

MISSOURI

VOLUME 82, ISSUE 6, JUNE 2021
SERVING NATURE & YOU

CONSERVATIONIST





When was the last time you connected with nature?

Spending time in nature, including conservation areas, urban parks, and in green space, can ease stress levels. Just 20 minutes outside can give your brain an energy boost comparable to a cup of coffee. Let nature — which is free and close by — be your go-to for self-care and health.

It's time to make that connection again, and **Never Lose Touch**.



For ways to reconnect with nature, visit mdc.mo.gov/NeverLoseTouch.

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Yellow lady's
slipper

MISSOURI
CONSERVATIONIST



ON THE COVER

Black trumpet mushroom

📷 **NOPPADOL PAOTHONG**

100mm lens, f/16

2.5 sec, ISO 100

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Inbox



Letters to the Editor

Submissions reflect readers' opinions and may be edited for length and clarity. Email Magazine@mdc.mo.gov or write to us:

MISSOURI
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APRIL COVER
Kudos to Noppadol Paothong for the image on the cover of the April issue. Love how the camera settings and lenses used are provided with the photos [Page 1].

James M. Cobb
St. Peters

READY TO READ

I have a 5-year-old great-grandson who loves your magazine. He asks his dad every day if it is time for it to come. He keeps it with him all the time, even when he goes to bed, and brings it to his 84-year-old great-granny to read to him.

Cash Crump New Bloomfield

SAVE THE TREES

I have read your magazine for many years and enjoy it very much. I especially enjoyed the March issue about trees [*The Mighty Ones*, Page 10]. I, like Sara Parker Pauley, love the poem *Trees* by Joyce Kilmer and memorized it years ago [*Up Front*, Page 3]. Please help us conserve our old trees. Thank you for all you do.

Tree Lover Gentry

GENERATIONAL GIFT

I can't tell you how much I enjoy your monthly magazine. My grandmother Cora signed us up for your magazine when I was about 13 years old. You sure have come a long, long way. I am now 78 and get the pleasure of signing up my three wonderful grandchildren. Thanks for bringing great knowledge and pleasure to all of us.

Norman Hug O'Fallon

IS IT INVASIVE OR NATIVE?

I really enjoy your magazine! In your April 2021 issue, you wrote about the invasive Callery pear [*Missouri's Least Wanted*, Page 8]. In trying to be a good steward of my woods, I wanted to remove this invasive. When the tiny white flowers appeared in late March, I cut down several trees and marked several others for removal. After having second thoughts, I did some research and found that the native wild plum is very similar. I may have cut some wild plum by mistake. They are so similar that I'm



Invasive
Callery pear



Native
wild plum

still not sure how to tell them apart. Note to self: Research and be sure before you cut. A chainsaw is not a reversible tool.

Jeff Goris Licking

We are glad you are taking action to manage and control invasive pears. The invasive Callery pear has white petals that are rounded and close together; its flower stamens are not longer than the petals; and the flowers are unpleasant smelling. Also, look at the overall growth shape of the tree. If it's more oval or cylindrical with a "typical" symmetrical shape, then it's likely an invasive pear. Our native trees are less uniform in shape, or "nontypical," and tend to have odd branching patterns that make them nonsymmetrical. To help compare the two, visit short.mdc.mo.gov/ZKY. —THE EDITORS

PAPER

I've loved the *Conservationist* magazine for years. Has there ever been a conversation about printing on recycled paper versus glossy?

Joe Mosley New Bloomfield

The paper we use for printing the Missouri Conservationist is 30 percent post-consumer content, and the ink is soybean-based. There is a little symbol on the bottom of Page 3 to indicate this. The magazine has been printed on some percentage of post-consumer paper since the 1980s. It is probably important to note, just because it's glossy doesn't mean it's not recyclable. —THE EDITORS

CALLERY PEAR: DAVID J. MOORHEAD, UNIVERSITY OF GEORGIA, BUGWOOD.ORG; WILD PLUM: JIM RATHER

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Have a Question for a Commissioner?

Send a note using our online contact form at mdc.mo.gov/commissioners.



Want to see your photos in the Missouri Conservationist?

Share your photos on Flickr at [flickr.com/groups/mdcreaderphotos-2021/](https://www.flickr.com/groups/mdcreaderphotos-2021/), email Readerphoto@mdc.mo.gov, or include the hashtag #mdcDiscoverNature on your Instagram photos.



1

1 | Unusual patterned cave salamander by [smashtonlee05](#), via Flickr



2

2 | First bluegill by [Kenny Schmitt](#), via email

3 | Green milkweed by [Kathy Bildner](#), via Flickr



3

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Up Front

with Sara Parker Pauley

✳️ “You find what you’re looking for.” So said a fabulous speaker I listened to recently as he shared a story about finding a jar of nails at his mother’s house. When he asked where she found the nails, she said she tends to find them when she goes on walks. “That’s because you’re looking for nails, mom,” he noted. “Why not look for coins instead?”

After reviewing this month’s articles, I have imagined the sheer delight of taking a walk through the woods with MDC power couple, Malissa and Jeff Briggler. She is the state botanist (all things plants and that includes mushrooms — see her article on Page 10) and he is the state herpetologist (all things amphibians and reptiles — see article on snakes on Page 22). Would that not be a fun hike? Imagine what Malissa’s trained eye sees during a spring walk in the Missouri woods. Imagine those same woods, but from a different viewpoint, and you have what Jeff may see with his expert eye. They’re both seeing the treasures that nature offers — just with a different lens.

Isn’t that the gift of nature? It has so much to offer each of us with our particular interests. So, the fabulous speaker ended his talk this way: The next time he visited his mother? He found a jar full of coins. She’d changed the lens she was looking through and found treasures not seen before.

Jackpot.

SARA PARKER PAULEY, DIRECTOR
SARA.PAULEY@MDC.MO.GOV

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Printed with soy ink



Nature LAB

by Bonnie Chasteen

Each month, we highlight research MDC uses to improve fish, forest, and wildlife management.

FOREST PEST MANAGEMENT

Laurel Wilt

✳ Missouri's beloved sassafras trees face a new threat. Laurel wilt — an invasive, tree-killing disease — has been found within 10 miles of the state's southeastern border in western Tennessee.

"This disease kills sassafras as well as its close relatives — spicebush and the federally-endangered pondberry," said MDC Forest Entomologist Robbie Doerhoff.

Laurel wilt is a lethal vascular wilt disease that rapidly kills entire clumps of sassafras and its relatives. The disease is spread to new areas when the tiny, wood-boring redbay ambrosia beetle (*Xyleborus glabratus*) deposits spores of the fungus *Raffaelea lauricola* in healthy trees.

"Because nearby sassafras trees are often connected underground through root grafts, you might see entire clumps of wilted or dead sassafras as laurel wilt spreads through the roots," Doerhoff said. "Leaves may cling to affected trees for months after death."



A sassafras tree dying of laurel wilt shows reddish-brown leaves in mid-summer.

MDC Forest Entomologist Robbie Doerhoff checks a trap for redbay ambrosia beetles, which carry the fungus that causes laurel wilt.

MDC asks for help detecting signs of the tree-killing disease on sassafras

Other signs to look for are dark staining in the sapwood under the bark and tiny ambrosia beetle exit holes in the bark.

"Please be on the lookout for laurel wilt this summer," Doerhoff urged. Email photos of dying sassafras, include the location, to Forest.Health@mdc.mo.gov.

Laurel Wilt at a Glance



A microscope is needed to sort tiny redbay ambrosia beetles from other insects captured in traps.

Cause

The redbay ambrosia beetle (*Xyleborus glabratus*) and the fungus it carries, *Raffaelea lauricola*, are native to Asia. Scientists suspect the beetles first entered the U.S. around 2002 through a major shipping port in Georgia.

Treatment

None for infected trees, although research on preventative treatments is underway. Dead and dying trees should be destroyed to slow further spread of the disease.

Ecological Impact

Spicebush swallowtails and other insects, as well as many kinds of birds and mammals, use sassafras, spicebush, and pondberry as food and/or host plants.

Look for These Signs

- Sassafras leaves that rapidly wilt and turn reddish-brown in mid-to-late summer
- Entire clumps of wilted or dead sassafras trees
- Tiny exit holes in the bark
- Dark staining in the sapwood

In Brief

News and updates from MDC



Frogging is fun
for everyone!

MAKE A SPLASH THIS SUMMER

GET OUT ON
THE WATER AND
BAG BULLFROGS,
GREEN FROGS

➔ Discover nature this summer during frogging season. Beginning June 30 at sunset through Oct. 31, those with a fishing permit or small-game hunting permit may frog for bullfrogs and green frogs.

The daily limit is eight frogs of both species combined, and the possession limit is 16 frogs of both species combined. Learn more at short.mdc.mo.gov/ZZm.

