, if two spines are present, they are similar in length.



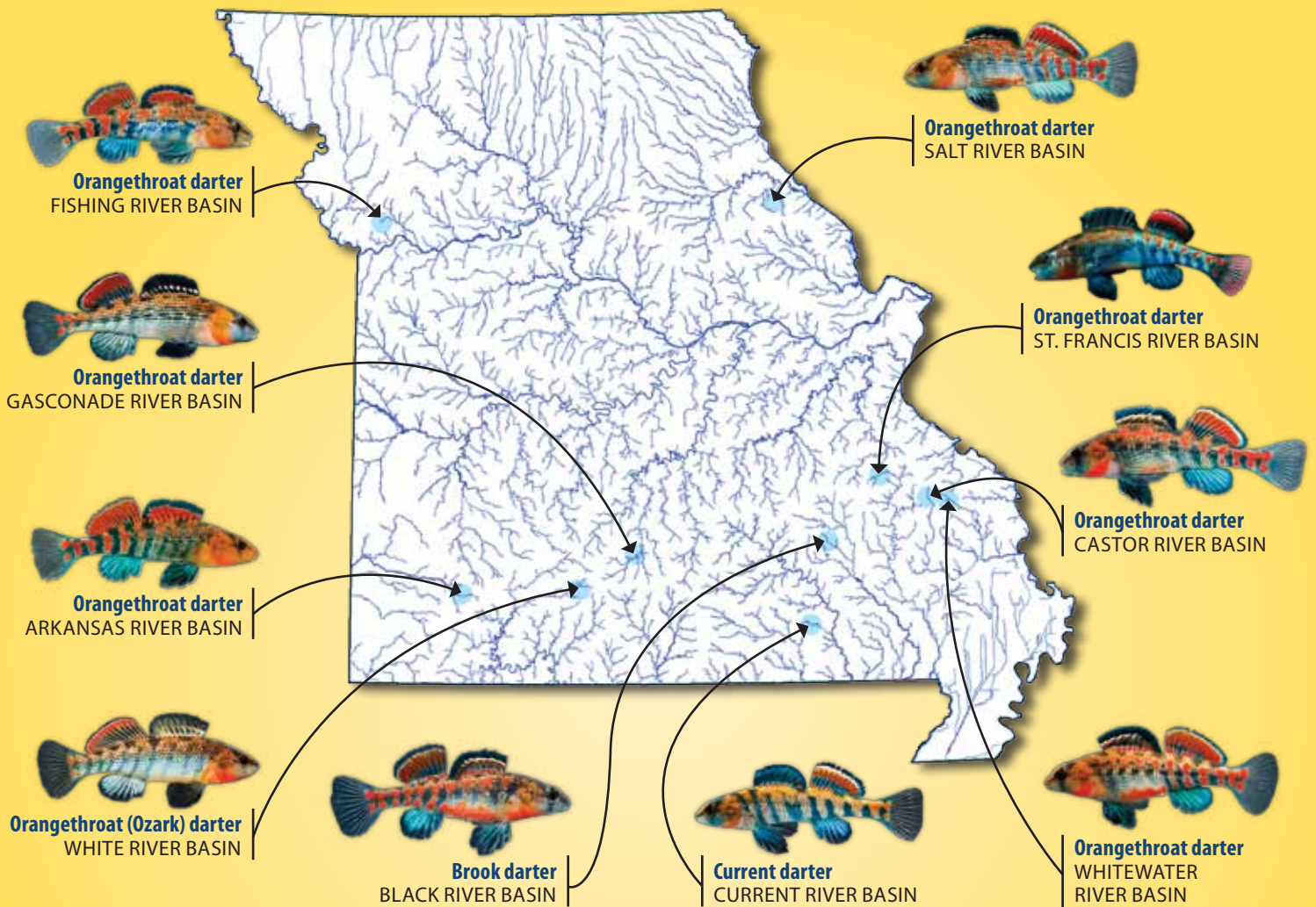
nominal species is *Etheostoma spectabile spectabile*. As other populations of “orangethroat” darters were later discovered they may have been described as a different species, but the prevailing naming convention and the lack of formal taxonomic descriptions ultimately required that these populations all be named *E. s. spectabile*. This was the status quo until the 1960s, when a researcher formally recognized five subspecies, three of which were known from Missouri. One of those has been described as a separate species, the current darter (*E. uniporum*; see the map on Page 21). Later, the orangethroat darter from the Black River system was named brook darter (*E. burri*). At present, one other orangethroat darter is being recognized as a different species. It is known from the White River system and is being called the Ozark darter, although a formal description has not yet been published. Judging from the images in the figure, it is certain that other orangethroat darter populations will eventually be raised to the species level.

