MISSOURI CONSERVATIONIST

VOLUME 85, ISSUE 2, FEBRUARY 2024

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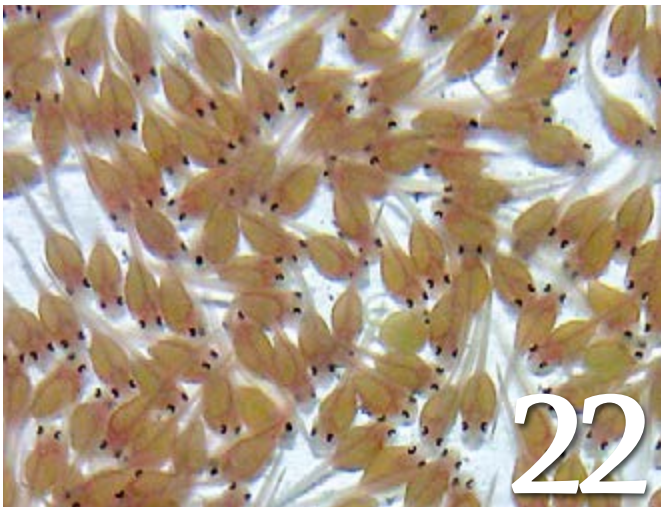

FEATURES

DEPARTMENTS


Snow goose

MISSOURI CONSERVATIONIST

ON THE COVER
A female brown-belted bumblebee on a flower.
NOPPADOL PAOTHONG
100mm lens, f/11
1/200 sec, ISO 400

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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 CONSERVATIONIST
PO BOX 180
JEFFERSON CITY, MO 65102

COVER PHOTO

The December 2023 cover photo is spectacular. Many thanks to Jian Xu for submitting it. Your magazine is known for great photography, now among readers as well as professionals.

Lucy Hirsch
Smithville

EYE OF THE BEHOLDER

If ever a photo screamed out, "Make me a 24-by-24-inch, 750-piece puzzle," it's Mina Sauk Falls [December, Page 27]. Best print I've seen in a long time.

Joe Quinn Columbia

My husband and I are always delighted to receive your magazine every month, but we were especially thrilled to see the photos from readers [*Eye of the Beholder*, December, Page 10]. All the photos were so striking and captivating. Thank you, photographers, for sharing your time and talents to enthrall us. Thank you, *Missouri Conservationist*, for continuing to create a national award-winning magazine.

Cathy Zinkel Ballwin

The photo on the cover of the December issue by Jian Xu is fantastic. The alignment, along with the color composition, is terrific. To shoot such a photo takes timing and an excellent eye on the part of the photographer. Kudos to Mr. Xu.

Dwaine Goodwin Ozark

Purple and green seem to be the colors of Halloween nowadays instead of black and orange. However, that color combination has been in Mother Nature's palette forever, as seen in the photos I spotted in your December issue. Moss-covered turtle, night sky over McCormack Lake, river otter, and the western cottonmouth all have that beautiful color combination. These four photos show Mother Nature has an eye for pleasing color combinations that we humans can only copy. The photos chosen to appear in this issue had it all — humor, beauty, and education. Another great issue to add to my *Missouri Conservationist* library.

Ramona Allen Sedalia

CELEBRATING THE HARVEST

During my 18 years as a school administrator, we have always had a "celebrate your harvest" amongst our students.

Each year, we encourage our students at St. Elizabeth to share pictures of their deer and turkey harvest. We try to promote good photography, as we have contest categories that include best picture.

On any given morning during Missouri's deer and turkey seasons, you can find five or six different children looking for new pictures. It is great to see our future get so excited about showing their harvest. And yes, it's always fun to hear them ask me, "Did you get my picture from mom and dad?"

I cannot wait until turkey season.

Doug Kempker, Superintendent
St. Elizabeth R-IV School District

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

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The Missouri Department of Conservation protects and manages the fish, forest, and wildlife of the state. We facilitate and provide opportunity for all citizens to use, enjoy, and learn about these resources.

Want to see your photos in the Missouri Conservationist?

Share your photos on Flickr at flickr.com/groups/mdcreaderphotos–2024 or email Readerphoto@mdc.mo.gov.

1

2

1 | House finch by Bryan Hunt, via Flickr

2 | Bird's nest fungi by William Allen, via Flickr

3 | Raccoon by Thomas Swartz, via Flickr

3

Want another chance to see your photos in the magazine?

In the December issue, we plan to feature even more great reader photos. Use the submission methods above to send us your best year-round pictures of native Missouri wildlife, flora, natural scenery, and friends and family engaged in outdoor activities. Please include where the photo was taken and what it depicts.

Up Front

with Sara Parker Pauley

There lives a band of brothers, self-christened as the Bees & Brews Club. They are paramours of tallgrass prairie, who, when on the clock, are conservation professionals, but once off, they are wildflower warriors, spending their time restoring Missouri's incredible habitats and cataloguing bumblebees, all while enjoying an occasional pint.

The "club" exists because MDC retiree Bill White was eager to collect bees as a Missouri Bumble Bee Atlas volunteer (Read more on the Atlas on Page 10). He asked MDC colleagues and fellow bee enthusiasts Jason Jensen and Nate Muenks to come along.

But where? They had the perfect location and next club member in mind — grassland guru and MDC colleague Aaron Jeffries, whose farm is home to over 100 species of native wildflowers (Read more about growing wildflowers on Page 16).

And brews? Well, they needed a cooler to keep the bees calm and sedated during processing, so why not add in a few beers. It was after hours, after all. Thus, the Bees & Brews Club was born — T-shirts to follow.

Now MDC is abuzz with stories of the club and interest is growing. I recently read that the first sign you love the work you do is when you "can no longer distinguish between work and play." I think the club members exemplify this wisdom. Wandering through a field of wildflowers catching bees — sounds like a pretty good day on or off the clock to me.

Sara Parker Pauley

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

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Nature LAB

by Dianne Van Dien

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

MDC researcher Anthony Cole samples rocks in gravel placed along the riverbank below the Taum Sauk Dam to determine sizes and distribution.

HABITAT MANAGEMENT

Improving Habitat at Taum Sauk Dam

Of course, MDC biologists track the movements of turkeys and elk, but did you know they also track rocks?

MDC is helping Ameren Missouri find the best way to improve stream habitat below the Taum Sauk Energy Center, a hydroelectric power plant southwest of St. Louis on the east fork of the Black River. Studying how rocks move in the river is key.

Hydroelectric power requires a dam and a reservoir. To keep the reservoir from filling up with sediment, a gravel trap catches the sediment, which means little moves downstream.

"Downstream we see habitat limitations," says Stream Habitat Ecologist Jason Persinger, "because of the loss of gravel and fine sediments. Only the big, heavy rocks remain, and a lot of minnows, other fish, and invertebrates need gravel and the spaces between the gravel to survive."

At Taum Sauk, the collected sediments are being removed from the gravel trap and placed below the dam to get them back into the river system. MDC's study will help determine how to do that to improve habitat.

Tracking rocks helps determine habitat management strategy

"We're looking at how much flow it takes to move the gravel, where we should put it, and where it goes when we put it here versus when we put it somewhere else," says Persinger.

To answer these questions, researchers count and classify rocks and pebbles placed at locations along the riverbank and tag some with passive integrated transponder (PIT) tags. After a high flow event, they again survey rocks in the area to see what changed, using a receiver to locate rocks with PIT tags to see how far they've traveled.

Data from multiple trials will help establish a procedure that Ameren Missouri can follow to maintain the river habitat through the future.

At a Glance

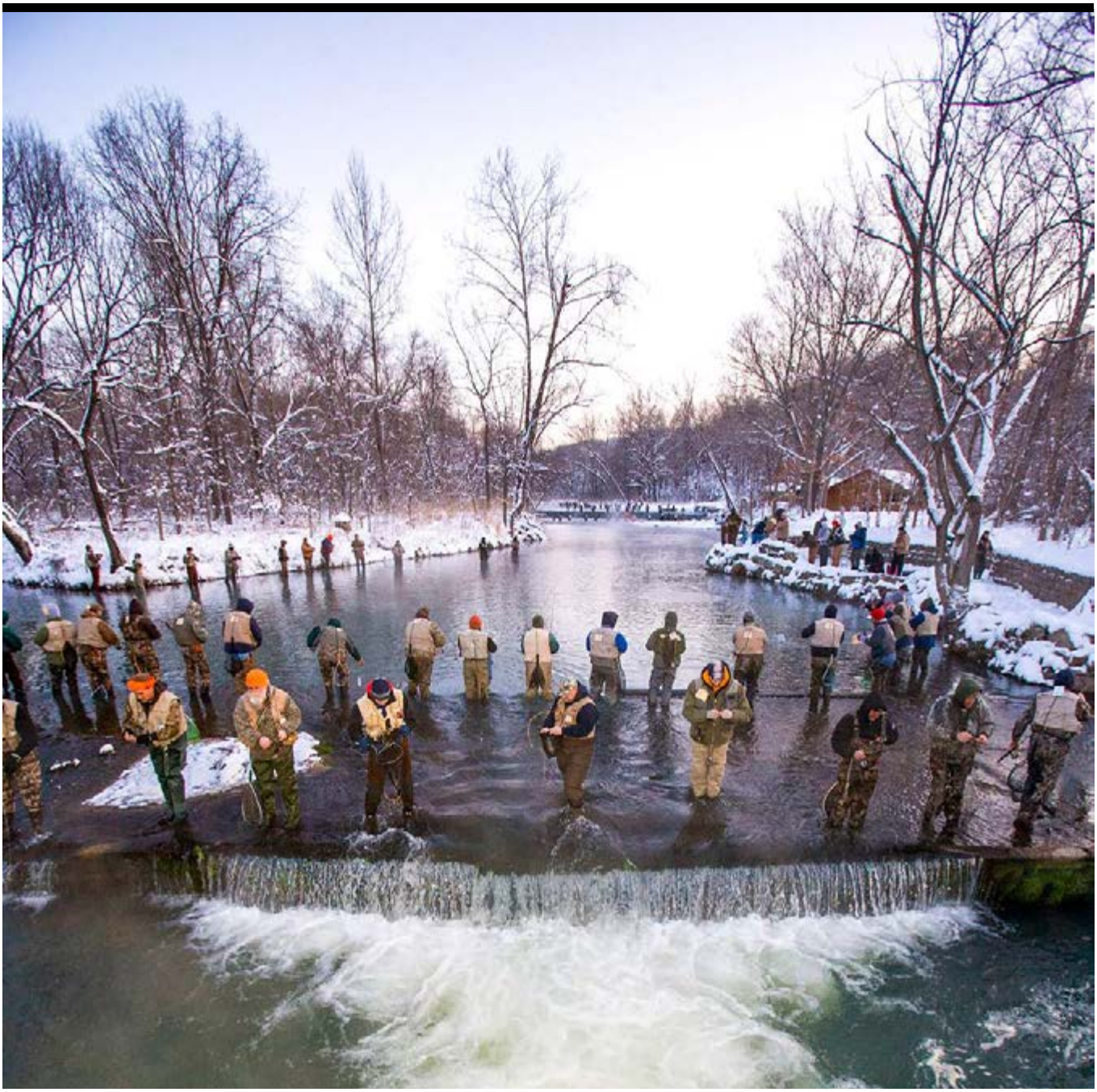
PIT Tagging Rocks

- A crevice is cut into each rock and passive integrated transponder (PIT) tags are attached with J-B Weld.
- PIT tags are similar to microchips used in pets.
- Each PIT tag has a unique ID that is recorded along with rock size.
- PIT-tagged rocks can be detected even if buried under 3–4 inches of sediment on the stream bottom.