The public can go frogging with a fishing or small-game hunting permit, but children 15 and under and residents 65 years and older are not required to have a permit.

The fun doesn't have to end after catching frogs. Be sure to browse tasty recipes online at short.mdc.mo.gov/Zxz.

Buy Missouri hunting and fishing permits from numerous vendors around the state, online at short.mdc.mo.gov/ZKJ, or through MDC's free mobile apps, MO Hunting and MO Fishing, available for download through Google Play or the App Store.



THANKS FOR SHARING THE HARVEST

MDC and the Conservation Federation of Missouri (CFM) thank the thousands of Missouri deer hunters who donated 238,920 pounds of venison to the state's Share the Harvest program this past deer season, including 4,787 whole deer.

MDC and CFM also thank the participating meat processors throughout the state who grind the donated deer meat into ready-to-use packages, and the many sponsors who financially support the program.

Meat-processing fees are covered entirely or in part by numerous local sponsors, along with statewide sponsors that include: Shelter Insurance, Bass Pro Shops, Missouri Chapter National Wild Turkey Federation, Missouri Food Banks Association, and MDC.

The donated deer meat goes to local food banks and food pantries to help feed hungry Missourians all around the state. To get Share the Harvest venison, contact local food banks or food pantries.

Share the Harvest is coordinated by MDC and CFM. Since the program began in 1992, it has provided more than 4.5 million pounds — including this past season's donations — of lean, healthy venison to help feed hungry Missourians.

For more information on Share the Harvest, visit CFM online at confedmo.org/programs/outreach/share-the-harvest.

APPLY FOR MDC MANAGED DEER HUNTS

Beginning July 1, deer hunters can apply online for a shot at more than 100 managed deer hunts throughout the state. Hunts are held from mid-September through mid-January at conservation areas, state and other parks, national wildlife refuges, and other public areas for archery, muzzleloading, and modern firearms. Some managed hunts are held specifically for youth or for people with disabilities.

The application period is July 1–31. Hunters are selected by a weighted random drawing. Draw results will be available Aug. 15 through Jan. 15. Applicants who are drawn will receive area maps and other hunt information by mail.

Get more information on managed deer hunts, preview hunt details, and apply starting July 1 at mdc.mo.gov/managedhunt.

Details about managed hunts can also be found in the *2021 Fall Deer & Turkey Hunting Regulations and Information* booklet, available starting in early July at MDC offices and nature centers, from permit vendors around the state, and online at short.mdc.mo.gov/ZZf.



Ask MDC

Got a Question for Ask MDC?

Send it to AskMDC@mdc.mo.gov
or call 573-522-4115, ext. 3848.

Q: What is this stuck to the prairie lizard's neck? It appeared to be a tick, but I knocked it off and couldn't get a good look at it?

→ Yes, it is a tick. Many prairie lizards will have a few ticks on them during the summer months. This is common and does not appear to affect the lizard's health.



Prairie lizard

Q: My wife and I found a small snapping turtle far from a pond or creek in Springfield. Can snapping turtles live out of the water indefinitely? How far will they travel to lay eggs?

→ Common snapping turtles (*Chelydra serpentina*) can be found in about any type of water. In urban situations, they inhabit small creeks, lakes, drainage ditches, golf course ponds, landscaping ponds, and even sewage lagoons.

Female turtles may travel considerable distances to deposit eggs. Individuals in some northern states have been documented traveling nearly a mile from a wetland to dig a nest. However, most females deposit their eggs within 55 yards of a wetland, and a good number bury

them less than 2 yards from the water's edge.

Snapping turtles seek well-drained, easy-to-dig sands and soils on open slopes. Once a female finds a satisfactory location, she digs a 4- to 7-inch-deep nest with her hind limbs. It's common for this species to lay 20–30 cream-colored eggs, which will hatch 55 to 125 days later, depending on temperature and humidity. Once that occurs, some landowners are alarmed to see so many common snapping turtles on their property. However, these young turtles disperse quickly in search of aquatic habitats, where they will spend most of their time hidden in the mud in shallow waters.



Black-bellied whistling ducks

Q: My family noticed these black-bellied whistling ducks in a pond near Belton. Is it common for these ducks to be this far north?

➔ Missouri is not historically part of this species' native range. Black-bellied whistling ducks (*Dendrocygna autumnalis*) are far more likely to be seen in Texas and Louisiana, along the coasts of Central and South America, and throughout much of Brazil. However, their population is increasing, and their range is expanding northward.

These long-legged ducks are frequently seen perching in trees

near rivers, ponds, marshes, and swamps. They tend to avoid alighting on deep water and will flee to woods if disturbed. Look for them around shallow ponds, near the trimmed grasses of lawns and golf courses, and in agricultural fields where they search for grains like corn, sorghum, and rice. They have been documented nesting in Missouri over the last five years in old tree cavities and wood duck boxes.

They are named for their high-pitched whistling calls, which can be heard at allaboutbirds.org/guide/Black-bellied_Whistling-Duck/sounds.



**Corporal
Jeff Harris**

CHRISTIAN COUNTY
CONSERVATION AGENT

offers this month's

AGENT ADVICE

Does the summer heat have you longing to get out that canoe or kayak? If so, keep a few things in mind. If taking a cooler, it must be affixed to your vessel and have a lid that seals. Floating vessels, like canoes and kayaks, are apt to tip, so this state statute is designed to keep our waterways clean and debris free. Also, a trash bag that closes must be secured to your vessel. All trash should be collected and disposed of in a proper receptacle at the end of your float. Leave our waterways better than how you found them! For more information, visit short.mdc.mo.gov/Zcn.

What IS it?

Can you guess this month's natural wonder?

*The answer is on
Page 9.*





READER SURVEY

Sharing content our readers learn from and enjoy is the magazine team's top priority. To better understand our readers, we rely on you to occasionally provide feedback, which in turn helps us deliver the best content.

Take our short reader survey online at short.mdc.mo.gov/ZzK, or scan the QR code with your smartphone.

- 1 Open the camera app from your device.
- 2 Point the camera at the QR code. The camera will scan the QR code automatically (if it does not, check camera settings to ensure this is enabled).
- 3 A notification will pop up prompting you to open qualtrics.com.
- 4 Tap the notification. This opens the URL contained within the QR code.
- 5 Take the survey to give us your feedback!



CHANTERELLE AND POLENTA FOIL PACKS

This foil packed dish really packs in the flavor. Whether you are gathered around the campfire or need a quick idea at home, this dish is sure to please. Chanterelle mushrooms are one of the most popular mushrooms in the world, and Missouri is home to four different species. Look for them in oak-hickory forests — especially after periods of extended rain.

Serves 4

INGREDIENTS:

- 2 cups fresh chanterelles
- 1 tablespoon butter
- Salt and freshly ground pepper
- 1 tablespoon extra-virgin olive oil
- 1 polenta log, purchased
- 4 sprigs fresh rosemary

CLEAN chanterelles and tear into bite-sized pieces, leaving the very small ones whole.

SAUTÉ in butter with salt and pepper to taste for 4 to 5 minutes, or until liquid has evaporated.

CUT four 12-by-12-inch squares of aluminum foil. Spread olive oil lightly on each piece and place a slice or two of polenta on foil. Top with chanterelles and rosemary sprig. Fold up foil.

BAKE over hot coals for about 10 minutes or a bit longer if you prefer the polenta edges crunchy (if at home, oven bake at 425 degrees F).



This recipe is from *Cooking Wild in Missouri* by Bernadette Dryden, available for \$16. Purchase at nature center shops or call 877-521-8632 to order. Shipping charges will apply to mailed products.





GO FISHING FOR FREE

Get hooked on fishing through MDC's Free Fishing Days June 12 and 13. During Free Fishing Days, anyone may fish in the Show-Me State without a fishing permit, trout permit, or trout park daily tag. Free Fishing Days is an annual MDC event that takes place statewide during the Saturday and Sunday following the first Monday in June.

Aside from not needing permits, other fishing regulations remain in effect during Free Fishing Days, such as limits on size and number of fish an angler may keep. Special permits may still be required at some county, city, or private fishing areas. Trespass laws remain in effect on private property. Fishing permits are required before and after June 12 and 13 unless an angler is exempt by age or other factors. All other fishing regulations are also in effect.

For information on Missouri fishing regulations, fish identification, and more, get a copy of *A Summary of Missouri Fishing Regulations* where permits are sold, or online at short.mdc.mo.gov/Zq3.

MDC's MO Fishing app can help anglers find the best places to fish in Missouri, access regulation information, identify fish by species, and more. Learn more at short.mdc.mo.gov/ZJZ.

