

MISSOURI CONSERVATIONIST

VOLUME 85, ISSUE 3, MARCH 2024
SERVING NATURE & YOU





Xplor



Looking for a way to coax your kids to unplug, climb off the couch, and get outside? Then check out *Xplor*, the Conservation Department's free magazine for kids and kids at heart.

Six times a year, *Xplor* serves up eye-popping art, photos, and stories about Missouri's coolest critters, niftiest natural places, and liveliest outdoor activities. The magazine is free to Missouri residents (one subscription per household, please). Out-of-state subscribers pay \$7 per year; out-of-country subscribers pay \$11.

**INSPIRE THE CHILDREN
IN YOUR LIFE TO GET OUTSIDE.**

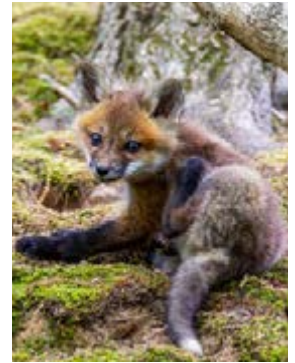
Subscribe online at
mdc.mo.gov/xplor



Contents

MARCH 2024
VOLUME 85, ISSUE 3

MISSOURI
CONSERVATIONIST



ON THE COVER

A fox kit leaves the den in early spring.

NOPPADOL PAOTHONG

600mm lens with 2x, f/8
1/160 sec, ISO 1600

GOVERNOR

Michael L. Parson

THE CONSERVATION COMMISSION

CHAIR Steven D. Harrison

VICE CHAIR Margaret F. Eckelkamp

SECRETARY Mark L. McHenry

MEMBER Raymond T. Wagner Jr.

DIRECTOR

Sara Parker Pauley

DEPUTY DIRECTORS

Aaron Jeffries, Jason Summers,
Tom Neubauer (acting)

MAGAZINE STAFF

MAGAZINE MANAGER

Stephanie Thurber

EDITOR

Angie Daly Morfeld

ASSOCIATE EDITOR

Larry Archer

PHOTOGRAPHY EDITOR

Cliff White

STAFF WRITERS

Kristie Hilgedick, Joe Jerek,
Dianne Van Dien

DESIGNERS

Shawn Carey, Marci Porter

PHOTOGRAPHERS

Noppadol Paothong, David Stonner

CIRCULATION

Marcia Hale

mdc.mo.gov/conmag



FEATURES

10 Motus

Tracking birds and growing partnerships across the hemisphere.

by Sarah Kendrick

18 Show Me a Place

Boone County Nature School takes education outdoors.

by Brian Flowers

22 Infinite Healing

Spring's renewing splendor ushers in new beginnings.

DEPARTMENTS

- 2 Inbox
- 3 Up Front with Sara Parker Pauley
- 4 Nature Lab
- 5 In Brief
- 28 Get Outside
- 30 Places To Go
- 32 Wild Guide
- 33 Outdoor Calendar



Nine-banded armadillo



Download this issue to your phone or tablet at mdc.mo.gov/mocon.



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

Explore both the latest and past issues on the MO Con Mag app!



BLUE DECEMBER

I enjoy reading my mother's *Missouri Conservationist* when I visit my Missouri home. The December issue's photograph by Ben Caruthers [Night sky over McCormack Lake, Mark Twain National Forest, *Eye of the Beholder*, Pages 16-17], alight with various shades of dancing twilight, was a fitting homage to its forest namesake Mark Twain. The inky blues, that no doubt ran through his veins, were in full display in that awesome image. I write this letter full of pride for our Hannibal gift and in thanks for your lovely photograph.

Pamela Grainger Tilson Hendersonville, NC

PRINTER'S PRIDE

I ran a printing press for 40 years, but I am now retired. Whenever I read a magazine, I look to see how well it is printed. I always look at the screens and the reverse type to see if there's any shadow. Whoever does your printing does a very good job. I always took pride in what I was printing, and I can tell they do, too. I love the magazine. Keep up the good work.

Dale Francis Fenton

Editor's note: The Missouri Conservationist is printed by LSC Communications in Liberty, MO.



XPLOR MORE

The *Missouri Conservationist* magazine is great, but the magazine my daughter gets, *Xplor*, is phenomenally educational in all ways and on every page. The raptor section in the January/February 2024 issue [*Hunters of the Skies*, Page 12] was truly educational. I read it front to back and then we are sharing it with my grandsons, who live in Nebraska. Thank you all for it.