ROCK SAMPLING: CLIFF WHITE; ROCK TAGGING: MDC STAFF

Learn more at **short.mdc.mo.gov/ZL8**

In Brief



DAVID STONNER

CATCH-AND-KEEP TROUT SEASON STARTS MARCH 1

OPENING DAY AT MISSOURI'S FOUR TROUT PARKS EXPECTED TO DRAW LARGE CROWDS

March 1 marks the annual opening of catch-and-keep trout fishing in Missouri at the state's four trout parks: Bennett Spring State Park near Lebanon, Montauk State Park near Licking, Roaring River State Park near Cassville, and Maramec Spring Park near St. James. The catch-and-keep season at the trout parks runs through Oct. 31.

MDC operates trout hatcheries at all four parks and stocks rainbow trout daily throughout the season. Staff stock more than 800,000 trout annually at the state's four trout parks and approximately 1.5 million trout annually statewide.

continued on Page 6 »

TROUT SEASON

(continued from Page 5)

Trout anglers need a daily trout tag to fish in Missouri's trout parks during this time. Daily trout tags can only be purchased at each of the four trout parks. MDC encourages trout anglers to have the correct amount of cash for daily tags if possible. Missouri residents 16 through 64 and nonresidents 16 and older also need a fishing permit in addition to the daily trout tag.

The cost of a daily trout tag is $5 for adults and $3 for those 15 years of age and younger. A daily fishing permit is $8. The daily limit is four trout.

Get more information on trout parks at **short.mdc.mo.gov/4cw**.

MDC encourages trout anglers to buy their fishing permits ahead of time from numerous vendors around the state, online at **mdc.mo.gov/buypermits**, or through MDC's free mobile apps, MO Hunting and MO Fishing, available for download through Google Play for Android devices or the App Store for Apple devices.

Missouri has a wealth of trout waters, including red-, white-, and blue-ribbon areas that support naturally reproducing trout. For more information on trout fishing in Missouri, visit MDC online at **short.mdc.mo.gov/Zvy**. Get the information in booklet form with our *Trout Fishing in Missouri* booklet, available for free at MDC locations where publications are found, or order one online at **short.mdc.mo.gov/4fK**.

MDC also offers the Missouri Blue Ribbon Trout Slam to honor anglers who catch a trout in at least five of the nine blue-ribbon trout streams. Participants can have their successes listed on the MDC website. Learn more at **mdc.mo.gov/troutslam**.

To prevent the spread of the invasive alga called didymo or "rock snot," the use of shoes, boots, or waders with porous soles of felt, matted, or woven fibrous material is prohibited at all trout parks, trout streams, Lake Taneycomo, and buffer areas. Get more information at **short.mdc.mo.gov/4ZA**.

Ask **MDC**

Got a Question for Ask MDC?
Send it to AskMDC@mdc.mo.gov
or call 573-522-4115, ext. 3848.

Q: I've been seeing this cardinal throughout the year. I assumed it was an immature cardinal that would eventually change colors; however, after months of seeing this bird, it hasn't. Will this be his permanent color? Is there a name for a cardinal with this coloration?

Male northern cardinal

➔ This is an adult male northern cardinal, but it lacks the mask of typical black pigment, or "eumelanins," on his face. A common form of melanin, eumelanins are brownish to black pigments that protect the epidermis — the outermost layers of skin — against damage from ultraviolet radiation. Ornithologists might say this bird lacks eumelanin in part of its body or is partially "non-eumelanic."

This is probably a rare genetic abnormality.

Q: Does Missouri have a body of water known to have a good chain pickerel population? I fish on Lake of the Ozarks several times a year. A side trip to complete my pike slam would be great!

➔ A favorite target for anglers, chain pickerel are not widespread in Missouri, so MDC Fisheries Management Biologist Scott Williams recommends focusing your search to the southeastern Ozarks from the Eleven Point River east to the St. Francis River.

"Reportedly, its greatest abundance is in the Eleven Point and Current rivers," Williams said. "I would focus on slow deep pools and backwaters that have abundant aquatic vegetation to try to find chain pickerel."

This game fish has an elongated body, a snout shaped like a duck's bill, and a large mouth with many sharp teeth. The back and sides are olive or yellowish brown with a chainlike pattern of dark lines. The dorsal fin is positioned far back on the body.

They inhabit clear, quiet waters where aquatic vegetation is abundant, particularly in backwater sloughs of streams. Adult chain pickerel lie motionless in dense stands of vegetation and ambush prey with a quick darting motion. Young chain pickerel feed on crustaceans and aquatic insects. Adults are carnivorous and feed on other fishes.

Chain pickerel, grass pickerel, and pike resemble one another but are different species of fish. (Grass pickerel are quite like chain

CARDINAL: MATT PEMBERTON; DEER: JOY MCDOWELL

White-tailed deer

pickerel but more widespread.) All three species can be found in freshwater, but pike are much larger. For more information on chain pickerel, visit **short.mdc.mo.gov/Zjy**.

Q: I took pictures of this deer coming to our corn feeder, and I noticed it had a swollen jaw. What do you think is the cause?

➔ It appears you are seeing a deer afflicted with a disease informally called "lumpy jaw." Regrettably, it's somewhat common in Missouri, although MDC scientists cannot tell you precisely how many deer have the disease annually in our state.

Unfortunately, this occurs when a food impaction is created by arterial worms. Partial paralysis of the deer's jaw muscles occurs when high arterial worm infestations reduce blood flow. Subsequent infections can result in food being impacted under the tongue, causing facial swelling, occasional tooth loss, and jawbone degeneration. The nematodes, or worms, live in the carotid arteries of white-tailed deer, and deer contract them when bitten by infected horseflies.

These worms pose no threat to humans, and the venison of infected deer is safe for consumption. For more information about this disease, visit **short.mdc.mo.gov/Zj9**.

What IS it?

Can you guess this month's natural wonder?

The answer is on Page 9.

Austin Davis
ST. FRANCOIS COUNTY CONSERVATION AGENT
offers this month's

AGENT ADVICE

As MDC's first conservation agent with hearing loss present at birth, I appreciate the opportunity to use my position to reach the deaf and hard of hearing community. Many people in our community fear the outdoors or think they can't fully participate. They ask me how they can do certain things — like fish and hunt — if they can't hear. Education and access are the keys. Using my skills — including my fluency in American sign language — I can expand programs to get the deaf and hard of hearing community more involved. MDC provided me with the adaptations and accommodations to do my job. I want to do the same for the deaf and hard of hearing community because nature is for everyone.

INVASIVE SPECIES MISSOURI'S LEAST WANTED

Invasive nonnative species destroy habitat and compete with native plants and animals. Please do what you can to control invasive species when you landscape, farm, hunt, fish, camp, or explore nature.

Burning Bush

by Angela Sokolowski

Burning bush (*Euonymus alatus*), or winged euonymus, is a common landscaping shrub that grows up to 15 feet tall. Football-shaped opposite leaves, at 1–2 inches long, turn bright red in the fall, giving it a stunning fiery appearance. Yellow-green flowers with four petals bloom in May–June and orange to red oval berries appear July–October.

Why It's Bad

Burning bush will invade natural habitats, choking out the understory of forests and woodlands and filling in open areas like pastures, roadsides, and prairies. As with other invasives, this will displace native species that our wildlife and complex natural systems depend on.

How to Control It

During the growing season, this plant blends in, but brilliant scarlet autumn foliage makes it noticeable in the fall. Winged stems also help confirm identification. Plants can be marked in fall for winter treatment, if convenient.

Mechanical: Small plants can be hand pulled or dug any time of year.

Chemical: Larger shrubs can be cut-stump treated. Cut the trunks near ground level and apply herbicide to the freshly cut stump, using 25 percent glyphosate or triclopyr. In the dormant season, trunks can be basal bark treated. Spray the first 8–12 inches of the trunk with 25 percent glyphosate or triclopyr with an oil carrier, not water.

Alternative Native Plants

✔ American burning bush (also known as wahoo)

Signature red foliage in fall

Winged stems

Burning bush is a common landscaping shrub that can spread to natural habitats and choke out other native plants wildlife depend on.

Fall fruits

To learn more, visit **short.mdc.mo.gov/4SX**.

DISCOVER NATURE WITH US AND AGENTS OF DISCOVERY

Don't let winter temperatures keep you inside. There's still much to explore in this season. To help kids and adults discover nature, we are once again partnering with the Agents of Discovery mobile gaming app for its Winter Edition Missions.

Agents of Discovery is an educational gaming app that allows users to engage with nature while completing missions — or games — proving that screen time can be green time.

Winter Edition Missions will run through March 1. Anyone can join by downloading the free app and completing the missions at participating locations. Each mission consists of educational challenges that teach players about local history, culture, ecosystems, and safety.

Missions include prizes to reward players — or agents — who participate. Once an agent completes a mission, they can earn stickers, pins, and other prizes.

New Winter Edition Missions can be found at several MDC conservation nature centers:

- "How Do Animals Handle the Winter?" at Runge Conservation Nature Center in Jefferson City
- "Operation Backyard Bird" at Cape Girardeau Conservation Nature Center
- "Winter Mission" at Powder Valley Conservation Nature Center in Kirkwood
- "Winter Walk" at Springfield Conservation Nature Center

Download the free app and create an agent profile. Then pick a mission in your area. Download the mission before heading to it, so you can play the game without WiFi or a data connection. Then use your secret agent tool to find and unlock challenges.

Agents of Discovery is available for download through the App Store for Apple products or Google Play for Android devices. For more information on Agents of Discovery, visit **short.mdc.mo.gov/4PQ**.

WHAT IS IT?