FINAL CWD RESULTS FOR 2020-2021 SEASON

MDC completed the monitoring, management, and testing efforts for the 2020-2021 chronic wasting disease (CWD) surveillance year. From those efforts, more than 15,300 tissue samples were collected from mostly hunter-harvested deer for CWD testing. MDC confirmed 44 new cases of CWD from the deer tested.

The new findings bring the total number of CWD cases in the state to 206. MDC has tested more than 152,300 deer since the first cases of CWD were found in free-ranging deer in Missouri in 2012.

Of the 44 new cases, two were found in Putnam County and one in Pulaski County, both of which had no previously known cases of CWD.

The 44 new cases of CWD were found in the following counties: Adair (2), Franklin (5), Jefferson (5), Linn (6), Macon (5), Oregon (3), Polk (1), Pulaski (1), Putnam (2), St Clair (1), Ste Genevieve (12), and Stone (1).

We thank the thousands of hunters who brought their harvested deer to our locations for CWD sampling and testing. We also thank the more than 150 partnering taxidermists and meat processors throughout the state who sampled over 9,300 hunter-harvested deer this year for CWD testing.

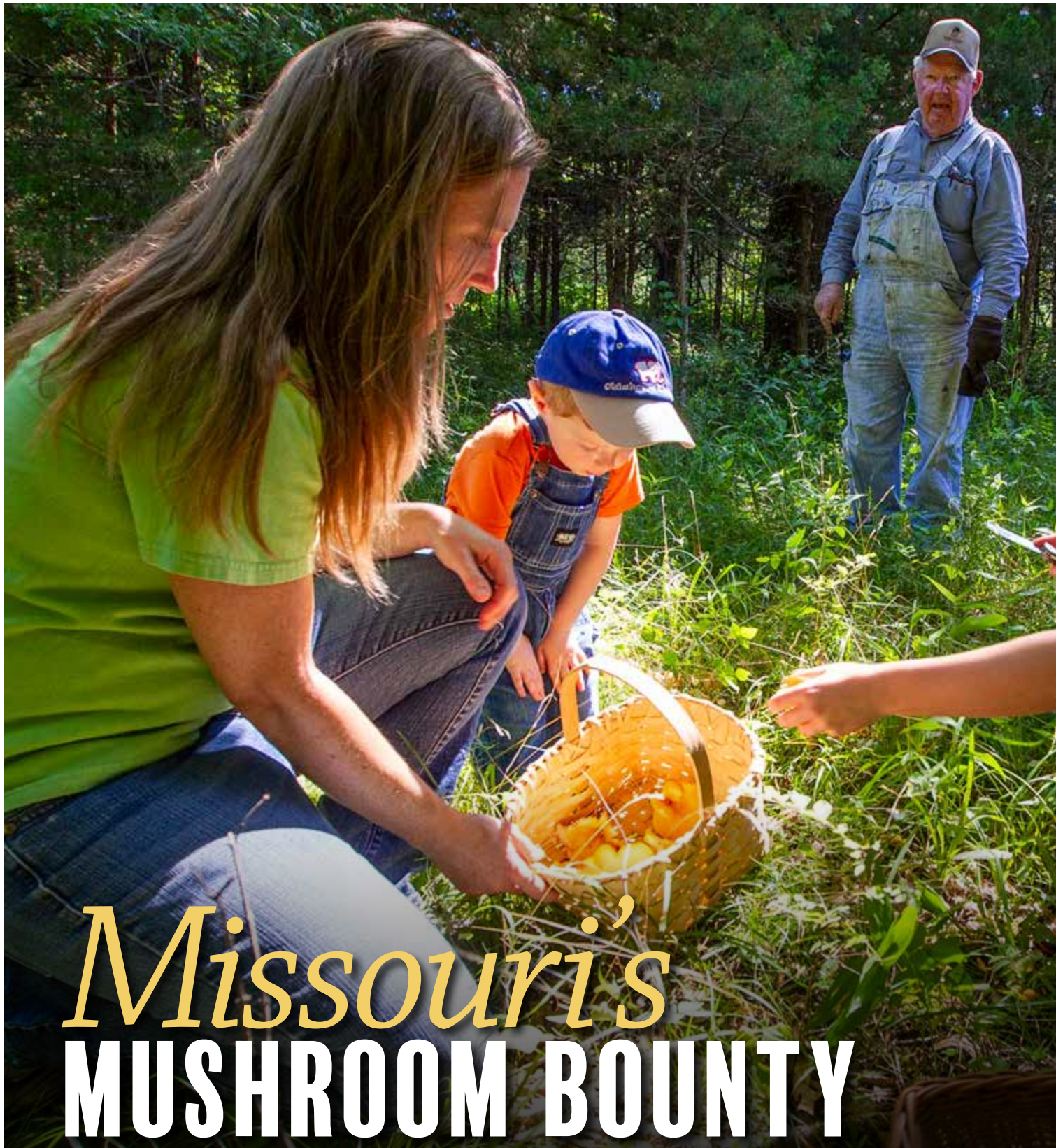
We also thank the more than 1,500 landowners in areas where CWD has been found who voluntarily signed up to participate in our post-deer season CWD management efforts. Cooperatively, landowners and our staff in these areas harvested an additional 2,713 deer after the close of the deer season, removing an additional 18 CWD-positive deer.

All deer harvested through the post-deer season CWD management efforts that did not test positive for CWD were either returned to the landowner or donated to local food pantries through the Share the Harvest venison-donation program. More than 80,000 pounds of venison were donated to Share the Harvest from last season's efforts.

WHAT IS IT? SIX-SPOTTED TIGER BEETLE

The six-spotted tiger beetle is probably the most familiar tiger beetle in Missouri. It's most often seen in spring, as it darts in and out of trails just ahead of hikers. Its shiny green color makes it easy to spot, but its fast-running, fast-flying behavior also make it distinctive. This beetle, a subtribe of tiger beetles called "flashy tiger beetles," has six legs and strong pincers at the mouth.





Missouri's **MUSHROOM BOUNTY**

A BUFFET BEYOND MORELS
by Malissa Briggler



Jimmy Wekenborg enjoys seeing his family harvest mushrooms from the family farm in Callaway County.

PHOTOGRAPH BY DAVID STONNER

AS A BOTANIST, I am often asked what a particular plant is “good for.” Could it cure headaches or toothaches, perhaps help an upset stomach, or treat wounds. Sometimes people are more interested in wildlife or landscaping uses. People want to know if a plant will attract birds and butterflies, if it is beneficial to deer and turkey, or easy to care for in a flower bed. People often question the origin of a plant species and show concern for potential invasive tendencies.

Part of my job is to step outside my familiarity with the plant kingdom and identify macrofungi (fungus that produces mushrooms). Beyond knowing the name of a mushroom, there is almost always only one of two questions that follow: “Is it edible?” or “Is it poisonous?” Aside from identifying the optimists from the pessimists, these questions clearly show most interest in mushrooms is related to consumption and its aftermath.

I was once more on the pessimistic side, probably due to what I was told as a child. Upon encountering any mushroom, I’d usually hear someone tell me not to touch it since it might be poisonous. This led to a long-term belief that simply touching a mushroom could result in poisoning myself. Like most kids growing up in Missouri, I was very familiar with the tasty morel mushrooms but anything else was surely poisonous. Answering questions about edible and poisonous mushrooms have laid to rest several myths I understood as a child. I’ve learned there are many other edible mushrooms that grow in Missouri that can be just as tasty as morels. Another myth is that poisoning can occur by touching mushrooms. The mushrooms we have in Missouri that cause mild to severe distress are the result of ingesting the mushroom, and not absorption through skin.

Even with these myths debunked, the underlying caution of eating poisonous mushrooms is well founded. Several mushrooms found commonly in Missouri can make a person very sick when ingested and a few are considered potentially lethal. For that reason, there are some general guidelines to follow when eating wild mushrooms.

Check and Double-Check

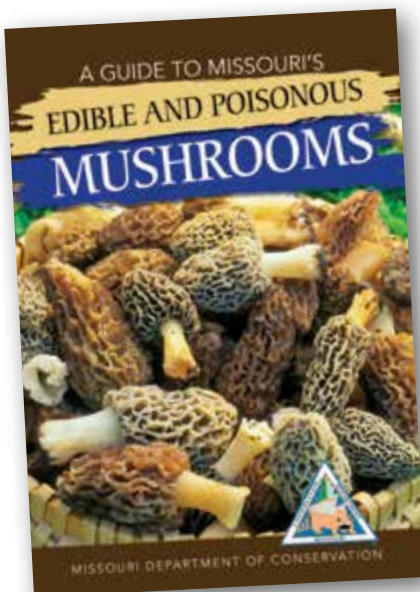
Don't rely on folk methods to determine if a mushroom is edible or poisonous. To be completely confident that a mushroom is edible, pay attention to all the features of the mushroom: the cap, stem, pore surface (where the spores are released), spore color, growth habit and size, habitat, and time of year the mushroom was observed. If even just one of these features does not match the description of an edible mushroom, it may be a similar-looking, yet poisonous, mushroom.