Small Size, Big Role

So why should we care about darters, in general, and specifically the orangethroat darters? Darters are a wonderfully diverse group of fish. They have evolved and radiated into a myriad of aquatic habitats that includes lakes and streams, wetlands and swamps, and even in big, deep, and muddy rivers. They occupy specific habitats within these larger macro-habitats, and as part of the larger functioning of the ecosystem, they utilize resources and in return they are used as resources themselves (i.e., they may be used as food for other aquatic and semi-aquatic animals).

Darters have evolved and radiated into a myriad of aquatic habitats that includes lakes and streams, wetlands and swamps, and even in big, deep, and muddy rivers.

The orangethroat darters of Missouri and the drainages from which the images were taken. Shown are males in breeding colors (typical for March–May).



The orangethroat darters, in particular, have managed to spread across and exist in Missouri for a long enough time to show so much diversity and color. While many populations are common, they all live in clear and typically headwater streams, thus they are excellent indicators of healthy, clean waters. Their reduction in numbers or loss from a headwater would be a strong indication that something is wrong in a particular stream.

Moreover, orangethroat darters are very attractive and easy to keep in a home aquarium. They take to a variety of standard fish foods that can be purchased at pet stores (although

I like to feed them frozen bloodworms). They often “perch” on rocks and logs and display their showy colors. Kids love them (so do adults!). Probably Dr. Suess would have loved them, too, as his poems suggested that trying new things is fun and meeting new creatures is fun, too!

Yes. Some are red. And some are blue. Some are old. And some are new. Where do they come from? I can't say. But I bet they have come a long, long way. ▲

Robert Hrabik is a fisheries programs specialist for the Department of Conservation. He lives in Oak Ridge.

In general, members of this orangethroat darter complex live in riffles in headwater streams where they are sometimes the only or the most abundant darter.

The Fuss About Catfish

Managing an important contributor to Missouri's culture and economy

by **GREG PITCHFORD**

IN THE PAST decade, the Conservation Department has invested substantial resources toward better managing and protecting Missouri's channel, blue, and flat-head catfish populations. During that time we have learned a lot about how to sample catfish, how fast they grow, how much and when they move, and how many are harvested. We have much yet to learn. However, some people have asked, "Why all the fuss?" These are just some of the many reasons.

Missourians and visitors to our state spend a lot of time fishing for catfish. Surveys conducted by the U.S. Fish and Wildlife Service show that anglers spend more than 15 million days and more than \$1 billion annually fishing in Missouri. As a group, catfish were the fish anglers most wanted to catch.

Catfish, especially large individuals (20 pounds and more), are the top predator in many of Missouri's rivers and streams. Top predators help control the populations of other fish species, including invasive species that are threatening our outdoor heritage. In Missouri, it often takes longer than a decade to produce a large catfish.

Many freshwater predators that fight hard are not preferred table fare. There is also a strong catch-and-release ethic when dealing with species such as largemouth bass, smallmouth bass, or muskies. Large catfish are unique. They not only fight hard, but also taste good. There is a strong harvest tradition among catfish anglers.

Missourians are good, and are getting better, at catching catfish, especially big ones. Techniques and places that were once mysterious and hidden are now shared openly through social media and other technologies. Anglers are able to quickly learn a skill that used to take years to acquire. This puts more pressure on large catfish that make up a small but important part of the population.

The memories of catching a large catfish and the meals shared with family and friends connect us to the outdoors and one another.