Marianne Kaempfe via email

Editor's note: Xplor reconnects kids to nature and helps them find adventure in their own backyard. Though it's designed for kids, it captures the hearts and minds of all ages. There's always something new to learn at any age within the pages of this bi-monthly magazine. For more information, visit mdc.mo.gov/xplor.

Connect With Us!

- /moconservation
- @moconservation
- @MDC_online

Conservation Headquarters

573-751-4115
PO Box 180
Jefferson City, MO
65102-0180

Regional Offices

Southeast/Cape Girardeau: 573-290-5730	Southwest/Springfield: 417-895-6880
Central/Columbia: 573-815-7900	Northwest/St. Joseph: 816-271-3100
Kansas City: 816-622-0900	St. Louis: 636-441-4554
Northeast/Kirksville: 660-785-2420	Ozark/West Plains: 417-256-7161



Have a Question for a Commissioner?

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

MISSOURI CONSERVATION COMMISSIONERS



Margy Eckelkamp



Steven Harrison



Mark McHenry



Ray Wagner Jr.

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](https://www.flickr.com/groups/mdcreaderphotos-2024) or email Readerphoto@mdc.mo.gov.



1

1 | Trout season by Sara McCarty, via email

2 | Jumping spider by Christian Gott, via email

3 | Spring turtle by Steven Haddix, via Flickr



2



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

✳ Oh, to be a child again — with a heart wide open to awe and wonder. When a walk through the woods is no mere act of the ordinary kind, but an awakening to nature’s mystery and allure. Yet, how does one hold onto this childlike spirit? After more than three decades in the natural resource profession, I’m sometimes asked to sum up my advice to the younger generation on what they should do with their lives. I often leave them with one of my favorite Howard Thurman quotes: “Don’t ask yourself what the world needs. Ask yourself what makes you come alive, and go do that, because what the world needs is people who have come alive.”

I was blessed with family who not only introduced me to nature but made it come alive. And I see more clearly with each passing decade what I experienced innately as a child — that in nature I know the thrill of adventure and yet a tranquility of spirit; the lure of the unknown and yet know that I am home.

But what about youngsters who might otherwise never get that introduction to the life-changing magic of the outdoors? Thank goodness for our conservation educators, conservation agents, and many other MDC staff and partners who are committed to connecting others to nature (see *Show Me a Place*, Page 18).

Spring is here, friends — time to remember our childlike curiosity, refresh our sense of wonder, and reconnect to the great outdoors. Let’s head for the woods!

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

The *Missouri Conservationist* (ISSN 0026-6515) is the official monthly publication of the Missouri Department of Conservation, 2901 West Truman Boulevard, Jefferson City, MO (Mailing address: PO Box 180, Jefferson City, MO 65102.) Equal opportunity to participate in and benefit from programs of the Missouri Department of Conservation is available to all individuals without regard to their race, color, religion, national origin, sex, ancestry, age, sexual orientation, veteran status, or disability. Questions should be directed to the Department of Conservation, PO Box 180, Jefferson City, MO 65102, 573-751-4115 (voice) or 800-735-2966 (TTY), or to Chief, Public Civil Rights, Office of Civil Rights, U.S. Department of the Interior, 1849 C Street, NW, Washington, D.C. 20240.

SUBSCRIPTIONS: Visit mdc.mo.gov/conmag, email subscriptions@mdc.mo.gov, or call 573-522-4115, ext. 3856. Free to adult Missouri residents (one per household); out of state \$13 per year; out of country \$19 per year. Notification of address change must include both old and new address (send mailing label) with 60-day notice. Preferred periodical postage paid at Jefferson City, Missouri, and at additional entry offices.

POSTMASTER: Send correspondence to Circulation, PO Box 180, Jefferson City, MO 65102-0180. Phone: 573-522-4115, ext. 3856. Copyright © 2024 by the Conservation Commission of the State of Missouri.

Printed with soy ink



Nature LAB

by Dianne Van Dien

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

SPECIES OF CONSERVATION CONCERN

Looking for Western Chicken Turtles

✳ **Western chicken turtles are hard to find.** Not only are they rare — state endangered in Missouri — but, unlike other turtles, they tend to avoid traps and are not motivated by bait.

Another challenge for finding them, says State Herpetologist Jeff Briggler, is “they’re only in the water for a short time. They spend most of their life on land beneath forest vegetation or leaf litter. In early spring, they travel to nearby wetlands to mate, forage, and feed, but only for a few months. Then they return to the forest.”

To boost the chances of locating chicken turtles, MDC has adopted a new tool — detecting the species through their environmental DNA (eDNA).