Never Eat a Raw Mushroom

Wild mushrooms are not growing in a sterile environment. Cooking the mushroom first will kill any harmful bacteria that might be present. It is also a good idea to prep mushrooms by slicing them lengthwise and soaking them in salted water. This should rid the mushrooms of any insects.

Try a Small Amount First

Before you eat a new species of mushroom for the first time, cook it and try a small amount. Mushrooms affect people differently, so wait at least 24 hours before eating more. Morels are a well-known and widely enjoyed edible mushroom, yet they can cause illness for some people. Be sure you do not have an adverse reaction to a species before consuming more than a small amount.



← To be safe, always be certain of your mushroom identification before consuming. For more information, consult *A Guide to Missouri's Edible and Poisonous Mushrooms* at short.mdc.mo.gov/ZNf.

Mushrooms are safe to handle and a fun way to learn and explore.



Beyond morel season, mushroom hunting continues for tasty chanterelles.

Edible Mushrooms THROUGHOUT THE SEASONS

Many people are surprised at the variety of edible mushrooms found in Missouri. For most, mushroom hunting is an activity that goes along with spring turkey season and crappie fishing. But there are rewards for those willing to venture into the woods on hot and humid days of summer, as the first shades of fall leaves arrive, and as flakes of the first snow begin to fall.

Summer Mushrooms

Chanterelle mushrooms are shaped like small funnels or trumpets with wavy cap edges. Most are bright orange or yellow, although one type is a reddish-orange color. Some fresh chanterelles have a pleasant, fruity fragrance. To make sure you have a chanterelle, cut the mushroom in half lengthwise to reveal the center part of the mushroom. Chanterelles will be completely white in the center. They do not have true gills. Instead, they have a network of wrinkles or gill-like ridges running down the stem. The ridges have many forks and cross veins and are always blunt-edged, unlike true gills, which are sharp-edged and knifelike. They range in size from ½-6 inches wide and from ½-6 inches tall.

Chanterelles are found growing on the ground in grass or leaf litter in hardwood forests during the summer and fall (May to September). They are never found on decaying wood



Chanterelle mushrooms

or trees and grow as scattered individuals rather than densely compacted clumps. Chanterelles are especially common when the weather has been hot and humid.

All chanterelle mushrooms are edible. However, there are some poisonous mushrooms that look similar. Jack-o'-lantern mushrooms (*Omphalotus illudens*) and big laughing gym (*Gymnopilus spectabilis*) are two poisonous mushrooms that can be mistaken for chanterelles. These look-alikes have true gills, orange inner flesh, and usually grow in tightly compacted clusters instead of scattered individuals. Chanterelles are susceptible to overharvest, so don't pick more than half or you might not find many in that location again.

Fall Mushrooms

There are two species of mushrooms commonly referred to as **chicken of the woods**. They both have bright orange overlapping caps that can grow up to 12 inches wide, making them one of the easiest mushrooms to spot. The caps do not have a stalk, and are flat and shelflike, with a fleshy texture. Young mushrooms have vibrant color but fade to a peach or salmon color with age. If you were to lay one of the caps on a black piece of paper for about one day and gently lift it up, the white or yellow spores will appear like powder on the paper.



Chicken of the woods
(*Laetiporus cincinnatus*)



Chicken of the woods
(*Laetiporus sulphureus*)

Chicken of the woods is found on dead or dying hardwood trees, stumps, buried roots, or living trees. They can be found in Missouri from May to November, although they most commonly occur in the fall.

The distinctive color and growth pattern of chicken of the woods makes it difficult to mistake them for any other poisonous mushroom. They can cause a mild allergic reaction (swollen lips) in some people. If you're eating them for the first time, cook and try a small amount to determine if they will cause an allergic reaction.

Cook only the tender outer edges of the caps because the inner portions are tough and woody. Be sure to gather only the young, fresh mushrooms with vibrant color. As the mushroom ages and the color fades, the flavor and texture become less favorable. When cooked, this mushroom has the texture and often the taste of chicken and can be used as a chicken substitute in casseroles, enchiladas, and more.

Look at the underside color of the caps to identify the particular species — *Laetiporus sulphureus* has a sulfur-yellow color while the underside of *L. cincinnatus* will be white.

Lion's mane is a round, beardlike mushroom that is an unbranched mass of long, hanging, toothlike spines. They may grow quite large, as much as a foot across with each spine ½ to 2 inches long. Also known as bearded tooth, this mushroom is white when young but yellows with age. They are found growing on trunks of living hardwood trees and on fallen trees and logs in Missouri from August to November.

Only young, white specimens should be eaten; older, yellowed ones are sour. Although they are a distinctive mushroom, **comb tooth** (*Hericium coralloides*) is a closely related and similar looking species but is more open, with branched spines. Fortunately, comb tooth is also a good edible when young and white.

POISONOUS MUSHROOMS ☠

Green-Spored Lepiota

These large, common mushrooms often appear in fairy rings on suburban lawns and cattle pastures. Perhaps due to their similar appearance to the mushrooms sold in grocery stores, they are one of the most commonly eaten poisonous mushrooms. Green-spored lepiotas cause violent gastrointestinal upset, including vomiting and diarrhea severe enough to require hospitalization.

False Morels

False morels have also been called red morels, elephant ears, Arkansas morels, and elfin saddles. They should be considered poisonous, although many people have enjoyed eating them and some even consider them a favorite edible wild mushroom. However, false morels can cause serious illness and death. They contain various levels of gyromitrin, a toxin that when consumed, is hydrolyzed into the toxic compound monomethylhydrazine (MMH). This compound causes diarrhea, vomiting, severe headaches, and can occasionally be fatal. Because of different cooking techniques, level of toxicity, and individual sensitivities, false morels sicken some people but leave others seemingly unaffected. However, the toxin is known to accumulate in the body over time, perhaps delaying effects of the toxin.



Green-spored lepiota



False morel

Year-Round Mushrooms

Two species are referred to as **oyster mushroom** and both are edible. *Pleurotus ostreatus* is pale to dark brown and favors cooler weather in the spring and fall, while *P. pulmonarius* is white to pale tan and appears in the warm summer months. They are gilled mushrooms with a stubby, off-center stalk. The cap is 1 to 8 inches wide, semicircular to elongated like an oyster and is smooth, sometimes wavy on the edges. The gills are narrow, and their attachment descends along a short, thick stalk.

Oyster mushrooms are always found growing on wood in overlapping clusters. They sometimes appear to be growing out of the ground but are attached to tree roots beneath the soil surface.

Because there are several similar-looking species that grow on wood, confirm the identification of oyster mushrooms by making a spore print. Place the cap on a white piece of paper for about one day, gently lift the cap and the grayish-lilac spores will look like powder on the paper. Most species that get misidentified as oyster mushrooms are not dangerous, but they may be woody or unpleasant tasting. Watch out for the small black beetles that sometimes infest this mushroom.



Comb tooth



Cinnabar chanterelle



Lion's mane



Oyster

Eat Fresh and Inspect

Many edible mushrooms are good for a very short time, so eat only fresh mushrooms. If the mushroom is soggy, has a foul odor, or is darkening, leave it for the bugs and other wildlife to enjoy. Be sure to inspect every mushroom. It is easy when gathering mushrooms to inadvertently harvest a similar-looking, yet different and potentially dangerous, mushroom. Give each mushroom a thorough inspection. When in doubt, throw it out. If you are in the slightest doubt of the identification of a mushroom, don't risk eating it.

In my experience, I have found that learning more about edible mushrooms has been a gateway to deeper interest in other types of fungi and their role in our world. Fungi play an incredibly important role in breaking down organic material and returning those nutrients to the soil. Many form mutually beneficial relationships with roots of trees and other plants, increasing capabilities to absorb water and nutrients that help them to survive and flourish. In fact, scientists have found that soil health is based to a large degree on the relationship between fungi and plants. Some find it surprising that seeing mushrooms in your yard, garden, or flowerbed can be a welcomed sight as an indicator of good soil quality.

Have fun exploring. Mushroom hunters spend a lot of time in the woods and generally spend more time observing and learning more about the plants, birds, insects, and other life in the forest than they do gathering edible mushrooms. It can also be therapeutic. It's good exercise and I find it very difficult to walk in the woods in a bad mood. Some of the most enjoyable moments spent mushroom hunting might be the times you come back empty handed. ▲

State Botanist Malissa Briggler began her full-time MDC career as a grassland botanist in 2007. She and her husband, State Herpetologist Jeff Briggler, live in Callaway County with their three children.