NORTHERN CARDINAL'S CREST

Northern cardinals — both males and females — have red crests adorning the tops of their heads. The female cardinal, pictured here, has a more orange-red crest, which stands out next to her muted feathers. These crests are not just jaunty accessories — they serve a purpose. Referred to as mood mohawks, cardinals raise their crests to show agitation and lower them at rest. Males and females also use their crests during courtship. Males raise their crests to appear more robust and attractive to potential mates.

BURNING BUSH: (MAIN) BARRY RICE, SARRACENIA.COM, BUGWOOD.ORG; (WINGED STEMS) JAMES H. MILLER, USDA FOREST SERVICE, BUGWOOD.ORG; (FRUITS) LESLIE J. MEHRHOFF, UNIVERSITY OF CONNECTICUT, BUGWOOD.ORG; CARDINAL: NOPPADOL PAOTHONG

An American bumblebee visits American germander. Concerns regarding declines in many bumblebee species, including the American bumblebee, have mobilized many Missourians to participate in the Missouri Bumble Bee Atlas.

PHOTOGRAPH BY NOPPADOL PAOTHONG

Chasing the Buzz

BUMBLE BEE ATLAS IMPROVES UNDERSTANDING, CONSERVATION OF THREATENED SPECIES

by Steve Buback and Alex Morphew

The low buzz of a bumblebee visiting a flower is a familiar sound during Missouri summers. Bumblebees are easy to spot, methodically collecting pollen and nectar from a wide range of native flowering plants.

Historically, Missouri has been home to at least 11 native bumblebee species, of which eight are currently considered to be regular inhabitants. Of these, four are now tracked by MDC as species of conservation concern, and two are petitioned for listing under the Endangered Species Act within the next few years. This means more than half of our native species are now considered imperiled or worse.

Since the Endangered Species Act listing of the rusty patched bumblebee (*Bombus affinis*) in 2017, increased attention has been given to the populations and distribution of other bumblebee species in the United States.

To try and understand where these bees occur and get a snapshot of how they are doing, MDC partnered with the Xerces Society and the University of Missouri–Columbia to create the Bumble Bee Atlas in 2020.

Now entering its fourth year, Atlas volunteers survey bumblebees across the state in a variety of habitats to better understand where they occur, what threats they face, and which species most need assistance to thrive in Missouri.

Missouri Bumble Bee Atlas

Busy collecting pollen from a pale purple coneflower, a worker bumblebee barely notices the Atlas volunteer approaching. With a flick of a net, the bee is captured and gently coaxed into a plastic tube for temporary storage. This tube, buzzing with the vibration of the confused bee's wing muscles, goes into a cooler filled with ice, and the bumblebee slowly falls asleep.

After half an hour, the volunteer carefully tips her out of the chilled tube and onto a sheet of grid paper. Photos are taken of diagnostic characteristics, including shots of her face, abdomen, and sides. During this time, the bumblebee slowly warms up until she can fly again and return to her colony. The photos are used to determine the species of the bumblebee and are submitted to a central database, where identifications are confirmed by experts with the University of Missouri and the Xerces Society.

This simple process is all it takes to submit a record to the Atlas. To increase our understanding of bumblebee biology and habitat preference, volunteers are also asked to take notes on weather, the plant the bumblebee was visiting when captured, and other flowers occurring in the survey area.

Missouri citizens have come out in force to show their support for bumblebee conservation and contribute to the Atlas.

"I am so heartened each time I participate in the survey, knowing that in just a small way I contributed to the conservation of our bumblebees," said Kirk Suedmeyer, Atlas volunteer and veterinarian for the Kansas City Zoo and Aquarium. "The beauty of each bee is so incredible and awe-inspiring."

Since 2020, volunteers like Suedmeyer have submitted records for more than 6,800 bumblebees across the state. The Atlas divides the state into 89 grid cells, and volunteers are asked to sign up for a single grid cell to conduct two surveys throughout the summer. In 2023, additional information was provided to volunteers on the locations of where rare species were previously observed to capture as much information as possible about the status of these species.

While it is evident that many pollinators are in decline, little is known about which species are at greatest risk or where and why they are declining.

Atlas data indicates several bumblebee species appear to be thriving in Missouri. For example, the common eastern bumblebee (*Bombus impatiens*) and the brown-belted bumblebee (*Bombus griseocollis*) are thought to be increasing their range. These two species accounted for approximately 50 percent of Atlas observations and, in some instances, were the only species found during surveys. While only 16 percent of all recorded bees were species of conservation concern, these species do appear to be widely distributed in Missouri, with populations found even in urbanized areas, such as Jackson and St. Louis counties.

Since 2020, data collected through the Atlas has greatly expanded our understanding of these pollinators. In 2022, across 44 counties and the City of St. Louis, Atlas volunteers documented 201 individual American bumblebees (*Bombus pensylvanicus*). This species is being considered for listing under the Endangered Species Act, and information collected by Atlas volunteers will help inform federal and state decision making.

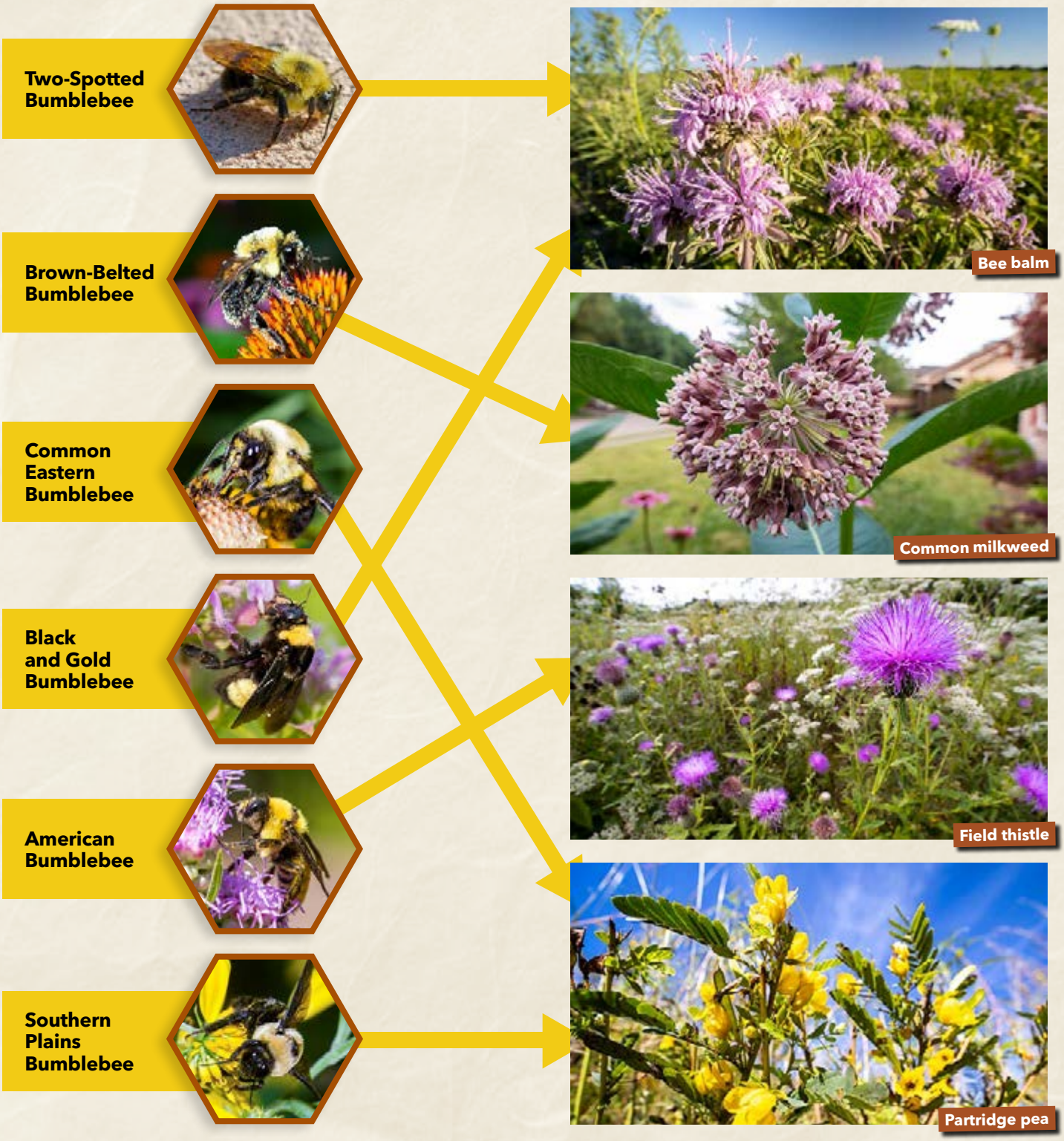
Jared Brabant, a doctoral student with the University of Missouri, assists MDC and the Xerces Society with Missouri's Bumble Bee Atlas as part of his graduate research.

"The findings from participants over the last few years have really deepened our understanding of bumblebee communities across Missouri, in present time," said Brabant. "With this large scale, coordinated effort, we are able to get a more comprehensive picture of what's going on today and shed light on where we should focus conservation efforts."

Dr. Gerardo Camilo, a bee researcher, looks closely at a female bumblebee collected in St. Louis. The Bumble Bee Atlas employs non-lethal methods to collect data that will ultimately inform conservation efforts in Missouri.

TWO-SPOTTED BUMBLEBEE: KEITH ALLEN | DREAMSTIME; SOUTHERN PLAINS BUMBLEBEE: BRYAN REYNOLDS | ALAMY STOCK; ALL OTHERS: NOPPADOL PAOTHONG

Bumble Bee Atlas Observations



Based on the first several years of Bumble Bee Atlas observations, the most observed native flower species visited by each of the top six most observed bumblebees in Missouri included bee balm (*Monarda fistulosa*), common milkweed (*Asclepias syriaca*), field thistle (*Cirsium discolor*), and partridge pea (*Chamaecrista fasciculata*).

Meet Some Bees

American Bumblebee

The American bumblebee (*B. pensylvanicus*) was once one of the most common bumblebee species found throughout Missouri and the eastern United States. In recent years, its distribution has contracted, and populations have declined dramatically. In Atlas data, this widespread species was found mostly in habitats with a mix of woodland and grassland and showed a marked decline in developed habitats. As a long-tongued bee, the American bumblebee can access floral resources that other species cannot. Atlas volunteers found the American bumblebee on 77 species of plants from 2020–2022, with 21 percent on native thistles, and around 15 percent each on wild bee balm, prairie blazing star, and showy partridge pea.