Catfish are part of a public trust that was inherited from previous generations, and the Department has been charged with their protection and management. Missourians expect that inheritance to be managed conservatively with the intention of passing it on, with interest, to future generations.

Catfish are an important part of Missouri's culture and economy. As with all public trust resources, they must be managed conservatively with an eye toward future generations. This means that the Department will continue to learn more about catfish, and we will always take the conservative approach to management and related regulations.

The good news is that, in most places, there are plenty of catfish. But there is increasing pressure directed at the largest individuals that are most valuable socially, economically, and often ecologically. Our efforts to manage catfish must recognize and adapt to these changes.

Why all the fuss about catfish? Missourians both now and in the future deserve nothing less. ▲

Greg Pitchford has been a Department of Conservation fisheries management biologist in Chillicothe for 22 years.







White-tailed deer



BREAKING DOWN the HEMORRHAGIC DISEASE **OUTBREAK**

Understanding the deer virus of 2012

by **EMILY FLINN** and **JASON SUMNERS**

THE 2012 DEER SEASON MIGHT ALREADY BE A DISTANT memory; however, your next deer season may benefit from observations made during 2012–13. In 2012, more than 10,000 suspected hemorrhagic disease (HD) cases were reported, from all 114 counties, to Conservation Department staff, but the actual number of cases is unknown, and the severity will vary locally. To understand how and why this is the case, you must know a little more about the disease.

Understanding the Disease

Hemorrhagic diseases include both the bluetongue and epizootic hemorrhagic disease (EHD) viruses. Although the majority of confirmed-infected deer had the EHD virus, the bluetongue virus was also detected in Missouri. These viruses have indistinguishable symptoms, so we group them together for simplicity and refer to them as hemorrhagic diseases, or HD. Symptoms can appear similar to other diseases that affect deer, including chronic wasting disease (CWD). Therefore, it is important to notify the Conservation Department when sick or unexplained dead deer are found.

Hemorrhagic diseases are expressed in three different forms, with each causing a variety of symptoms. The three forms of HD are peracute, acute, and chronic (not related to chronic wasting disease) and dictate the length that a deer can survive. The peracute form progresses rapidly and causes death within a week after infection, which is the quickest of the HD forms. This form can cause swelling,



Both peracute and acute forms of hemorrhagic disease can cause deer to become lethargic, lose fear of humans, and develop a high fever.

or edema, when fluid accumulates in the head, tongue, neck, and lungs. Therefore, deer that die due to the peracute form often appeared healthy with very few clinical signs.

The acute form causes death within one to two weeks and symptoms include swelling and bleeding, or hemorrhages, throughout the body, including heart, rumen (portion of the stomach), and intestines. Sores, or ulcers, can also form on the deer's tongue, dental pad (front portion of the roof of the mouth) and portions of the stomach. Both peracute and acute forms can cause deer to become lethargic, lose fear of humans, and develop a high fever. It is this fever that causes deer to seek relief in the form of water, but as the infection progresses they become disoriented and lose coordination, often dying in or in close proximity to these water sources. Research suggests that approximately 85 percent of the deer in Missouri that contract HD will have either the peracute or acute form.

Although the chronic form of HD is less common in Missouri, it can become more noticeable during widespread, intense outbreaks such as that seen in 2012. The chronic form is unique in that deer survive the HD virus, but the resulting tissue damage and secondary infections can lead to death. For example, if a deer survives the HD virus, but experienced rumen damage, then this can inhibit the proper digestion of food, causing the deer to eventually starve to death. However, HD is not always fatal, as some deer can survive HD and secondary infections, with the only remaining evidence being the occasional growth interruptions or sloughing of hooves. Does that survive the HD virus will pass maternal antibodies to their offspring the following year which adds a level of immunity to the population.

Life Cycle of HD

Hemorrhagic diseases are spread primarily by a biting midge in the genus *Culicoides*, which



High fever causes deer to seek relief in the form of water, but as the hemorrhagic disease infection progresses they become disoriented and lose coordination, often dying in or in close proximity to these water sources.

are commonly referred to as “no-see-ums” due to their small size (much smaller than mosquitoes); however, there are likely other unknown vectors of transmission. Midges can transmit the HD virus to a deer (or the virus can be transmitted to a midge) when the female midge bites a deer for a blood meal, which is used to produce eggs. The eggs are laid in muddy areas and once they become larvae, they live within shallow water. As they mature they leave the water, develop wings, and complete the life cycle when they begin to breed. The life cycle of a midge is approximately 4–5 weeks, so as the summer progresses, the midge population can grow exponentially.