Go on a mushroom hunt and get your daily **Nature Boost!** Listen to MDC's *Nature Boost* podcast to hear more from Malissa Briggler about tasty mushrooms you can find in Missouri throughout the year. Stream *Nature Boost* on Apple Podcasts, Spotify, or wherever you listen to your favorite podcasts.

suburban SALMON

HARD-FIGHTING COMMON CARP MAKE
FOR CHALLENGING FISHING, TASTY FARE

story and photographs by Larry R. Beckett

If anglers were to list the qualities of the perfect fish to pursue, undoubtedly the words plentiful, catchable, sizable, hard-fighting, and tasty would be mentioned. We are blessed to have many such fish in Missouri, but one species is often overlooked, *Cyprinus carpio*.

Carp reside in about every corner of the state, can be pursued with minimal gear and bait, average 8–10 pounds (but can grow to more than 40 pounds), can pull like a freight train, and, when prepared properly, make a delicious meal. Anglers across the nation are catching onto these facts, and the challenge of the “suburban salmon” or “freshwater bonefish” is becoming more popular every day. Missourians should be salivating at the chance to pursue this fish, but as soon as many hear “common carp,” the misconceptions about this fish lead them astray: trash fish, bottom feeder, scum sucker, sewer bass, and the list goes on.

‘HIGH-CLASS’ FOOD MOVES WEST

The common carp inhabited Europe and Asia long before making its way to the United States. In China and Japan, it was esteemed as a symbol of strength and courage. Japanese samurais would carry banners adorned with carp to symbolize their status. In Europe, they were revered as a high-class food source. Kings and queens were once among the few that were worthy of having a meal of carp. Special holding ponds were created to raise and fatten the delicacy prior to consumption. As it escaped the ponds into the European waterways, the prize fish became more available to the rising population of middle class citizens.

When European immigrants of the mid-1800s came to the New World, their taste for the fish suffered, as common carp were not present. Demand for the fish ensued with thousands of letters a year being sent to the United States Commission of Fish and Fisheries. With populations of native fish plummeting by the millions of pounds from being netted to supply food for the expanding East Coast, the commission had already been looking for a fish to introduce to keep up with the harvest. There are some accounts of common carp being brought into the United States as early as 1830, but the first federal government introduction occurred in 1877, when a few hundred common, mirror, and leather carp were imported and stocked into ponds in Baltimore. Soon, the subsequent 6,000 fingerlings were distributed across 24 states and into Missouri in 1879. By the late 1800s, they were nationwide.

Common carp can
be a rewarding
challenge for
anglers of all ages.





AN ABUNDANT OMNIVORE

Common carp are a warm water species and can be found in a variety of water sources throughout the state. They are most abundant in large rivers and lowland waterways but can also be found in small streams, ponds, and lakes. During their late spring/early summer spawning, they deposit eggs numbering up to 500,000 on submerged vegetation. Within a week, the small fry emerge and begin feeding on plankton. Although often thought of as being mud suckers, adult common carp are actually omnivores. Surprisingly to many, most of their diet comes from aquatic insects, but they also consume a variety of vegetation.

Common carp are one of the largest members of the family Cyprinidae, the minnow and carp family. The Missouri state record common carp, weighing in at 50 pounds, 6 ounces, was caught on a rod and reel in Moberly in 1996. Common carp exist in a few other varieties such as mirror carp, which are only partially scaled along their sides, leather carp, which have very few if any scales, and koi, which are often seen in water gardens or small ornamental ponds.

A TOUGH FIGHT

Just about any rod and reel can be used to catch common carp, but it should be

one that can handle a tough fight. The thick body and powerful tail of a 10-pound carp can test the drag of your reel and the strength of your rod in a hurry. The combination of a 6-foot medium action spinning or spin-casting rod, a reel that can free-spool, and 10-pound braided line is a good place to start.

Common carp are far more intelligent than they are given credit for, and will often drop a bait as soon as they feel any resistance. The free-spooling reel allows a better opportunity for them to take the bait and additional time to set the hook. Bite alarms were developed to detect bites while free-spooling and can make watching your rods easier by allowing you to listen as well. When a fish picks up the bait, the fishing line runs over a magnetic roller or moves under the watchful eye of a digital sensor and the alarm sounds.

WORMS, CORN, AND THE BREAKFAST OF CHAMPIONS

Common carp can be caught on a variety of baits including worms, whole kernel sweet corn, and homemade Wheaties balls. If carp fishing with worms, you are likely to attract the attention of every other fish species in the vicinity. The chances of the worm lasting until the carp shows up are not in your favor. Whole kernel sweet corn can also attract a few turtles and panfish but is probably the easiest to use and is readily consumed by any common carp in the area. A Size 4-8 single baitholder hook below a slip sinker can be very effective. Three or four corn kernels threaded onto the hook will usually cover it and still be a small enough bait for the carp to pick up.

Homemade Wheaties balls also work very well and with a little practice are simple to make. The wheat cereal contains enough gluten to form into a "dough" when mixed with water. Although they can be prepared ahead of time, it's just as easy to do while you are at your fishing location. Hold a handful of



Bite alarm



the cereal, close your hand around it, and dip it into the water. Squeeze the water and cereal together until the flakes begin to crumble. Continue dipping and squeezing until the dough is formed. Form the dough around a Size 4-8 treble hook that is tied below a slip sinker. When made properly, the dough will stay on the hook easily during casting and will require a quick jerk on the rod to come off the hook. Whatever bait is selected, simply toss it into a likely area and let it sit on the bottom until a bite occurs much in the same way that catfish are pursued.

WEED BEDS AND CLEAR PATCHES

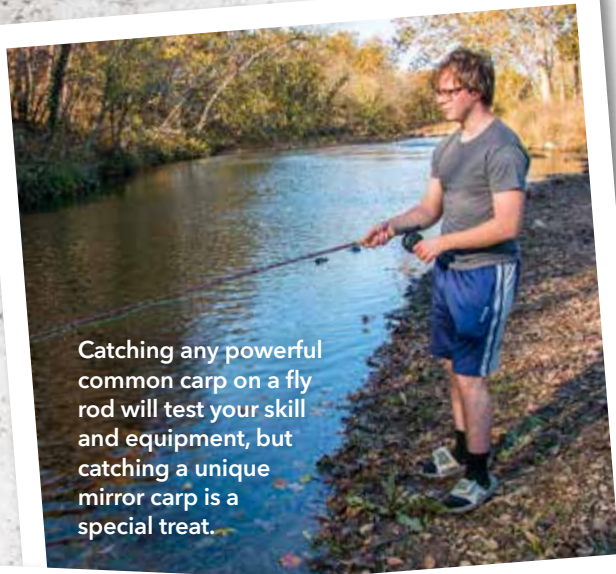
As mentioned, fishing locations containing common carp are available in most areas throughout the state. Like

most fish, carp are rarely far from their food sources. Look along weed beds where carp can find snails, beetles, insect larvae and plant seeds. Watch for clear patches that could indicate a carp feeding area. If there is a local pond where residents enjoy feeding ducks or geese, any carp in the water will quickly learn and congregate around this food source.

Common carp can be caught throughout the year, but they are most active during the warmer seasons when their metabolism is elevated. They can be found in shallow water areas during the summer but also during the winter as the sun will heat these areas more rapidly. An escape route to deeper water is often close by and they will disappear quickly if spooked. Although common carp can be caught at any time of the day or night, they typically feed more aggressively at dawn, dusk, and throughout the night.



Shoreline weed beds are home to many aquatic insects, and carp can often be seen feeding nearby. In clear water, sight casting in front of a feeding carp can be productive.



Catching any powerful common carp on a fly rod will test your skill and equipment, but catching a unique mirror carp is a special treat.



FLY FISHING

Since common carp often feed on aquatic insects, it only stands to reason that eventually anglers would realize the potential to use a fly rod to tangle with these beasts. Fly fishing for carp is growing in popularity and is likely the source of the suburban salmon and freshwater bonefish nicknames that the common carp has acquired.

Since common carp can often be seen cruising through shallow areas, sight casting to them with a fly rod can be an adrenaline pumping way to test your skills. A 9-foot, 8-weight rod will



Clouser swimming nymph

get you started. As with all fishing, imitating the food source is the way to success, and a Clouser swimming nymph will often prove effective for common carp. Place the fly about a foot in front of the carp's mouth, which will allow them to spot it while limiting the chance of spooking it. If a bite occurs, set the hook quickly as the wary carp will soon realize the fly does not taste like the meal it thought it was.

PROPER PREP PROVIDES FINE FARE

The historical European opinion that common carp is a delicious and a welcome addition to the dinner table continues. Carp is prepared in the finest of European restaurants by top notch chefs and fetching five-star prices. The perception here of having carp on the menu is quite different, where many believe it's not worthy of consumption. Like any fish or wild game, common carp provides fine table fare if handled, processed, and prepared properly.