Southern Plains Bumblebee

The Southern Plains bumblebee (*Bombus fraternus*) is found primarily in grassland habitats, according to 70 percent of Atlas observations for this species. The main populations occur primarily in southwest Missouri, although this bumblebee can still be found on prairie remnants elsewhere, including in the City of St. Louis. Only 68 observations of this species were made from 2020–2022, with the top three visited plants being showy partridge pea (22 percent), native thistles (18 percent), and grey-headed coneflower (15 percent).

Half-Black Bumblebee

The half-black bumblebee (*Bombus vagans*) is a major success story for the Atlas. Only 11 individuals of this species were documented from 2020–2022, but this also represents the first time it has been found in the state since 2003. This species is still thought to be quite rare in Missouri and may be in decline throughout its range. The flowers most visited by half-black bumblebees were wild bee balm and American germander.

Life Cycle

Unlike the nonnative European honeybee, bumblebees have an annual colony cycle. Each nest is founded by a queen in the spring, who emerges from winter hibernation, known as diapause, and forages for nectar and pollen over the course of several weeks, which she uses to prepare for her offspring.

The queen then lays eggs in a series of wax pots inside of old mouse burrows, wren houses, or even under tufts of bunch grass, such as prairie dropseed. This first generation of offspring are worker bees whose primary job is to collect pollen and nectar so the queen can turn her energy to laying more eggs and growing the colony. Over the course of the year, the colony can grow to over 100 workers, all dedicated to collecting resources for their expanding family.

At the end of the colony life cycle, sometime from mid-summer to fall depending on the species, the colony begins to produce new queens and reproductive males known as drones. Finally, after a new queen mates, she searches for a sheltered location to overwinter. Come spring, the process begins anew.

Bumblebees are generalist pollinators, meaning they can collect pollen and nectar from a wide range of plant species and can be found just about anywhere flowering plants occur. Workers will venture up to a mile to find flowers and, within this range, will learn to efficiently forage on only a few widely available flower species, focusing primarily on those plants during the few weeks of their lives.

Pollen is only consumed by juvenile offspring and provides protein necessary to grow the next generations of workers. Nectar provides calories for both juvenile and adult worker bees.

When workers forage, they collect pollen from anthers and actively pack the grains into hair "baskets," called corbiculae, on their hind legs to take back to the nest. During this process, rogue pollen also gets stuck between hairs elsewhere on the bee's bodies. As they move between plants, this pollen is brushed off and subsequently fertilizes the flower, ensuring that seed can be produced.

Bumblebee Declines

The primary threat to bumblebees and other pollinators, including monarchs, is the loss of habitat that provides abundant floral resources and protected nesting sites. With the conversion of prairies and woodlands to agricultural fields and housing developments, large patches of habitat are disappearing. This leaves only small, fragmented habitat "islands" in the form of public lands, gardens, and crop field edges.

In addition to habitat loss, other major threats to bumblebee health include exposure to pesticides from human activities and greater transmission of diseases proliferated by the captive rearing of bumblebee colonies for greenhouse crop pollination.

What You Can Do

Volunteering for the Atlas is just one step concerned citizens can take to help conserve pollinators. For more information about volunteering for the Bumble Bee Atlas, visit **mobumblebeeatlas.org**.

If catching bees doesn't sound appealing, there are other local solutions to help mitigate pollinator declines.

The easiest answer is to plant native plants. Native pollinators rely on native plants for the pollen and nectar they need to thrive. While ornamental roses may be a beautiful landscaping option, years of cultivation have limited these plants' ability to produce nectar and pollen. This is true for many ornamental plants and even cultivars of native plants, which may not convey the same benefits to pollinators as their wild counterparts.

Replacing even small sections of cultivated garden beds or lawns with native species can yield outsized results. For bumblebees, planting multiple flower species with bloom times ranging from April to October can help support colonies over the course of a full generation and enable the production of the next generation of queens. Additionally, minimizing the use of pesticides on and around these plantings will help support the health of bumblebees and other insect pollinators.

To find more information about planting natives and where to buy them, visit **grownative.org**.

Keeping our fields and forests buzzing with bumblebees contributes not only to the health of Missouri's natural ecosystems, but to the security of our domestic food supply as well. Native bees pollinate one-third of the food we eat and many food crops, such as tomatoes and peppers, require native bees for adequate pollination. Keeping these species on the landscape helps secure the long-term health of people and plants. ▲

Steve Buback is a natural history biologist with MDC, based out of Columbia. Alex Morphew is MDC's pollinator ecologist, based out of Columbia.

Planting native wildflowers helps attract bees, providing them with the nectar and pollen they need. Aromatic aster is one of the many native species that can be grown in gardens and prairie plantings to attract bumblebees and other native pollinators.

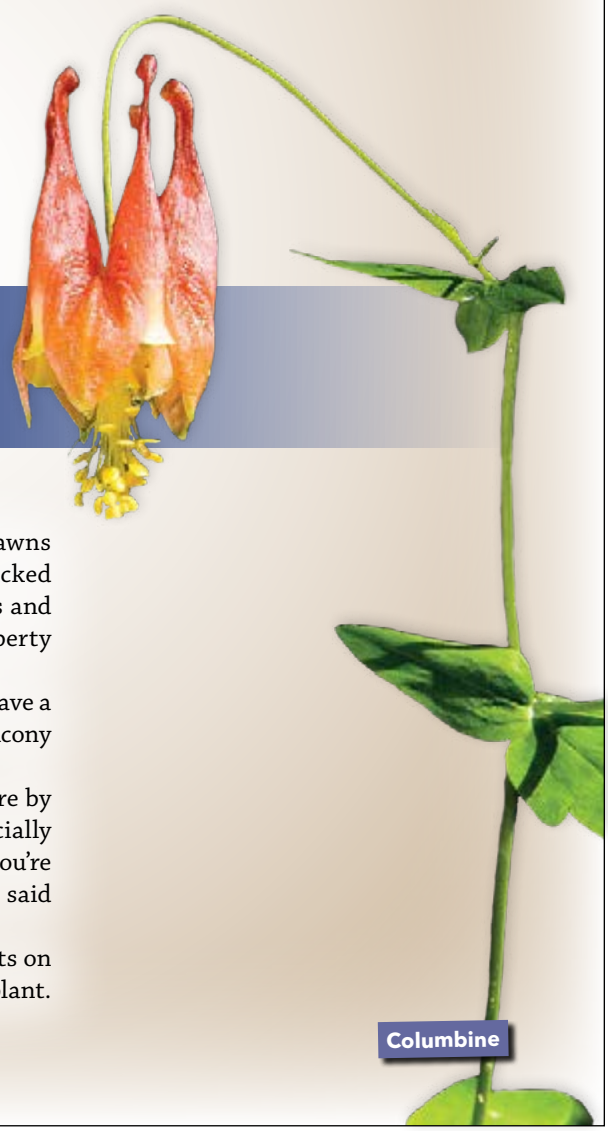
Common eastern bumblebee

AMERICAN BUMBLEBEE, COMMON EASTERN BUMBLBEE: NOPPADOL PAOTHONG, SOUTHERN PLAINS BUMBLEBEE: WIRESTOCK | DREAMSTIME; HALF-BLACK BUMBLEBEE: DAVID CAPPAERT, BUGWOOD.ORG; GIRL PLANTING: CLIFF WHITE

Prairie ON THE Patio

CONTAINERS OFFER NATIVE PLANT OPTIONS FOR LIMITED LANDSCAPES

by Larry Archer



Columbine

In recent years, the trend toward replacing manicured lawns and exotic ornamental flowers with native plants has picked up traction. Led by natives' positive effects on pollinators and nature in general, their benefits have convinced many property owners to rethink their gardening.

And while gardens — or acres — of native flowers can have a tremendous effect on nature, what is one to do who has a balcony instead of a backyard or a patio instead of a pasture?

"Even if you have a small space, you can still help nature by having planted container gardens with native plants, especially since our native pollinators prefer our native flowers, then you're helping even more by having those food supplies there," said MDC Native Landscape Specialist Alix Daniel.

According to Daniel, success in container gardening rests on three elements: the right place, the right pot, and the right plant.

Containers offer opportunities for those wanting to grow native plants but lack the space.

PHOTOGRAPH BY NOPPADOL PAOTHONG

The Right PLACE

Just as one would with in-ground gardening, familiarity with the available sunlight will strongly influence the likely success of one's container garden.

"It all starts the same way," said Cydney Ross, outdoor education program manager for Deep Roots KC, a Kansas City-based not-for-profit that promotes the use of native plants in landscaping. "It's about the site assessment, it's about knowing the right plant for the right place. I always talk about the importance of just really spending the time to get to know your space because those observational notes — like what time of day is the sunlight hitting your space — are going to inform your planting choices."

Most plants are classified as needing either full sunlight, part sunlight, part shade, or full shade. A sun survey — taking an hourly look at your available space sometime during mid-June and noting how much sun it gets — provides the best estimate, but south-facing spaces, such as balconies, typically get full sun, while north-facing ones are more likely to be full shade.

Less obvious are terms like part sun and part shade, said Daniel.

"There is a difference between part shade and part sun," she said. "Part shade is four hours-ish of morning sunlight followed by afternoon shade. Part sun gets its shade in the morning, and it gets that hot afternoon sun, probably around four hours."

The Right POT

A walk down an aisle of any gardening or home improvement store will quickly provide a person with a dazzling assortment of flowerpots of every shape, size, and material (See The Right Plant for the Right Pot and Place on Page 19).

As the pots increase in size, the number of appropriate plants for those pots also increase. Also, plants that can thrive in small pots can also work in larger pots, but the opposite is not true — plants requiring larger pots do not do well in smaller pots. The space available will generally help make the decision.

And while pots come in a variety of materials, including clay, plastic, and metal, Ross has her favorite.

"Terracotta is your best bet," she said. "I would say unglazed terracotta is going to be your best bet. The problem with ceramic glazed pots is they're usually glazed on the outside, and when they get that moisture and then freeze, they're going to crack."

The Right PLANT

Once a location and pot are chosen, it is time to go shopping for plants. Staff at a native plant nursery can help you pair your available sun and pot space with the right plant. To find a native plant nursery near you, visit the Grow Native! website at **grownative.org**.