Theoretically, once a hard frost kills the adult midges, deer cannot become newly infected with HD because deer can only contract HD from the bite of a midge. However, warm spells after the first frosts can cause midge activity to continue, potentially allowing the virus to be spread to additional deer. Also, chronic forms of HD can cause mortality well into the winter. The Department of Conservation received reports of dead or sick deer that were typical of chronic HD into March of 2013. It is reassuring to know that the virus dies very quickly (less than 24 hours) once a deer dies, therefore, carcasses do not pose a threat for spreading HD. Additionally, the virus is only viable within a deer’s bloodstream for 50 days, with peak virus activity within a

deer occurring between days four and 10, so an infected deer is unlikely to be a permanent reservoir for the disease in Missouri.

One question remains: How and where does the HD virus survive over winter? While there are several theories, none have been proven.

Implications for Humans and Other Wildlife

Hemorrhagic disease is not infectious to humans or non-ruminant animals like dogs and cats. Therefore, the virus itself poses no threat to humans. However, secondary infections in deer arising from the effects of the HD virus can pose human health risks if consumed or improperly handled. This provides further justification for normal precautionary measures to be taken when field dressing, butchering, and preparing venison to reduce any potential health risks. The Department of Conservation recommends not consuming venison from known diseased animals.

While infrequent, domestic ruminant species, like cattle and sheep, can become susceptible to specific HD viruses dependent on the animal species. For example, cattle can exhibit varying severity of symptoms from either EHD or bluetongue, but it is infrequent. However, domestic sheep are generally unaffected by EHD, but bluetongue can have serious health implications.

Weather Intensified the Outbreak

The intensity of the 2012 HD outbreak in Missouri was a result of several weather conditions.

If a deer survives the chronic form of the hemorrhagic disease virus, but experienced rumen damage, then this can inhibit the proper digestion of food, causing the deer to eventually starve to death.



While it is only a theory that warm winters allow the virus to be maintained from one year to the next, the 2011–12 winter was the third-warmest winter on record in Missouri. In March of 2012 the rainfall was slightly above average, causing the ponds and other water bodies to fill with water, which would provide ample breeding area for midges during the summer. Plus, March 2012 was the warmest on record at 14 degrees warmer than the long-term average! This warm weather continued, making the 2012 spring the warmest on record and likely causing midges to become active much earlier than normal.

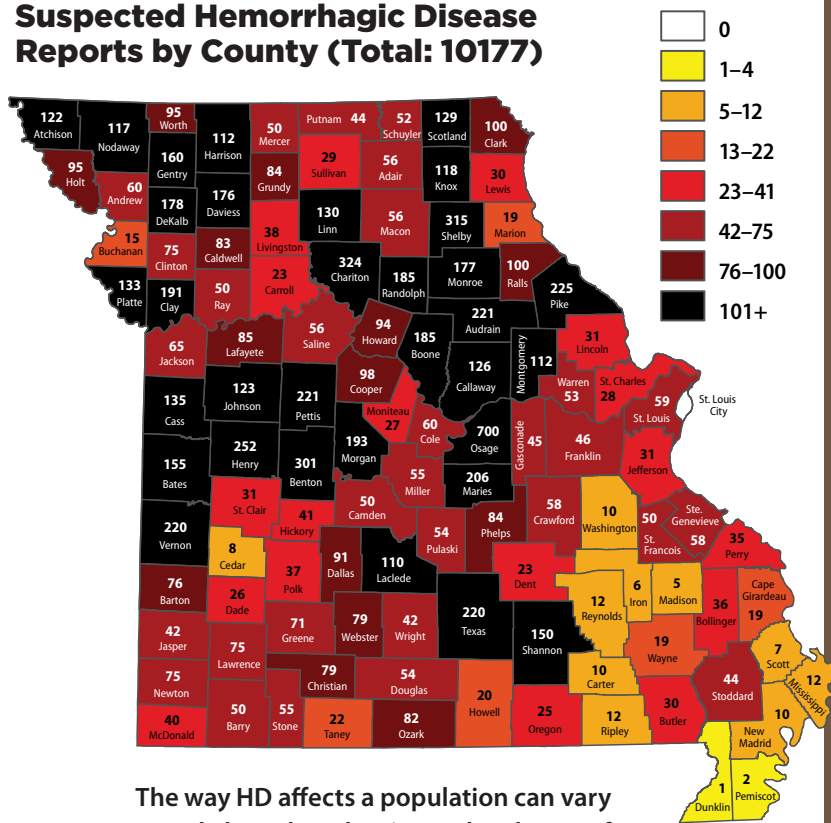
Weather extremes continued into the summer with a combination of record heat and drought conditions, causing ponds and other water sources that filled up during early spring to dry up. The exposed mud flats created the ideal breeding areas for midges. The drought conditions also caused deer to visit these water sources more often because of lower water