If you plan on eating a common carp or any fish, keeping it fresh until you return home is vitally important to preventing spoilage. While still fishing, secure the carp on a stringer or in a basket so that it remains alive in the water or place it in a cooler of ice to retain freshness. As soon as possible, process the fish. Begin by removing the scales from the carp and then filet it as you would any other fish but leave the skin on the filet. The rib bones can be very large, so working your knife over them instead of cutting through them is recommended. Common carp have a "mud vein," or a strip of darker meat, that runs along the lateral line, similar to white bass. If this strip is not removed, it can result in a strong, unpleasant taste. Once the filet is removed from the fish, make a v-cut along each side of the darker meat and remove it from the filet.

Many people believe that carp are inedible due to the amount of bones in the meat. There are two sets of "y-bones." The top set runs above the lateral line from the tail to the head. The bottom set runs below the lateral line from the tail to the rib cage. If the flesh is scored prior to frying, the hot oil can dissolve them and result in a "boneless" filet. Similar to preparing sucker fish, score the fish by making vertical cuts into the filet. The cuts should be about 1/8 inch apart and be made along the entire length of the filet. Cut down through the meat just to the skin. Do not cut through the skin. Once the filets are prepared, coat them in your favorite breading and deep fry until golden brown. When properly prepared, common carp have a mild flavor that results in a tasty meal.

Like their name implies, common carp are very common throughout Missouri. Although often overlooked by many anglers, they provide a great opportunity to catch an abundant, hard-fighting fish that can make a great addition to your next fish fry. ▲

Larry Beckett is a writer, photographer, and videographer from Jasper County. He can often be found devouring tasty carp filets.



deep fried COMMON CARP

- Wash filets thoroughly, and then then pat dry.
- Dredge filets in favorite breading mix or use equal parts flour, baking mix, and cornmeal seasoned with salt and pepper.
- Place into deep fryer with oil at 350 degrees.
- Fry until golden brown and filets float to the top of the oil.
- Remove filets and drain on paper towels.

To learn more about carp, visit short.mdc.mo.gov/ZKz.

SNAKE TREK

EXPLORING THE STRANGE WORLD OF COPPERHEADS
story and photographs by Dan Zarlenga





Enterprising investigators launched their voyage of snake exploration with a copperhead named Captain Kirk. Now they're searching for mysterious reptilian life forms on the grounds of MDC's Powder Valley Conservation Nature Center (CNC).

Ben Jellen holds an unusual, spindly metal apparatus in the air, then parallel to the ground, then dipping downward. An electronic device at his side spits radio static from electronic blips that grow louder or softer as he slowly moves about. When the blips reach their highest volume, Jellen stops and scrutinizes the ground carefully, using his hand-held antenna as a divining rod.

This scientist is not divining for water — he's seeking out snakes. The radio tracking device tells him that his quarry is right there, but his eyes can't see it. The snake has retreated underground, choosing to avoid confrontation and seek safety in the subterranean world.

VOYAGE OF THE COPPERHEAD SCIENTISTS

Jellen is on a multi-year mission to seek out new information about the life of the eastern copperhead. His objective is to study *Agkistrodon contortrix*, one of Missouri's five venomous snakes — and the state's most commonly encountered venomous snake species.

The purpose of the journey is to gain insight into how these snakes live near a heavily populated and urbanized area like the one that surrounds Powder Valley CNC. The nature center's 112-acre oak-hickory forest straddles the St. Louis suburban communities of Kirkwood and Sunset Hills and is bracketed by the intersection of I-270 and I-44. Powder Valley CNC offers a small world of natural habitat in a galaxy of residential and commercial development.

An associate professor of biology at the University of Health Sciences & Pharmacy in St. Louis, Jellen completed his master's degree in natural resources and environmental sciences. As a passionate reptile and amphibian researcher, he's been tracking snakes for over 20 years. In 2018, he was approached by MDC State Herpetologist Jeff Briggler to undertake the study.

Jellen's second in command on this enterprise is Brittany Neier, an educator with the Saint Louis Zoo and recent graduate of Miami University's Project Dragonfly program. Neier is making a point of studying the connections between copperheads and people.

The main questions posed by the project: Why, where, and how much do copperheads move? What do they eat and how long do they survive? What habitat do they use, and does it



Ben Jellen tracks radio transmissions from a tagged copperhead. Brittany Neier ties flags to mark the location where one of the snakes has been detected.



shift throughout the year? Where do they overwinter? And what do both people and snakes think when they encounter one another?

"Powder Valley is an ideal place to try to learn more about copperheads. This study can help with planning where trails should be in the future, to benefit both people and snakes," said Briggler.

DETECTING ALIEN LIFE FORMS

Copperheads are secretive by nature. Evolution has gifted them with special coloring and scale patterns, a natural “cloaking device,” that allows them to blend in discretely with their surroundings. Just finding the snakes is a considerable challenge.

“It’s really about impossible to do without a little bit of help,” Jellen said. “That help comes in the form of technology, and the technology is radio transmitters.”

Jellen stressed that to obtain meaningful data about the creatures, scientists must find a snake, be able to follow its movements, and find it again consistently. Radio signals provide a beacon to help zero in on what would otherwise be an almost invisible snake. Since copperheads don’t readily transmit radio signals on their own, all the snakes that Jellen has “on the air” have been fitted with miniature radio transmitters. MDC purchased the initial transmitters and the Saint Louis Zoo performed the surgical transmitter implantations.

“The Saint Louis Zoo has been an amazing partner,” Jellen said, acknowledging it has provided all surgical implantation to support the study.

The delicate procedure involves anesthetizing the snakes, then making an incision two thirds down the length of the body on the lateral side. The veterinarian inserts the transmitter into the abdominal/pelvic cavity, running the antenna wire up just beneath the skin, then carefully stitches up the animal. After a 24-to-48-hour recuperation period, Jellen releases the snakes back to the exact location of their capture. No snakes are ever moved from one location to another in this study.



TRANSMISSIONS FROM CAPTAIN KIRK

The key to the whole process was finding that first snake to get the study rolling. That’s when Captain Kirk came to the rescue.

The first snake in the study was a male copperhead encountered by World Bird Sanctuary staff while giving a demonstration at Powder Valley CNC. Once “on the air,” he proved especially adventurous. Jellen and Neier named this first copperhead Captain Kirk, both as a nod to the Kirkwood area and to the iconic character of the *Star Trek* TV show and movies. After all, the space-traveling Captain Kirk was known as a brave adventurer with an eye for the ladies.

“Getting a male is what you want because they’ll look for females. The males are the roamers, they’re the travelers,” said Briggler.

And roam he did. Captain Kirk boldly went, exploring the strange new worlds of Powder Valley CNC’s oak-hickory universe. His travels propelled him, at what must have been warp speed by snake standards, throughout most of the 112-acre property and beyond, leading the research team to three additional copperheads. Following Captain Kirk’s radio trail gave the study a jumpstart, and enabled the researchers to capture, implant, and track those snakes, too. Through a similar process, Jellen and Neier have succeeded in fitting 15 other copperheads with transmitters in the last three years.

Alternating tracking duties, Jellen and Neier have been following the copperheads each day from March to November since August 2018. Jellen has even gotten assistance from his 8-year-old daughter, Eve, who has accompanied him on his tracking runs. The research team has gathered about 1,400 radio locations since starting the study.



Implanting a radio transmitter into a copperhead is intricate work, and the Saint Louis Zoo donates this service to support the study. The veterinary team anesthetizes the snake and surgically inserts the device into the abdominal cavity. The antenna is run just under the skin before final suturing of the incision.



Tracking a copperhead, clockwise from upper left: Jellen documents weather conditions using a Kestrel meter as part of the data. Dialing in a snake's frequency on the radio receiver. An external transmitter attached to a smaller, neonate snake. Scanning the area for signals with an antenna.



Jellen and Neier have fitted about 20 copperheads with transmitters. The team has gathered around 1,400 radio locations in the Powder Valley CNC study and discovered the survival rate of the snakes is only about 50 percent.

WHERE NO RESEARCH HAS GONE BEFORE

One of the snakes captured in 2020 was a gravid female, which meant that the team had the chance to tag and track six newborn copperheads. Jellen estimates that fewer than 20 studies have been done on neonate snakes worldwide. This project is the first in history to specifically study copperhead newborns, placing it on the frontier of such research.

"This is definitely a rare opportunity," said Briggler.

Female copperheads bear live young in the fall, and the neonates in this study were released in late September, complete with tiny transmitters attached to their bodies. Since they are the size of a pencil, newborn copperheads do not have room inside their bodies for implanting the devices.

A copperhead mother is not the dotting type — she simply drops her babies and goes off to replenish her

own depleted resources. The newborns receive absolutely no parental care. They must survive by instinct alone.