NOPPADOL PAOTHONG; POTS: © CHERNETSKAYA | DREAMSTIME.COM; OBOVATE, CONEFLOWER, MISTFLOWER, PINKROOT: JIM RATHERT; PHLOX: DAVID STONNER; ALUMROOT: MARY ELLEN (MEL) HARTE, BUGWOOD.ORG; PUSSYTOES, PRICKLY PEAR, YARROW, BULESTAR: MDC PHOTOS

The Right Plant FOR THE Right Pot and Place

(As suggested by the naturalists at The Anita B. Gorman Conservation Discovery Center)

	FULL SUN	PART SHADE/PART SUN	SHADE
 **SMALL POT** HOLDS UP TO 3 GALLONS (.46 CUBIC FEET) OF SOIL	 **Fame flower** (*Phemeranthus calycinus*)	 **Golden groundsel** (*Packera obovata*)  **Pussytoes** (*Antennaria parlinii*)	 **Little flower alumroot** (*Heuchera parviflora*)
 **MEDIUM POT** HOLDS UP TO 5 GALLONS (.69 CUBIC FEET) OF SOIL	 **Eastern prickly pear** (*Opuntia humifusa*)	 **Meadow anemone** (*Anemone canadensis*)  **Yarrow** (*Achillea millefolium*)	 **Woodland phlox** (*Phlox divaricata*)
 **LARGE POT** HOLDS UP TO 10 GALLONS (1.5 CUBIC FEET) OF SOIL	 **Missouri coneflower** (*Rudbeckia missouriensis*)	 **Blue mistflower** (*Conoclinium coelestinum*)  **Thread-leaved bluestar** (*Amsonia ciliata*)	 **Woodland pinkroot** (*Spigelia marilandica*)

Fame flower

Familiarity with Missouri's various habitat types also helps in choosing plants for containers. Daniel and Ross both suggest glade species for smaller containers, while prairie species, with their deeper root systems, require larger pots.

"When you go out into a glade, it is usually rocky and it has very shallow soil," Ross said. "So, the plants that naturally grow there can handle dry, rocky, shallow soil and heat. And that's very similar to the conditions of a pot. Especially a small pot."

"And I love fame flower because it's literally a succulent, and I think a lot of people have either tried succulents before or are familiar," Daniel added. "So, it's a really easy plant to take care of."

The Grow Native! website's native plant database also allows you to search for plants recognized as working well in containers. It also allows you to search by available sunlight and other factors, such as color, season of blooming, and the type of nature the plant attracts.

The Right PLAN

One of the main benefits of gardening with natives is that once established, they require much less maintenance than nonnatives. Unfortunately, that characteristic doesn't necessarily transfer to natives in containers.

Mervin Wallace, owner of Missouri Wildflower Nursery, Jefferson City, has been growing native plants in containers nearly 20 years as a way to display mature plants. In addition to choosing the right container, Wallace suggests special attention to several elements of container gardening: soil, fertilizer, watering, and winter care.

Eastern prickly pear cactus

While Wallace uses a potting soil made of a mix of rice hulls, pine bark, compost, and Turface (a commercial soil additive), he's also seeing success with regular topsoil, he said.

"And I think I'm learning that real dirt is pretty important," he said. "Normally you don't think of using real dirt in a pot, but it's working in these big containers."

And regardless of soil in the pot, it will settle to the point where more is needed, he added.

"So, when you're growing native plants in pots over time, one of the things you have to do is add soil."

He also noted that new soil should be added to the bottom of the pot, requiring the plant to be removed, soil added, and the plant repotted.

Because potted plants lose nutrients over time, keeping plants healthy over several seasons requires occasional fertilization, he said.

"Fertilizer's important because your pot is a closed system, and the plant's using nutrients out of that soil," he said. "They don't need a lot, but they need some."

Container-grown natives require more attention when it comes to watering. Wallace suggests avoiding a set schedule and basing your watering on the plant, pot size, and weather. Smaller pots require more frequent watering than large pots, but even that is influenced by the type of plant in the pot. For example, glade species, such as fame flower (*Talinum calycinum*) and eastern prickly pear cactus (*Opuntia humifusa*), do well in small pots, but are accustomed to drier conditions, so they require less watering.

Just like their in-ground counterparts, container-grown natives are accustomed to Missouri winters, so they are fine to be left on the ground outside, where the occasional rain or snow should be sufficient to keep them going until spring, he said. Species that are more common to southern Missouri might benefit from overwintering in an unheated garage or insulated under a pile of leaves.

The Right PERSPECTIVE

After one becomes comfortable with natives in containers, it's an easy step to expand to multiple species in a single pot or even water plants.

And while a few containers with natives may not have the same effect as a garden in the yard or fields of wildflowers, the benefits are still there, Wallace said.

"It's a small token, granted, but it does happen, and you get to see not just the flower, but you get to see what visits it — the interaction of you and nature and nature with nature." ▲

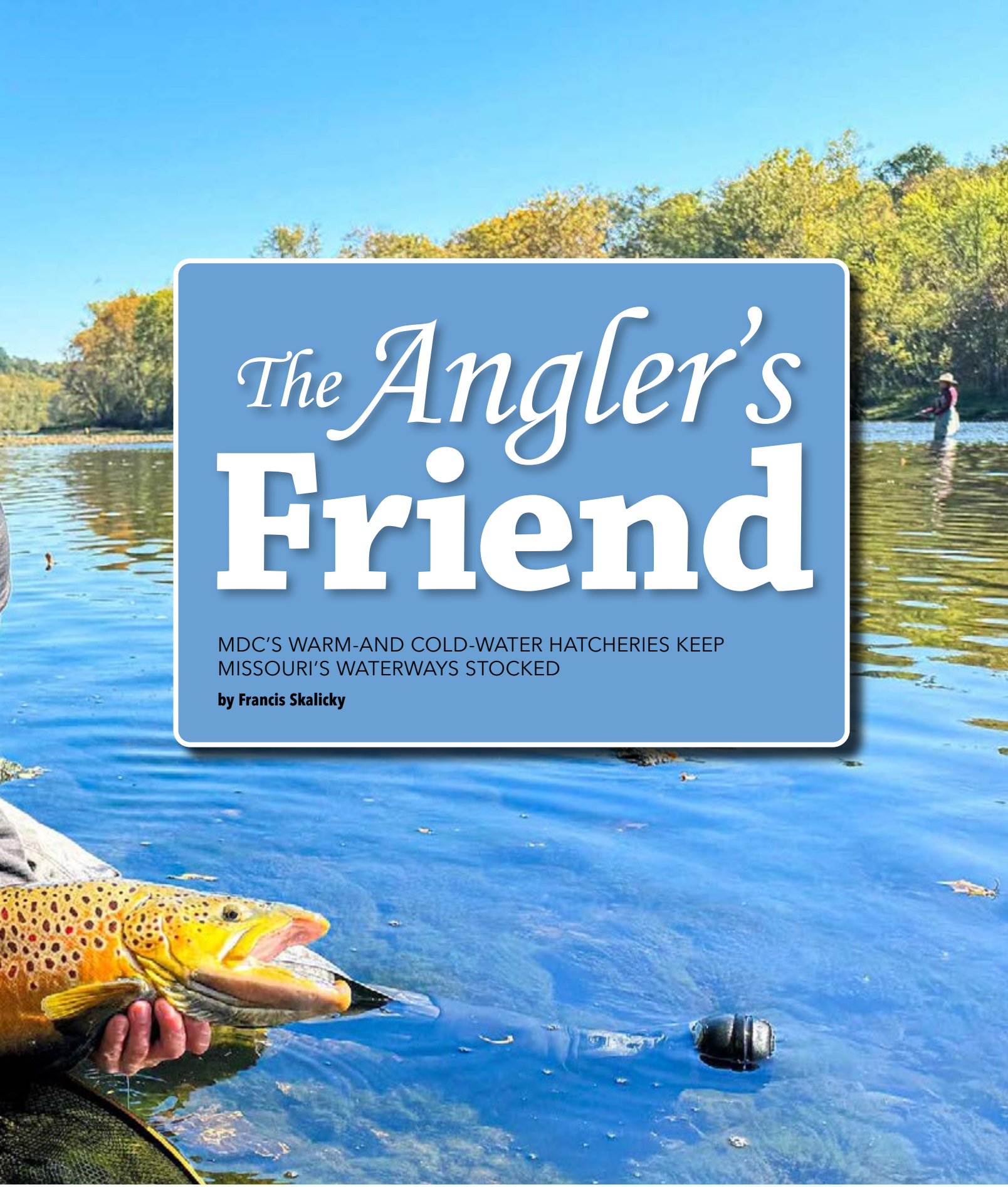
Larry Archer is the associate editor of the Missouri Conservationist.

> "You get to see not just the flower, but you get to see what visits it — the interaction of you and nature and nature with nature."
>
> — Mervin Wallace

NOPPADOL PAOTHONG; EASTERN PRICKLY PEAR CACTUS: MDC FILE; POT IN THE SNOW: CYDNEY ROSS

Matt Weber of Washington shows off a brown trout, caught at Lake Taneycomo. The trout weighed in at 12 lbs., 8 oz. and measured 28 inches.

PHOTOGRAPH COURTESY OF MATT WEBER



The Angler's Friend

MDC'S WARM-AND COLD-WATER HATCHERIES KEEP MISSOURI'S WATERWAYS STOCKED

by Francis Skalicky

An aerial view of Blind Pony, a warm-water hatchery near Sweet Springs, shows the raceways that help fish progress through their growth stages until they are ready to be stocked in public waterways.

You won't find a dissolved oxygen meter or a Secchi disk in an angler's tackle box. Nor will you see a UV disinfection device or a fish egg sorter.

However, in terms of fishing success, these items are as integral to improving the chances of reeling in some of Missouri's popular sportfish as crankbaits, jigs, and hand-tied flies. Because of the important role MDC's fish hatcheries play in sustaining a number of sportfish populations, behind-the-scenes aquatic science has become as important to Missouri's fishing success as on-the-water angler savvy.

"MDC hatcheries play a vital role in fisheries management plans to support sportfish populations in waterbodies throughout the state," said MDC Hatcheries Systems Manager Clint Hale. "Many fishing experiences would simply not be possible without the work of MDC's hatcheries."

> "Hatcheries increase recruitment, retention, and reactivation of anglers through stockings and public outreach."
>
> — Clint Hale

To be clear, not every Missouri fish's story has a lineage that traces back to the raceways and rearing ponds of an MDC hatchery. The spawning journeys walleye and white bass make each March and the crappie spawn in April are examples of naturally occurring fish propagation events that anglers across the state set their calendars by each year.

However, along with nature, human-made nurture also provides boosts to several of the state's fish species. On an annual basis, MDC hatcheries produce more than 4 million fish representing 10 different species (see sidebar on Page 25). This infusion of variety isn't just about making sure there are large numbers of fish in Missouri's waters. It's also about making sure there are large numbers of people trying to catch them.

"Hatcheries increase recruitment, retention, and reactivation of anglers through stockings and public outreach," Hale said.

MDC's fish hatcheries fall into two categories, warm-water and cold-water. In addition to adding variety to Missouri's fishing opportunities, some of MDC's warm-water and cold-water hatcheries also are great places to visit. MDC's five cold-water hatcheries (Bennett Spring near Lebanon, Roaring River near Cassville, Montauk near Salem, Maramec Spring near St. James, and Shepherd of the Hills near Branson) raise rainbow trout and brown trout that are released at their fishing areas and at trout management areas across the state.