In spring when the turtles forage in wetlands, researchers collect water from potential chicken turtle habitat and process the water through filters to collect any skin and other cells the turtles may have shed. The filters are then mailed to a lab and tested for the species’ DNA.



Listed as state endangered in Missouri, western chicken turtles live in Missouri’s Bootheel, which is the northern edge of the species’ range. Loss of bottomland forests and associated wetlands has caused their population to decline.

Testing for eDNA helps researchers find chicken turtle locations

“Because they’re so rare,” Briggler says, “if we get one or two positive hits, that’s a very big deal.”

If the species is detected, Briggler and staff return to the wetland and set up traps specially designed to catch chicken turtles. Trapping requires a lot of staff hours, so using eDNA to determine which locations are likely to have chicken turtles prevents wasted effort.

Captive breeding and other recovery efforts may be undertaken in the future, but, Briggler says, “first we need to better understand where the turtles are and learn more about their basic biology.”

The U.S. Fish and Wildlife Service is deciding whether western chicken turtles should be federally listed. Population surveys from Missouri and other states will help inform their decision.

At a Glance

Because western chicken turtles are so rare, researchers collect water to try to detect the species’ eDNA in wetlands. The water is processed in the field, using a bicycle pump to force the water through a filter. Animal cells and other tiny debris are captured by the filter, eventually causing it to clog. The filter is then removed, placed into a bag, frozen, and mailed to a lab for DNA testing.



Western chicken turtles are hard to find because:

- They are low in abundance.
- They live in isolated wetland areas.
- They spend only a few months per year in water.
- Most of their historical habitat is gone.

How You Can Help

If you see a western chicken turtle, take a photo and send it (along with the location) to Jeff.Briggler@mdc.mo.gov.

CHICKEN TURTLE: JEFFREY T. BRIGGLER; RESEARCHERS: JEFF DAWSON

In Brief

News and updates from MDC



MDC REPORTS DEER HARVEST

MISSOURI SEES
RECORD-SETTING
DEER HARVEST
DURING THE 2023-
2024 SEASON

➔ The 2023–2024 deer hunting season, which ended Jan. 15, was record-setting with a total deer harvest of 326,026. This year’s record surpasses the one set in 2006 of 325,457.

Increasing deer numbers and regulation changes that added a new early antlerless firearms portion, a new chronic wasting disease firearms portion, and an increase in the number of firearms antlerless deer hunting permits in most counties led to additional hunting opportunities and contributed to a record harvest.

“With deer numbers increasing in most counties, additional antlerless deer harvest is needed to slow population growth and help maintain deer numbers at desired levels,” said MDC Cervid Program Supervisor Jason Isabelle. “It was great to see hunters take advantage of the additional hunting opportunities.”

For the first time since 2013, more does were harvested than antlered bucks, and this year’s antlered buck harvest is also the highest on record.

Learn more at short.mdc.mo.gov/4n7.

NEW MDC HUNTING, FISHING BOOKLETS AVAILABLE

Missouri hunters, trappers, anglers, and others can get free copies of MDC's updated booklets on spring turkey hunting, hunting and trapping, and fishing starting in early March at MDC regional offices, MDC nature centers, and other places where permits are sold. The handy booklets have information on related permits, seasons, species, regulations, limits, conservation areas, sunrise and sunset tables, and more. Get booklet information online at mdc.mo.gov using the search tool at the top of the homepage.



GET HOOKED ON TROUT FISHING

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. The daily limit is four trout.

MDC operates trout hatcheries at all four parks and stocks rainbow trout daily throughout the season. Trout anglers need a daily trout tag to fish in Missouri's trout parks during the catch-and-keep season. Daily trout tags can only be purchased at each of the four trout parks. Missouri residents 16 through 64 and nonresidents 16 and older also need a fishing permit in addition to the daily tag.

Missouri also offers excellent trout fishing throughout the state on rivers and streams that support naturally reproducing trout. For more information on trout fishing in Missouri, visit short.mdc.mo.gov/Zvy.

Buy Missouri fishing permits 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.

Ask MDC

Got a Question for Ask MDC?

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

Q: Compared to previous years, it seemed like deer in St. Francois County held their antlers longer in 2023. Was it due to mild weather or another reason?

→ The deer antler growth and shedding process is largely driven by photoperiod, or day length. Thus, we do not typically see large swings in the timing of these events on an annual basis. That said, some characteristics of a local deer population can slightly shift timing of the antler cycle. These include the buck age structure, adult sex ratio, and overall deer abundance, which relates to the availability of nutrition for deer within a population.