"So, here's this little thing that's just been born, and it's just there. It has no instructions on how to live, no instructions on anything," said Jellen. "And of course, the most important things for it are finding food and finding shelter. Nobody really knows how they do either."

Jellen's preliminary observations show that young copperheads are not at all bound to their mothers. The neonates in the study were content to go their independent ways.

"Not a single one of them wound up in the same place as their mom or followed her scent trail," he observed. "The mom moved the least of all, only about 1.5 meters (4 to 5 feet) from where she gave birth to where she overwintered. Some of the babies moved as

far as 150 meters (about 500 feet) total from their birth spot."

In a 24-hour period, one infant travelled 106.5 meters (almost 350 feet) seeking an overwintering spot.

"For something that small to move that far, I was really struck by their mobility," Jellen said.

The researchers consider it too early to draw definitive conclusions due to the small sample size, yet the neonate behavior is consistent with what we understand about the species in general.

"Copperheads are known to be more solitary, so they do spread out more. Their nature is not to cluster in large groups," Briggler pointed out.

Since copperheads occur in a wider variety of habitats than other venomous snakes in Missouri, Briggler speculated that characteristic might explain their innate drive to explore, move, and disperse.

The Prime Directive: Non-Interference

One thing the copperhead study at Powder Valley CNC has revealed is that these snakes do cross the trails. They can often hang out unseen mere feet from the footpaths. But copperheads are highly reclusive and non-aggressive creatures that want little to do with humans. MDC State Herpetologist Jeff Briggler says he rarely gets a venomous snake report from the public on MDC areas.

"They prefer to get away from you and that's why we have so few encounters. They really want to be left alone," he said.

If you do see a copperhead on a trail, the logical course of action is to follow the prime directive: non-interference. Leave them alone, and they'll likely return the favor. Don't attempt to pick up the snake or harass it in any way. Most snake bites occur on the hands and arms from people trying to pick them up. Walk around the snake carefully, preferably from



behind it, leaving plenty of space and giving it an escape route. Avoid making the snake feel cornered. And appreciate the fact that it might eat something you like even less.

To learn more about copperheads and other snakes in the Show-Me State, consult *A Guide to Missouri's Snakes*, available online at short.mdc.mo.gov/ZhD.

There's a place for all life forms, people and snakes included.

Check out the Nature Boost Podcast

Join host

← Jill Pritchard as

she talks with

Ben Jellen and

Brittany Neier

about their

copperhead research and goes with

them on a snake tracking run in

the latest episode of MDC's *Nature*

Boost podcast. You can find it at

mdc.mo.gov/natureboost.



MISSION ANALYSIS

The project is still a work in progress, however, Jellen has observed some interesting trends from the data gathered so far.

For one thing, being a copperhead is dangerous business — for the snake that is. Jellen has been surprised by the high mortality rate for the snakes they've been tracking, which has been about 50 percent.

"On no study I've done have I had nearly as high a mortality rate. I've maybe lost one or two snakes to predation after three years in other studies. And right now, in the same three years, I've lost 10," Jellen said.

Three snakes were struck by cars, one was swept away and drowned in a creek during a heavy rain event, and another asphyxiated from being trapped in a burrow. The most common death however, has been predation from birds of prey like owls and hawks. Mammals such as foxes, raccoons, coyotes, or skunks also take a toll. The average life span of a snake in the study? About one year.

"You've got heavily fragmented habitat, and a high level of traffic on multiple sides. I would probably expect a higher mortality rate because your predators are going to learn this is a better place to find prey," suggested Briggler.

In such a setting, predators learn to focus in on the nature center's area of good natural habitat amid the surrounding urban sprawl.

Jellen has seen some interesting trends regarding overwintering, too.

"Snakes use Powder Valley like people do. They come there when the weather is nice and then go back to their 'homes' to overwinter," he pointed out.

Half the snakes in the study overwintered off the nature center property. Three chose to spend winter under nearby Cragwold Road, and another under the rocks building up the shoulder of I-270.

Briggler is not surprised, noting that finding a site with the right sun exposure is critical for surviving the cold months. This behavior is similar to snakes in the wild seeking open, rocky areas.

"The road cuts where rock has been disturbed, especially south facing ones, could provide the right sun angles and provide more warmth in winter," he deduced.

How cold do the snakes get? The transmitters allow the research team to determine the snakes' temperatures when they're overwintering.

"They stay just above freezing" Jellen said. "The lowest temperature is about at 4 degrees Celsius, or about 40 degrees Fahrenheit."

Finally, Jellen's data indicated that the copperheads seem to make good use of Powder Valley CNC's native grass plantings, like big bluestem, compass plant, and other perennial prairie plants. Briggler said this rang true with research he's done, too. Rodents are more abundant on forest edges and big grassy fields, which draws the snakes.

"I think these grassy strips are really important for the snakes," Jellen said, adding that it's one aspect he'd like to explore further, and he's begun a small mammal trapping study.

CLOSE ENCOUNTERS

In addition to tracking copperheads, Neier is also hoping to learn more about how people interface with snakes as part of her graduate work. With nearly 100,000 visitors annually, Powder Valley CNC is fertile grounds for exploring the relationship between snakes and humans, she said.

A lot of people are uncomfortable around snakes, and Neier has encountered a wide range of reactions from the public while out doing her copperhead research; everything from, “Why the heck are you doing that?” to “That’s awesome!”

“No matter where they landed on the spectrum, they all just wanted to know more, and as an educator, I found that to be an area to focus on,” said Neier.

She appreciates the curiosity from visitors, and always takes extra time to explain what she’s doing and what the study is all about.

As part of her exploration, Neier conducted a public outreach program in cooperation with the nature center staff that included displaying a live snake.

“There was a family with a mom who didn’t really like snakes, but she could see her kids were really interested,” she recalled.

Neier was impressed that the mother was willing to put her own discomfort aside to encourage her kids to see and learn about the snake. She hopes that education and understanding can minimize potential snake-human conflicts. She encourages visitors to ask questions of her and Jellen when they notice them at work.

“It’s such a great opportunity to see science in action,” she said.

KIRK OUT

The starship Captain Kirk faced down a battalion of Klingons, a solar system-eating amoeba, and a man-sized lizard. The copperhead Kirk, however, became another one of the casualties; he was eaten by a hawk. Copperhead Captain Kirk beat the odds by surviving three years, an incredible accomplishment considering the hostile universe snakes face in the wild. And Jellen is confident he didn’t go without a fight.

While he lived, the intrepid copperhead kickstarted a pioneering research project. Captain Kirk performed above and beyond the call of duty and represented his species with distinction.

“Snakes are highly persecuted, and venomous snakes even more,” Jellen said. “To give them a voice is important.”

“People might be less scared of them if they know more,” added his daughter, Eve.

And the mission carries on. Thanks to a trailblazing copperhead named Captain Kirk and a “crew” of radio-tagged snakes, these enterprising researchers will continue to go where no scientists have gone before. ▲

Dan Zarlenga is the MDC media specialist for the St. Louis Region. He likes to discover nature mostly through hiking, backpacking, day and nighttime photography, and an occasional float trip.

The eastern copperhead is one of five venomous snakes found in Missouri. Copperheads are rare to see because they are reclusive creatures. Their first defensive instincts are to hide or flee, rather than attack.



Get Outside

in JUNE

→ Ways to connect with nature

Gooseberries



Blackberries



Raspberries



Mulberries



World's Most Popular Mushroom

Chanterelle mushrooms, probably one of the world's most popular mushrooms, appear May through September. Look for them singly or in groups in moss, leaves, grass, on paths, and under oaks.



Chanterelles

Missouri Gets Berry Fruity

Go nuts for berries. Wild gooseberries, raspberries, blackberries, and mulberries begin to ripen in June. These wild edibles make delectable pies, jellies, and other goodies. Be sure to leave some for the birds and other wildlife.

SOUTHWEST REGION

Hiking: Bennett Spring State Park

Saturday • June 19 • 9 a.m.-3 p.m.
 Springfield Conservation Nature Center
 4601 S. Nature Center Way, Springfield, MO 65804
 Registration required by June 18 at short.mdc.mo.gov/Zza
 or by calling 888-283-0364.

Ages 18 and older

Hike the 7.4-mile Natural Tunnel Trail at Bennett Spring State Park. Bring a sack lunch and water and wear comfortable hiking shoes. Hike is rated moderate to difficult. Meet at the Natural Tunnel Trail parking lot. Please remember to wear a mask and social distance.

Who's Calling?

Northern bobwhites call from fence rows. Listen for their distinctive bob-WHITE call this month.



Natural Events to See This Month

Here's what's going on in the natural world.



Young woodchucks disperse, making their own burrows.



Common buckeyes arrive. They must repopulate each year.