MDC's four warm-water hatcheries (Lost Valley near Warsaw, Chesapeake near Mount Vernon, Blind Pony near Sweet Springs, and Hunnewell in Shelby County) provide a variety of sportfish. Some of the species they produce — such as walleye, channel catfish, and bluegill — are used to enhance natural-reproducing populations at reservoirs throughout the state. Other species — such as paddlefish and muskie — are raised and added to populations that experience little or no natural reproduction in Missouri waters.

Some of the state's warm-water hatcheries are also used to sustain threatened species such as Topeka shiners and lake sturgeon.

Cold-Water Hatcheries

Rainbow trout are the species raised at all of MDC's cold-water hatcheries. In addition to rainbow trout, brown trout are also raised at Shepherd of the Hills Hatchery.

Raising trout from egg to a stocking size of 12.5 inches is a two-year process that starts in late fall or early winter. It begins with eggs being taken from gravid females and fertilized with milt (the trout equivalent of sperm), which is extracted from the males.

Fertilized eggs are put in specialized incubation holders — called up-welling jars — where their progress is monitored and manipulated to produce hatching success. When hatching occurs, the tiny sac-fry (the term used for newborn fish) are put in special holding tanks inside the hatchery building. Here the combination of frequent feedings and the regulation of light and temperature transform the sac-fry to swim-up fry in 14–18 days. From swim-up fry, they grow to fingerlings, then subadults, then to 12-inch fish that are ready to be stocked.

Serving as the foundation of operation at each MDC cold-water hatchery is a steady supply of cold water. At Bennett Spring, Roaring River, Montauk, and Maramec Spring hatcheries, the cold water comes from naturally occurring springs. At Shepherd of the Hills Hatchery, the cold water is the result of water that comes from the bottom of Table Rock Lake and gets released through Table Rock Dam to the hatchery and the adjacent Lake Taneycomo.

Neither rainbow trout nor brown trout are native to Missouri. The cold-water conditions that exist at MDC hatcheries mirror the water conditions found in trout's native habitat (northern California and the Pacific Northwest for rainbow trout, Europe and parts of Asia for brown trout). Since their introduction to Missouri and other states, trout have become extremely popular.

"Trout are popular with anglers for a number of reasons," said Allen Brandes, who is the retired hatchery systems supervisor for MDC's cold-water hatcheries. "Trout inhabit some of the most beautiful and pristine areas in the state. Also, tying your own flies is a hobby practiced by many who pursue trout. Being able to catch trout on a lure created by your own hands attracts many anglers to this sport. Some anglers simply chase trout for their taste, which can be prepared in numerous recipes by a variety of cooking methods."

Trout eggs (above) and fry (inset) are raised in cold-water hatcheries.

HATCHERY, FRY: DAVID STONNER; EGGS: NOPPADOL PAOTHONG

Species Hatched in MDC Hatcheries

On an annual basis, MDC hatcheries produce more than 4 million fish representing 10 different species:

Trout*	1,658,000
Walleye	1,700,000
Channel catfish	260,000
Bluegill	25,000
Sunfish	45,000 hybrid
Paddlefish	60,000
Blue catfish	3,000
Hybrid striped bass	265,000
Muskie	6,800
Lake sturgeon	10,000

*1,620,000 rainbow trout, and 38,000 brown trout

Making a Fish

An interesting and extremely popular product of MDC's warm-water hatchery system are hybrid sunfish. These fish, which range in size from 6–7.5 inches and are used for stockings at fishing events throughout the state, all have their beginnings at a hatchery. Here's the recipe:

Male bluegill are paired with female green sunfish in a hatchery pond each spring. They will spawn throughout the summer, often producing more than 100,000 hybrid fish offspring.

These offspring are fed in the same pond and most of them usually attain a size of 2–5 inches by the end of their first summer and some will grow to 6 inches. The following spring, these fish are removed from the pond and separated by size. The fish 6 inches and larger are used for stocking in the early spring. The 4–6-inch fish are put back into a hatchery pond for further growth and potential stocking in late spring and/or early fall. The 2–4-inch fish are also put into hatchery ponds for further growth so they can be stocked in the coming fall or the following spring.

"If you're trying to get a kid interested in fishing, this is the species you want," Blind Pony Hatchery Manager Nathan Storts said of the hybrid sunfish. "They bite so well that they practically bite themselves out of existence until more are created."

Warm-Water Hatcheries

MDC's warm-water hatcheries perform a variety of functions in the state's fish production system, but the bulk of the fish they produce fulfill three basic needs:

Restoration stockings: These are stockings where fish are put in a body of water that is lacking in these species, such as a new or renovated reservoir that needs to be stocked with specified species (in the correct ratio) to get the reservoir on the road to becoming a productive fishery.

Special event stockings: These stockings are primarily in the spring and summer and consist of hybrid sunfish and channel catfish that are stocked to enhance the fishing opportunity for the event's participants.

Supplemental stockings: These are the most common destinations for fish raised at MDC's warm-water hatcheries. Supplemental stockings help maintain populations of popular sportfish species at desired levels. The need for these stockings can be for a variety of reasons, depending on the management goals for the population structure at a specific reservoir or stream.

Staff work in a raceway at Blind Pony to tag a subset of juvenile paddlefish (above) prior to stocking to aid with survival studies (right).

"Sometimes it's because fishing pressure is greater than the natural production occurring on that body of water," said Rich Cook, who is the hatchery systems supervisor for MDC's warm-water hatcheries. "Other times, these stockings are brought about by land alterations, such as dams that restrict fish movement to historical spawning areas."

Some of the technology that has been incorporated into the fish-rearing process at warm-water hatcheries include dissolved oxygen meters, paddle-wheel aerators, microscopes, sonograms, and monitoring systems that check critical parameters on a continuous basis. The key to raising fish successfully at warm-water hatcheries is combining human technology and scientific strategies with nature's cycles.

"Our warm-water hatcheries are strictly driven by the seasons," said Kurt Hentschke, the manager at MDC's Hunnewell Hatchery. "The warm-water species spawn once each year, which means staff have one shot each year to meet

> "The warm-water species spawn once each year, which means staff have one shot each year to meet production goals."
>
> — Kurt Hentschke

production goals. Our warm-water hatcheries raise several different and unique species each year. Most require species-specific culture practices, all of which must progress simultaneously."

One feature that differentiates warm-water hatcheries from cold-water hatcheries is the water structures where the fish are raised. Warm-water hatcheries have mostly ponds, while cold-water hatcheries have concrete raceways.

"Most warm-water species are raised in ponds," said Nathan Storts, the manager of MDC's Blind Pony Hatchery, which is one of only three hatcheries in the U.S. that raises paddlefish. "This is because warm-water species require much more space to achieve growth and to maintain healthy populations."

Whether it's a warm-water or cold-water facility, the journey of a fish through a hatchery has several challenges that hatchery workers must be on the watch for at all times.

One of those challenges is weather. Too much rain can cause poor water quality due to flooding. Too much flow into a pond can prevent staff from being able to collect broodstock.

Warm-water hatcheries also must work with, and sometimes overcome, weather-related temperature fluctuations.

"Cool, cloudy weather can affect plankton production, which is what newly stocked fry will be eating," said Cook. "This will result in a lower abundance of available food. Hot and cloudy weather can result in low dissolved oxygen in the ponds. This could require supplemental oxygen and/or flushing with fresh water."

But the challenges of an MDC fish hatchery aren't restricted to weather-related issues.

"Probably one of the biggest challenges is to have a source of water that provides an adequate and steady supply of water. That water must have good quality," Cook said. Biosecurity is also a constant task to prevent the introduction and/or spread of any kind of bacteria, virus, or any other type of disease-causing organism.

"Fish in a hatchery setting are in higher densities than what are found in the wild," he said. "Hatchery staff are trained to recognize and provide treatments for fish health issues they encounter. MDC also has staff trained in fish health that will identify issues and give recommendations on treatment options."

Put everything together that takes place in MDC's cold-water and warm-water hatcheries and the result is a system designed to keep pace with the biological and recreational fish demands of the state. It's a conservation version of supply and demand.

"Fish hatchery production systems try to meet annual stocking requests to sustain sport fisheries statewide," said Drew Burdick, the manager of MDC's Lost Valley Hatchery. "In other words, our role is to provide a high-quality product to the public and other stakeholders ensuring that Missourians have sustainable populations of these sportfish."

The reward of these labors are what anglers reel in at the state's lakes and streams.

"MDC's fish hatchery jobs are rewarding because we are actually making a difference in fish populations and in some individuals' quality of life," Hale said.

"I enjoy seeing people out fishing or seeing pictures of catches of those species that we raise and stock," Cook said. "It is a good feeling knowing that a fish that was caught might be one that we raised and released." ▲

Francis Skalicky has been the media specialist for MDC's Southwest Region since Jan. 1, 1996. He lives in Springfield and enjoys the outdoors with his family as often as possible.

HYBRID SUNFISH: JIM RATHERT; HATCHERY WORKERS, LAKE STOCKING: DAVID STONNER

Get Outside in FEBRUARY


Spotted salamander

Ways to connect with nature

VIRTUAL

Dalton Happenings: February

Tuesday • Feb. 6 • 12:30–1 p.m.
Online only
Registration required by Feb. 6. To register, call 888-283-0364 or visit short.mdc.mo.gov/ZLS.
All ages

Come join us for an inside look at what staff do to keep the range up and running! We will let you know about programs we have done and programs coming up. We will take you to a part of the range and show you how we take care of things from the target frames to filling the trap and skeet machines. This is a monthly series we are doing for our shooters and visitors. You will receive a link to log on the morning of the program.

Sweetheart Salamanders

February is for love, but that doesn't just apply to humans. Salamanders are also looking for love this time of year.

Spotted salamanders breed from late February to mid-March. This activity is triggered by the first warm rains and air temperature at or above 50 degrees. They congregate in fishless woodland ponds. Small-mouthed salamanders also breed starting in late February through early April. Large numbers congregate at ponds, sloughs, or flooded ditches.

For more information on Missouri's salamanders, visit **short.mdc.mo.gov/Zu7**.

One-Way Ticket North

If you hear a distant-sounding chorus of squawking yips in the evening, look up. You might be hearing snow geese flying high overhead. They overwinter in Missouri and migrate northward February through April. Their white plumage reflects lights from cities and makes their V-shaped flocks look silvery against the night sky. It's a sight and sound to behold.


Snow geese

CORALBERRY: NATALIA PAVLOVA | DREAMSTIME

Natural Events to See This Month

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


Yellow-bellied sapsuckers drill holes in trees.