content in the plants they consumed and fewer free-standing water sources. Furthermore, nitrification of these sites because of livestock loafing in small ponds results in increased midge production. Additionally, both deer and midges are most active at dawn and dusk, further increasing the chance of contact.

But, it doesn't stop there — warmer temperatures cause female midges to lay more eggs, thus producing more midges. For example, females produce about 22 eggs at 50 degrees, but when the temperatures increase to nearly 90 degrees, females produce 100 to 200-plus eggs! Additionally, the virus replicates quicker in warmer temperatures, increasing the chances of virus transfer when a midge takes a blood meal.

However, even with all that information we cannot reliably predict when and where an HD outbreak will occur because these conditions do not cause HD, but rather intensify an outbreak. Even if we could predict an outbreak, there are no proven actions that can protect a deer from contracting the virus.

Suspected Hemorrhagic Disease Reports by County (Total: 10177)



The way HD affects a population can vary greatly based on the size and make-up of the population and severity of the outbreak.

Realistic Prevention?

While there is no way to completely protect deer from hemorrhagic diseases, there are a few management practices that could possibly reduce contact rates between midges and deer. These management practices are not absolute and effectiveness is dependent on the prevalence of HD in the area, size of your property, home range of deer in your area, and management on surrounding properties. However, after seeing the potential impact that hemorrhagic diseases can have on an area, these practices might be worth considering.

The most promising efforts for reducing potential contact between midges and deer are practices that reduce favorable conditions for midges around water and minimize unnecessary visits for deer to water sources. Efforts that promote vegetation surrounding water sources decrease the amount of mud flats that are exposed during droughts, thus reducing midge breeding areas. Also, fencing off livestock from ponds is an ideal practice because livestock ponds are perfect breeding areas for midges. This is because livestock remove surrounding vegetation, thus exposing more mud, and excrete in the water and surrounding area, fur-



ther increasing nutrient levels. While landowners have good intentions when placing feed or salt near water sources during the summer, this can cause deer to visit these water sources more often, increasing the probability of encountering midges. Most insects are unable to survive in water with high salt content; however, midges are the exception. Therefore, salt blocks near water can eliminate the majority of other insects, thus reducing competition for midges. The removal of salt and feed near water sources can reduce the risk of a deer encountering midges.

While preventative measures might have some affect on the severity of the outbreak in a local area, post-outbreak management efforts, such as assessing local conditions and adjusting doe harvest as appropriate, is the most critical.

Population Effects

The way HD affects a population can vary greatly based on the size and make-up (i.e., sex ratio) of the population and severity of the outbreak, which is often not fully expressed in changing harvest until two to three years following an

outbreak. Typically, the year following an HD outbreak hunters harvest the same number of deer as before the outbreak resulting in a greater proportion of deer being removed from the population because the pre-season population has already been reduced due to hemorrhagic mortality, thus leading to population declines. The declines will likely be intensified due to the record-low acorn crop, subsequently making deer more vulnerable to harvest in heavily forested areas. Alternately, in some areas where local harvest rates are typically low, the additional HD mortality will have little affect on long-term population size.