Fireflies flicker at dusk.

VIRTUAL

Best of the Ozarks Virtual Series: Family Fishing

Tuesday • June 15 • 10-10:30 a.m.

Virtual • Registration required by June 15 at short.mdc.mo.gov/ZzR or by calling 888-283-0364.

All ages

Dreaming of taking the kids fishing this summer? Join our virtual series Best of the Ozarks as we highlight some great places to go fishing in our area with your family. When registering, please provide an active email address in your profile as you will receive a link one day prior to the program.



RECONNECT WITH NATURE

Adventure can happen anywhere. Download the free **MO Fishing** app for great places to go fishing near you.



Fawn Season

White-tailed deer fawns are born through early June. If you spot a fawn on its own, admire it from a distance or take a quick picture, and then leave it alone. Its mom will be back for it soon. Remember, always leave wildlife wild.

A Cricket or a Frog?

Listen for the northern cricket frog. Their breeding peaks in late June, and their call — a metallic gick, gick, gick — sounds like small pebbles being struck together rapidly.

Gick
Gick
Gick



Yucca moths are seen on blooming yucca flowers.



Chimney swifts dart and glide over rooftops in early evenings.



Available on the **App Store**

Download for **Android**

Places to Go

SOUTHWEST REGION

Niawathe Prairie Conservation Area

Birds, blooms, and butterflies await
by Larry Archer

✦ When visiting Niawathe Prairie Conservation Area (CA), be prepared for a straight-B experience: birds, blooms, and butterflies.

Located on 320 acres in Dade County northwest of Springfield, Niawathe Prairie CA is 100 percent remnant prairie, meaning that it's still in presettlement condition, said Wildlife Management Biologist Kyle Hedges, who manages the area.

"This is native remnant prairie, stuff that God put here 10,000 years ago," Hedges said.

As remnant prairie, the area is covered in native wildflowers, many of which are blooming in June and July, he said.

"There'll be some really big patches of purple coneflower," he said. "For sure there's some huge — I mean, several acres — of liatris, prairie blazing star, that'll be blooming all at the same time. Just acres of purple sometimes, especially in the burn unit."

Roughly a third of the area is treated with prescribed fire annually. Those areas typically respond the following year with the most color. And with the blooms come the grassland species of birds and pollinators that rely on prairie flora for food and shelter. Henslow's sparrows, dickcissel, field sparrows, and Bell's vireos are common.

"It's the kind of place experienced birders do well," he said.



Black swallowtail

"The other thing we have is pollinators — butterflies in particular. Lots of monarchs, and, of course, swallowtails."

—Niawathe Prairie CA Manager Kyle Hedges

NOFPADOL PAOTHONG



The pale purple coneflower is one of several blooming wildflowers found on Niawathe Prairie Conservation Area, which was purchased by MDC and The Nature Conservancy.



NIAWATHE PRAIRIE CONSERVATION AREA

consists of 319.5 acres in Dade County. From Lockwood, take Highway 97 north 8 miles, then Route E west 1 mile, and County Road 61 north 0.50 mile.

37.5139, -93.96776

short.mdc.mo.gov/ZEp

417-326-5189

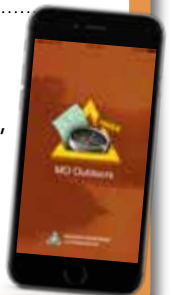
WHAT TO DO WHEN YOU VISIT



Birdwatching Included in the National Audubon Society's Golden Grasslands Important Bird Area (short.mdc.mo.gov/ZEW). Included in the Great Missouri Birding Trail (short.mdc.mo.gov/ZEc). The eBird list of birds recorded at Niawathe Prairie CA is available at short.mdc.mo.gov/ZEq.

DISCOVER MO OUTDOORS

Users can quickly and easily find outdoor activities close to home, work, or even while traveling with our free mobile app, MO Outdoors. Available in Android or iPhone platforms at mdc.mo.gov/mooutdoors.



WHAT TO LOOK FOR WHEN YOU VISIT



Henslow's sparrow



Regal fritillary



Bell's vireo



Monarch



Green Sunfish

Lepomis cyanellus

| | | |
|-------------------------------|--|----------------------------------|
| Status Nongame fish | Size 6-8 inches, max 10 inches and 1 pound | Distribution Statewide |
|-------------------------------|--|----------------------------------|

Green sunfish, a thick-bodied fish, can be found in any pond, lake, or stream that is capable of supporting fish life. They are most active throughout daylight hours. They are most closely related to bluegill, redear, and other sunfishes.



Did You Know?

This panfish is available to anglers statewide, providing fishing opportunities in small, intermittent creeks, where other hook-and-line fish cannot live. Still-fishing with a cane pole and bobber, using worms, grubs, or grasshoppers as bait, is about as effective as any method.

FOODS

Green sunfish are carnivorous, feeding on insects, crayfish, and small fish.

LIFE CYCLE

Green sunfish begin spawning in mid-to-late May, when water temperatures rise over 70 degrees. Spawning activity peaks in June, and it can continue into August. Individuals can live for 6 years.

ECOSYSTEM CONNECTIONS

Green sunfish may be the largest fish in some of the smallest streams where it occurs, making it a top predator in the aquatic ecosystem. As with all fish, however, they start out small, and many sunfish eggs and juveniles are eaten by a variety of predators. Herons, watersnakes, and other vertebrates feed on sunfish.

Outdoor Calendar

MISSOURI DEPARTMENT OF CONSERVATION

Free MO Hunting and MO Fishing Apps

MO Hunting makes it easy to buy permits, electronically notch them, and Telecheck your harvest. MO Fishing lets you buy permits, find great places to fish, and ID your catch. Get both in Android or iPhone platforms at short.mdc.mo.gov/Zi2.



FISHING

Black Bass

Impounded waters and non-Ozark streams:
Open all year

Most streams south of the Missouri River:

- ▶ Catch-and-Keep:
May 22, 2021–Feb. 28, 2022

Bullfrogs, Green Frogs

June 30 at sunset–Oct. 31, 2021

Nongame Fish Giggling

Impounded Waters, sunrise to sunset:
Feb. 16–Sept. 14, 2021

Streams and Impounded Waters,
sunrise to midnight:
Sept. 15, 2021–Feb. 15, 2022

Paddlefish

On the Mississippi River:
Sept. 15–Dec. 15, 2021

Trout Parks

Catch-and-Keep:
March 1–Oct. 31, 2021

Catch-and-Release:
Nov. 12, 2021–Feb. 14, 2022

For complete information about seasons, limits, methods, and restrictions, consult the *Wildlife Code of Missouri* at short.mdc.mo.gov/Zib. Current hunting, trapping, and fishing regulation booklets are available from local permit vendors or online at short.mdc.mo.gov/ZZf.

HUNTING

Black Bear

Oct. 18–27, 2021

Bullfrogs, Green Frogs

June 30 at sunset–Oct. 31, 2021

Coyote

Restrictions apply during April, spring turkey season, and firearms deer season.

Open all year

Crow

Nov. 1, 2021–March 3, 2022

Deer

Archery:

Sept. 15–Nov. 12, 2021

Nov. 24, 2021–Jan. 15, 2022

Firearms:

- ▶ Early Youth Portion (ages 6–15):
Oct. 30–31, 2021
- ▶ November Portion:
Nov. 13–23, 2021
- ▶ Late Youth Portion (ages 6–15):
Nov. 26–28, 2021
- ▶ Antlerless Portion (open areas only):
Dec. 4–12, 2021
- ▶ Alternative Methods Portion:
Dec. 25, 2021–Jan. 4, 2022

Elk

Archery:

Oct. 16–24, 2021

Firearms:

Dec. 11–19, 2021

Groundhog (woodchuck)

May 10–Dec. 15, 2021

Pheasant

Youth (ages 6–15):

Oct. 30–31, 2021

Regular:

Nov. 1, 2021–Jan. 15, 2022

Quail

Youth (ages 6–15):

Oct. 30–31, 2021

Regular:

Nov. 1, 2021–Jan. 15, 2022

Rabbit

Oct. 1, 2021–Feb. 15, 2022

Squirrel

May 22, 2021–Feb. 15, 2022

Teal

Sept. 11–26, 2021

Turkey

Archery:

Sept. 15–Nov. 12, 2021

Nov. 24, 2021–Jan. 15, 2022

Firearms:

- ▶ Spring: April 19–May 9, 2021
- ▶ Fall: Oct. 1–31, 2021

Waterfowl

See the Migratory Bird and Waterfowl Hunting Digest or visit short.mdc.mo.gov/ZZx for more information.



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Gray foxes spend their days in wooded areas, taking refuge in the trees, soaking up the sunshine, and foraging for fruits. What will you discover in Missouri forests? Get out there and see.

📷 by **Noppadol Paothong**