Opossums mate and bear young.

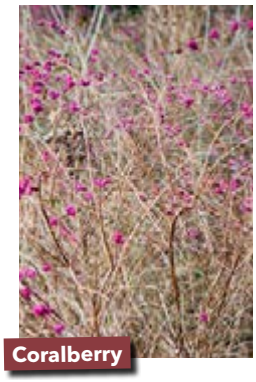

Spring peepers begin calling.

Color Crawl

Does winter's drab landscape have you feeling blue? Head outside and go on a color crawl! Nature has some hidden gems of color — even in winter — if you know where to look.

- Coralberry, or buckbrush, is not a favorite food of most animals, but its pink berries are a bright spot for hikers in the winter woods.
- Harbinger of spring is one of Missouri's earliest-blooming wildflowers. Though often overlooked due to its small size, the clusters of white flowers with prominent dark reddish-brown anthers are a delight. Look for it in bottomland forests and moist upland forests, mostly in ravines and valleys, protected areas at the bases of wooded slopes, and along streams and rivers.
- Early saxifrage is one of Missouri's earliest-blooming wildflowers. The tight clusters of white flowers appear at the top of leafless stalks. You will think spring has sprung!

For more color hiding in winter's wonderland, check out MDC's online *Field Guide* at **short.mdc.mo.gov/Z9d**.


Coralberry


Harbinger of spring


Early saxifrage

Groundhog Day

Woodchucks — or groundhogs — start to emerge from hibernation in Missouri as early as the first week of February. If you happen to see one, chances are it is an adult male. Adult males tend to emerge from hibernation before females and younger males, searching for food and mates.

Today's legend says if the groundhog sees its shadow on Feb. 2, we'll have six more weeks of winter. No shadow means an early spring. The gist of this is, if it's sunny on this day, we'll have six more weeks of winter. Old time Ozarkers had Feb. 14 as the magical day, not Feb. 2.


Woodchuck

Experience More

Want to have fun outdoors, learn about conservation, gain skills, and make happy memories? MDC hosts programs and events statewide—in-person and online. Visit **MDC Events** to find these programs and more:

- Native plants and landscaping
- Eagle Days
- Hunting and outdoor skills
- Nocturnal animals
- Guided walks and hikes

Go to **mdc.mo.gov/events** to register for an event near you.

Places to Go

NORTHEAST REGION

Atlanta Conservation Area

A lot of conservation ... and then some

by Larry Archer

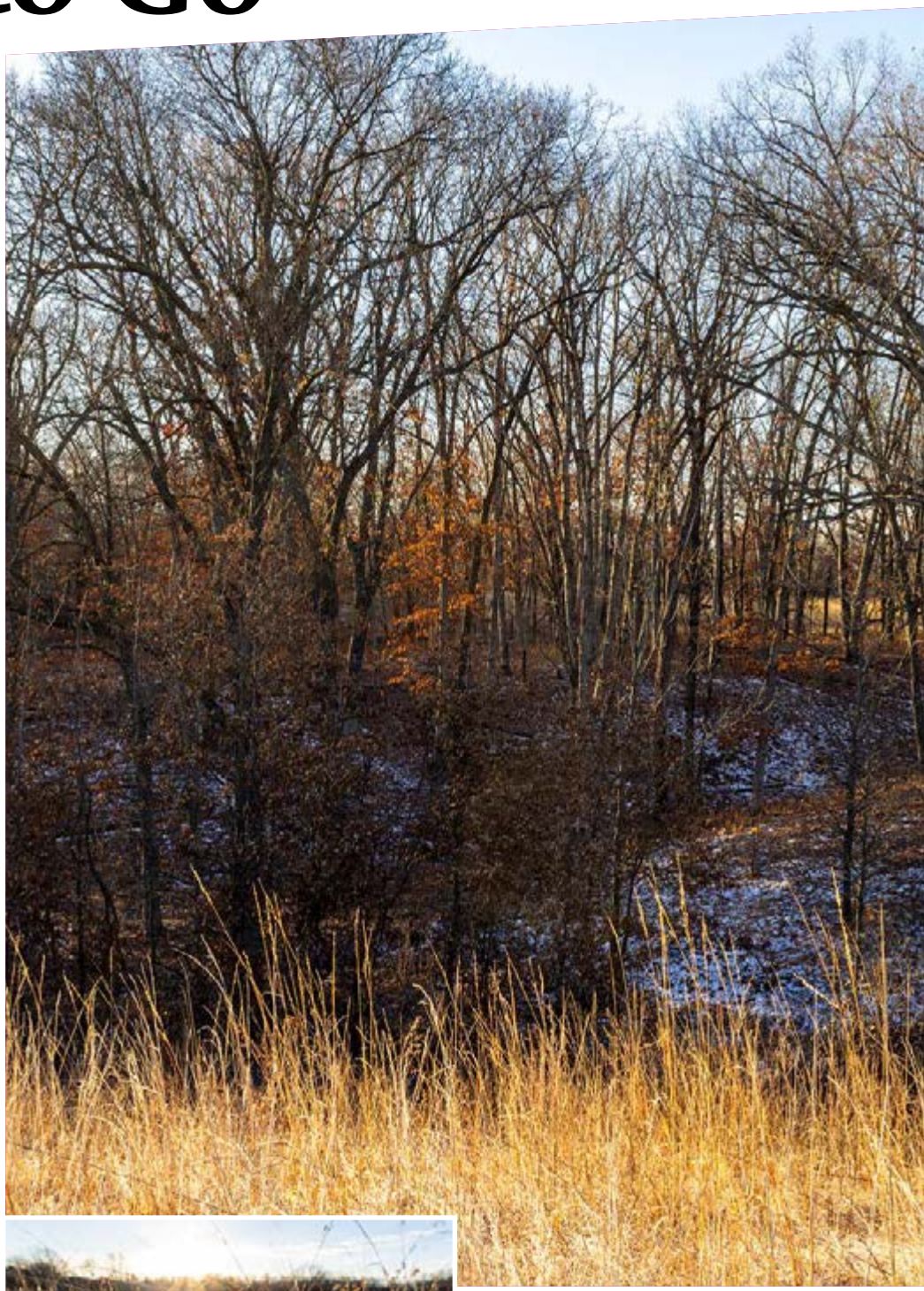
At more than 2,300 acres, Atlanta Conservation Area (CA) in Macon County offers prime hunting, fishing, hiking, biking, camping, and more, but that's just the beginning, according to Wildlife Biologist Andrea Schuetz.

"We also manage it with a portion of land called the Long Branch Management Lands (ML), which we lease from the U.S. Army Corps of Engineers," Schuetz said.

With 2,454 acres of Long Branch ML stretching along Atlanta CA's western border and an additional section connecting to the area's southeast corner, the combined area totals more than 4,800 acres and gives visitors additional access to wetland pools as well as the management land's namesake waterbody, Long Branch Lake. The adjacent Long Branch State Park also adds more than 1,800 acres of outdoor opportunities.

A popular deer and turkey hunting destination during spring and fall seasons, Atlanta CA experiences a slowdown of visitors in February, but the area's rifle and pistol range remains open, and its wetland pools draw early migrating waterfowl. And while it's no longer deer hunting season, February makes a good time for hunting shed antlers, she said.

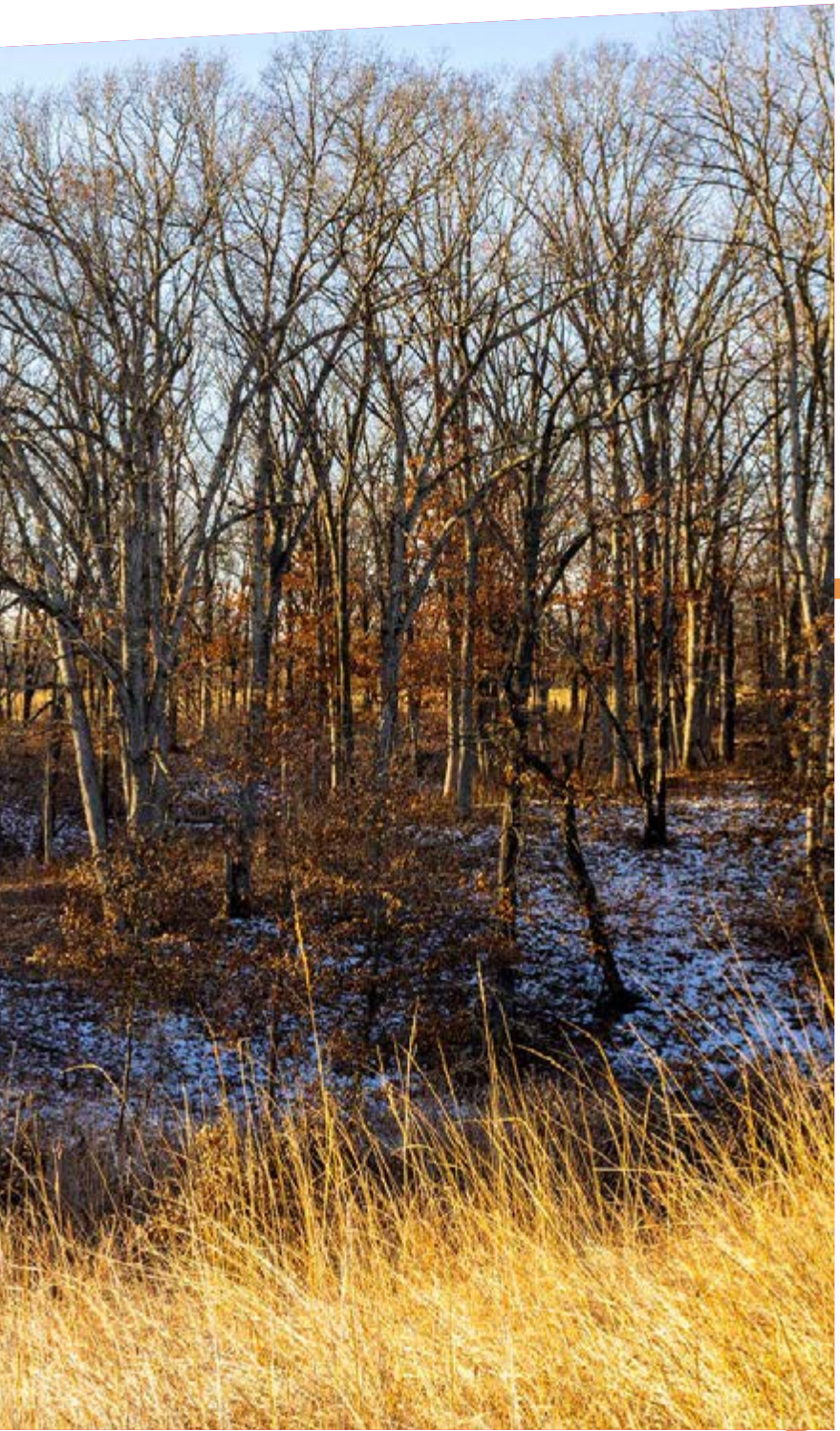
"You might not see monster sheds, but you'll definitely find some sheds in February at Atlanta."