In next month's *Conservationist*, we will discuss the potential population effects of the 2012 hemorrhagic disease outbreak, along with other factors that are influencing regional deer population trends. ▲

Emily Flinn and Jason Sumners are statewide deer biologists for the Department of Conservation and work at the Central Regional Office and Conservation Research Center in Columbia.

Hemorrhagic disease is not always fatal, as some deer can survive hemorrhagic disease and secondary infections, with the only remaining evidence being the occasional growth interruptions or sloughing of hooves.

Gray Fox

Nocturnal and secretive habits make this stealthy animal a true delight to see in the early morning hours.

LAST SUMMER, MY friend Krista asked me if I'd like to photograph a pair of gray foxes on her property in Franklin County. Intrigued, I responded with my usual barrage of questions including, "Are you sure they're not red foxes? Do you see them in the morning or evening? Is there cover nearby that would serve as a hiding place? Have you seen any kits?" As Krista answered my questions with both confidence and patience, I determined that her gray foxes were the "real deal" and that I'd need a pop-up blind to get close enough for a shot in the open habitat she had described. I thanked her for the opportunity and made plans for the next morning.

I arrived at the property a good hour before daylight, and headed toward the pasture where Krista and her husband Matt had been observing the foxes. Before I even made it through the livestock gate I saw something moving along the edge of the field where it met a patch of woods — a fox! The gray fox (*Urocyon cinereoargenteus*) is nocturnal, so I wasn't surprised to see one foraging the tree line under the cover of darkness. I hoped I hadn't ruined my chance at seeing it again later in the morning. I hurriedly assembled my blind, with a little help from Krista's friendly horse, and dived inside to begin my stand. It was a dead calm morning in early July so it wasn't long before I was soaked with perspiration. I wasn't too concerned about the miserable conditions of my hide because I knew it would all be worthwhile when I made my first photograph of one of Missouri's most gorgeous mammals.

About 15 minutes before sunrise, a creature materialized near a deadfall that Krista had described as a favorite of the foxes. I wiped the sweat from my eye and looked through the lens to verify my suspicion. There it stood, a gray fox, watching me with huge, cartoon-like eyes, perfectly designed for its nocturnal lifestyle. It was still very early with scant light available for a sharp image. I had to make a decision to either wait for more light or try to capture the fox with a very slow shutter speed. Already on alert, I didn't expect the fox to stick around much longer so I clicked the shutter. Startled by the sound, the stunning fox with dark eyes and a rusty neckerchief gave me a raspy bark and faded back into the woods. I sat for awhile in the steamy blind before I finally mustered the courage to look at the single image on the back of my camera — a keeper.

I returned the next morning for another session and my good fortune continued as I was able to photograph the gray fox's mate. Later, I shared my success with Krista and Matt and even gave an apple to their friendly horse. We wondered where the kits might be and delighted at the difference in appearance of the adults. Once again, I was reminded of how nature has a way of bringing folks together.

—Story and photo by Danny Brown

📷 500mm lens • f/4.0 • 1/25 sec • ISO 1600



We help people discover nature through our online field guide. Visit mdc.mo.gov/node/73 to learn more about Missouri's plants and animals.



Elmslie Memorial Conservation Area

Take a small summer getaway into the trees of this heavily forested conservation area in Northeast Missouri.

FIND AN ESCAPE from the July sun in the shaded hills of Elmslie Memorial Conservation Area (CA). This 238-acre area in Marion County invites visitors to explore the rugged wood hills of northeastern Missouri, which stand in sharp contrast to the flat farmlands nearby.

To highlight the best of the area's forests, Elmslie Forest Natural Area occupies 100 acres on the south end of the conservation area. The forests here are mostly upland, with white, black, and northern red oaks and hickories predominant. Post oak woodlands and small glade openings occur on the natural area's dry, rocky ridges, and southern exposures. On steep, north-facing slopes, moisture-loving tree species such as basswood and sugar maple grow. Bottomland forest occurs along North River, which runs through the southern portion of the area for more than ¼ mile.

Visitors can familiarize themselves with Elmslie Forest Natural Area's natural communities along with the native wildflowers and shrubs that associated with them just by taking a short hike. A ¾-mile trail leads hikers on a steep yet scenic journey through the forested area and around a picturesque pond at the natural area's north end. Primitive camping is permitted except along roadways and during firearms deer and turkey hunting seasons.

Anglers can lure catfish, crappie, and sunfish with plenty of access to the clear North River. Area managers maintain a 100-foot corridor of undisturbed vegetation along the waterway to prevent erosion of the banks and to enhance the stream's natural beauty.



Wild geranium

17–40mm lens • f/14 • 1/40 sec • ISO 400

In addition to protecting the river's aquatic ecosystem, Elmslie Memorial CA managers focus especially on maintaining forest quality in the area. A timber-stand improvement project was conducted in 2008 following a selective timber harvest. After the improvement project was complete, area managers installed a 5-acre tree planting in the northwest corner of Elmslie Memorial CA. Additionally, some log decks have been converted to clover food plots to benefit area wildlife.

Elmslie Memorial CA is located 1 mile east of Warren. To reach the area, travel 1.5 miles south on County Road 229 from Route C in Warren. As always, for more information about Elmslie Memorial CA including a brochure and map of the area, visit the website listed below.

—Rebecca Maples, photo by Noppadol Paothong



Recreation opportunities: Bird watching, fishing, hiking, hunting in season, primitive camping

Unique features: This area features diverse forest types including trees suited to upland, bottomland and dry, open forest communities, highlighted in a designated natural area.

For More Information Call 573-248-2530 or visit mdc.mo.gov/a6918.

Kids in Nature

6

Simple Ideas
for Family Fun

July 29 is the night of a new moon, or when the moon is not visible. Lay on a blanket outside to look at the stars and listen to the sounds of nature.



Millstream Gardens Conservation Area in Madison County

Take the Governor's **100 Missouri Miles** challenge. It's time to lace up your shoes, air up those bike tires, dust off the paddles, and hit a trail near you. Governor Nixon is challenging Missourians to complete 100 miles of outdoor physical activity by the end of the year. Whether you run, walk, bike, paddle, or roll, everyone can participate. Visit 100missourimiles.com to learn more.

Listen for dog-day cicadas.

Build a **bath for birds**. Anchor an old cake pan with some rocks under a tree, and pour in about an inch of water. The birds will have the tree to fly into for safety, and you will have a great way to watch them clean up. Remember to change the water daily to keep it mosquito free.



Purple finch

Kids in Nature Photo Contest!

Break out those cameras and send us your best images of you and your family enjoying the outdoors for our new photo contest. Once again, we will be accepting entries via the online photo sharing service, Flickr. If you are not a member of Flickr, it is easy and free to join. Once you are a member, just navigate to our kids in nature group page: www.flickr.com/groups/mdc-kids-in-nature and submit your photos. MDC staff will select a winner every month and display at mdc.mo.gov/node/20869. All of the monthly winners will appear in the January 2014 issue of the magazine.



Join in on nature's feast in July by going **blackberry** picking.

Watch for fledgling birds, but do not disturb them.



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I Am Conservation

Win Stevens of Climax Springs has been a hunter education instructor since 2007. He is one of the first certified bowhunter education instructors in Camden County and one of the first African-American hunter education instructors in Missouri. "I never had hunter education when I was growing up, and I sat through a class with my son and realized that there weren't any black instructors," said Stevens. "So, I decided to get certified. The outdoors is not about being white or black. It's for everyone. So it is important to show people that anyone can enjoy the outdoors." Stevens also has been active in angler recruitment programs with the Department for several years. He grew up in Washington, Mo., where his father introduced him to hunting and fishing at a young age. He passed along the tradition to his two sons, and now hopes to continue the tradition with his four grandchildren. "My two granddaughters, ages 7 and 5, are starting to fish and want to hunt with their grandpa," he said. Stevens moved to Camden County in 2007 where he loves to pursue bass and crappie on the Lake of the Ozarks and enjoys all types of hunting. —*photo by David Stonner*