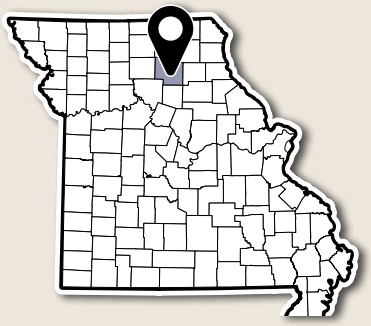


"We've got quite a few ponds on Atlanta that our fisheries biologist does a great job of keeping the vegetation cleared off as best they can, and they monitor them and stock them as needed."

—Wildlife Biologist Andrea Schuetz

NOPPADOL PAOTHONG





ATLANTA CONSERVATION AREA

consists of 2,355.4 acres in Macon County. From Macon, take Hwy. 63 north 5 miles, then Route AX west 2 miles, and Jupiter Ave. north 2.5 miles.

39.8855, -92.5055

short.mdc.mo.gov/ZRs 660-785-2420

WHAT TO DO WHEN YOU VISIT

Biking Service roads totaling 14.9 miles, plus 1 mile of improved road.

Birdwatching The eBird list of birds recorded at Atlanta CA is available at **short.mdc.mo.gov/ZLX**.

Camping Eleven individual campsites, primarily adjacent to parking lots. Walk-in open camping allowed (except during firearms deer and spring turkey seasons).

Fishing Seven fishing ponds, 4 miles of frontage to Long Branch Creek, and access to nearby Long Branch Lake. Black bass, catfish, sunfish.

Hiking No designated hiking trails, but 14.9 miles of service roads.

Hunting **Deer** and **turkey** Regulations are subject to annual changes. Refer to MDC's regulation page online at **short.mdc.mo.gov/Zjw**.

Also **dove**, **quail**, **rabbit**, and **squirrel**

Shooting Range Rifle and pistol.

Trapping Special use permit required.

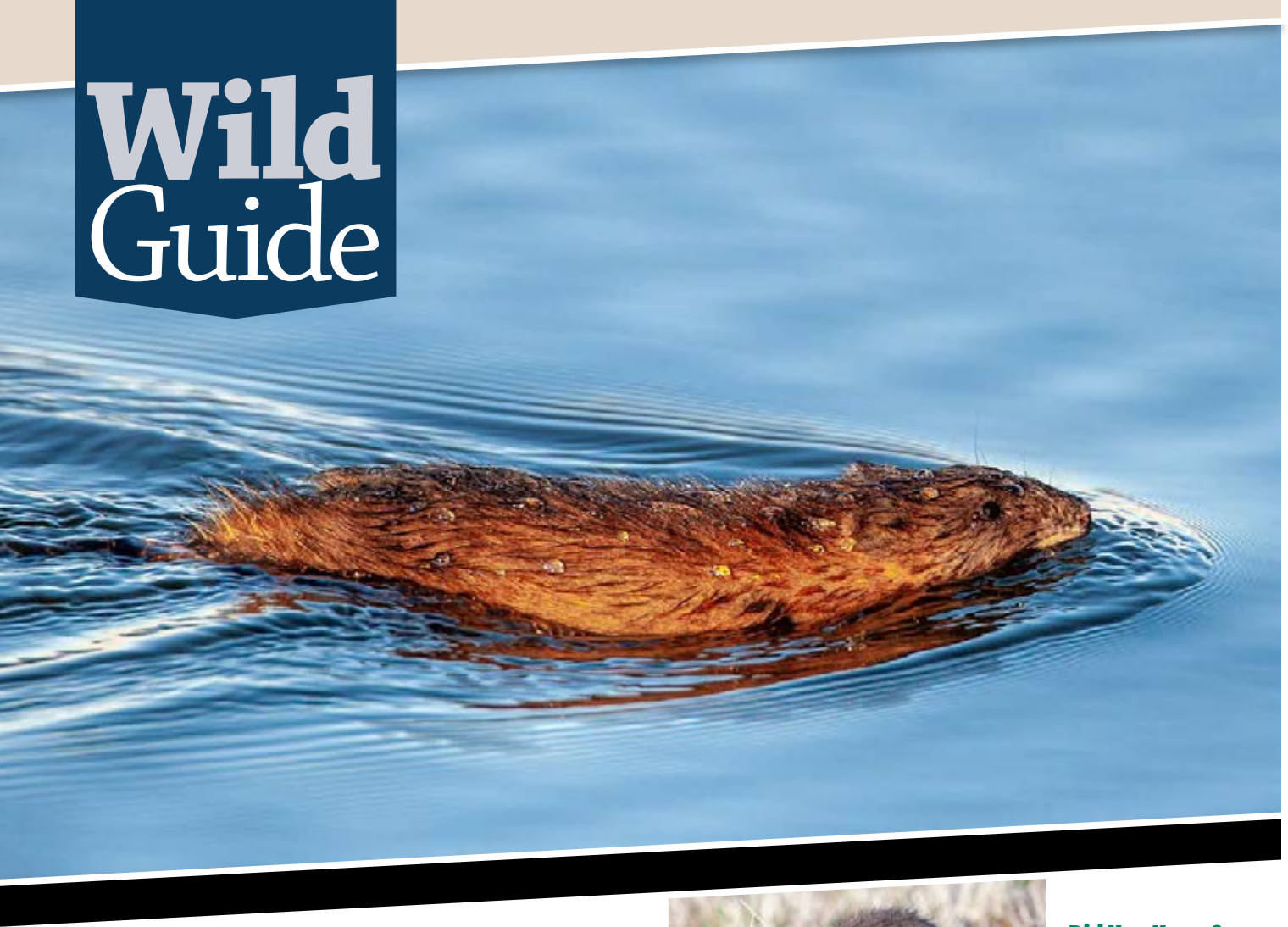
Waterfowl Hunting Open hunting.

WHAT TO LOOK FOR WHEN YOU VISIT

Snow goose

White-tailed deer

Wild Guide



Common Muskrat

Ondatra zibethicus

Status	Size	Distribution
Common	Total length: 16–25 inches; weight: 1½–4 pounds	Statewide

The common muskrat is a medium-sized mammal that has short front legs with small feet, stronger hind legs with large, partially webbed feet, and a vertically flattened, scaly tail that is slightly shorter than the combined length of its head and body.

Muskrats are semiaquatic, living in marshes, sloughs, streams, rivers, ponds, and lakes. They dig homes in a stream or pond bank or build large houses out of vegetation in the shallow water. The nest, or den, is reached by means of a tunnel that usually opens under water.

Did You Know?
As omnivores, muskrats help control populations of both the plants and the small animals they consume. The dens, mounds, tunnels, and canals they construct become habitat for other organisms to use.

LIFE CYCLE

Muskrats breed from late winter to mid-September with three peak times — March, April, and May. Females are pregnant for 28 days and bear two to three litters annually, each containing four to seven kits. Within two weeks, the kits can swim and dive, and within a month, they are weaned.

FOODS

Muskrats in marshy areas eat rootstocks and stems of cattail, three-square bulrush, and the seeds of lotus. Along Ozark streams, muskrats eat freshwater clams, snails, crayfish, fish, frogs, and aquatic plants. In other areas of the state, white clover, corn, and bluegrass are preferred.

HUMAN CONNECTIONS

Muskrat pelts are common on the commercial market, used in the manufacture of women's coats. The fur is durable, the skin makes strong leather, and takes dye well.

NOPPADOL PAOTHONG

Outdoor Calendar

MISSOURI DEPARTMENT OF CONSERVATION

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**.

Free MO Hunting and MO Fishing Apps

MO Hunting makes it easy to view permits, electronically notch them, and Telecheck your harvest. MO Fishing lets you view 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 27, 2023–Feb. 29, 2024
- Catch-and-Release:
  March 1–May 24, 2024

Nongame Fish Gigging

Streams and impounded waters, sunrise to midnight:
Sept. 15, 2023–Feb. 15, 2024

Impounded waters, sunrise to sunset:
Feb. 16–Sept. 14, 2024

Paddlefish

Statewide:
March 15–April 30, 2024

On the Mississippi River:
March 15–May 15, 2024
Sept. 15–Dec. 15, 2024

Trout Parks

During the catch-and-release season, state trout parks (except Maramec Spring Park) are open only Friday–Monday.

Catch-and-Release:
Nov. 10, 2023–Feb. 12, 2024

Catch-and-Keep:
March 1–Oct. 31, 2024

HUNTING

Bobcat, Opossum, Raccoon, Striped Skunk

Nov. 15, 2023–Feb. 29, 2024

Coyote

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

Open all year

Crows

Nov. 1, 2023–March 3, 2024

Deer

Archery:
Sept. 15–Nov. 15, 2024
Nov. 27, 2024–Jan. 15, 2025

Firearms:

- Early Antlerless Portion (open areas only): Oct. 11–13, 2024
- Early Youth Portion (ages 6–15): Nov. 2–3, 2024
- November Portion: Nov. 16–26, 2024
- CWD Portion (open areas only): Nov. 27–Dec. 1, 2024
- Late Youth Portion (ages 6–15): Nov. 29–Dec. 1, 2024
- Late Antlerless Portion (open areas only): Dec. 7–15, 2024
- Alternative Methods Portion: Dec. 28, 2024–Jan. 7, 2025

Rabbits

Oct. 1, 2023–Feb. 15, 2024

Squirrels

May 27, 2023–Feb. 15, 2024

Turkey

Archery:
Sept. 15–Nov. 15, 2024
Nov. 27, 2024–Jan. 15, 2025

Firearms:

- Youth (ages 6–15): April 6–7, 2024
- Spring: April 15–May 5, 2024
- Fall: Oct. 1–31, 2024

Waterfowl

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

TRAPPING

Beaver, Nutria

Nov. 15, 2023–March 31, 2024

Bobcat, Coyote, Mink, Muskrat, Opossum, Raccoon, River Otter, Striped Skunk

Nov. 15, 2023–Feb. 29, 2024

Special Trapping Season for Private Lands Only: Coyote, Opossum, Raccoon, Striped Skunk

March 1–April 14, 2024

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Serving nature and you®

February can be a winter wonderland in Missouri – filled with natural wonders like fall leaves frozen in time. Get out and explore! What will you discover?

by **Noppadol Paothong**

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