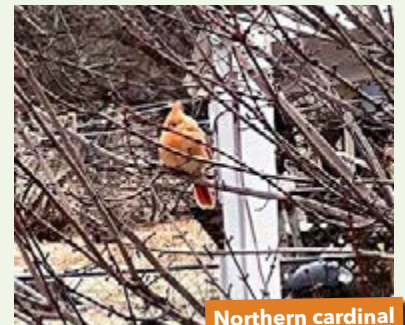
An older buck age structure tends to result in earlier and more synchronized breeding, which then results in synchronous and earlier antler shedding. Similarly, a balanced adult female-to-male sex ratio results in synchronized breeding and earlier antler shedding. Populations heavily skewed toward does may have a more prolonged breeding season, which results in heightened testosterone levels for a longer period among bucks and, thus, later antler shedding. In

a dense deer population — one

that is near biological carrying capacity — nutritional stress may force bucks to drop antlers earlier. Conversely, in places where deer are in great physical condition, bucks may hold their antlers longer. Due to a large acorn crop in autumn 2022 and a mild winter in early 2023, deer were in better physical condition than is typical for that time of year, and as a result may have held on to their antlers longer.

Q: I believe I may have a yellow cardinal visiting my backyard. Are they a rarity in this area?

→ This looks like a northern cardinal with diluted melanin, meaning its feathers have low concentrations of pigment, or it lacks eumelanin, or dark pigment. These colorations are caused by rare genetic mutations, of which there are many variations. For additional information about some of these abnormal colorations and their causes, visit short.mdc.mo.gov/4nP.



Northern cardinal



Q: If we spot a cluster of leopard frog eggs laid in a puddle that dried up, should we relocate them to a pond in hope they'll make it through the summer?

➔ Although conservationists normally advocate leaving nature in place and allowing "wild things to be wild," in this circumstance, it is acceptable to move stranded eggs to a nearby pond.

Missouri is home to three species of leopard frogs — northern, plains, and southern leopard frogs. Typically, these frogs breed as early as late February. In some years, they breed in autumn, too, if the weather is cool and rainy enough.

Leopard frogs prefer ponds, sloughs, temporary pools, and flooded ditches for their breeding sites. Males gather and begin calling after sunset. Females lay eggs in rounded masses that are protected by a thin coating of clear jelly. The clusters are attached to submerged stems or branches in shallow water. Each mass can have several thousand eggs, which hatch in two to three weeks, depending on water



Leopard frog eggs

temperature. Tadpoles become froglets in midsummer — about three months after egg laying — or, if they hatch late in the season, may overwinter as tadpoles in the ponds and transform the next spring.



Drew Davis

HENRY COUNTY
CONSERVATION AGENT

offers this month's

AGENT ADVICE

Late March is the unofficial opening of morel season. It's a great time to get outdoors after a cold winter. Get permission if hunting on private property. Always check area regulations before using public lands. Visit MDC's *Places to Go* — short.mdc.mo.gov/Z9o — to find public lands near you. Remember, it's illegal to sell mushrooms gathered from public lands. Morel season coincides with turkey season, so respect others afield. Consider wearing hunter orange for your safety. When picking morels, pinch the stem so the base remains. Place your harvest in a porous sack so spores release in the air. Never eat raw morels and be certain of your mushroom identification before consuming. For more tips, visit short.mdc.mo.gov/4no.

What IS it?

Can you guess this month's natural wonder?

*The answer is on
Page 9.*



WE ARE CONSERVATION

Spotlight on
people and partners
by Emily Franklin



James Priday

→ James and Jean Priday are the original hackers, but it's not what you think. Since the early 2000s, the Pridays have assisted the World Bird Sanctuary (WBS) in a process known as hacking, which has resulted in the release of nearly 85 owls.

The Whole Hacking Process

Owls are hatched and raised at WBS by a breeding pair until almost fully fledged. They are then banded and transported to a volunteer's location. At the Priday's farm, owls are kept in the barn loft and fed at a distance for about a week. The evening before their release, James feeds them and returns at midnight to open a small window near their perch. The next morning, James checks to confirm their departure.

In His Own Words

"Our decision to help WBS felt so natural. I believe it's important for people to see how beautiful these birds are and how important they are for the environment."

📷 Jeff Meshach

James Priday with a barn owl he helped release.

What's **your** conservation superpower?



MONASP STATE TOURNAMENT

Get ready for another exciting year of archery competition and fun at the 2024 Missouri National Archery in the Schools Program State Archery Tournament March 20-23 at the Branson Convention Center on the Landing in Branson. More than 3,700 students are expected to participate in the bull's-eye event and 1,800 in the 3D competition. For more information and tournament details, visit short.mdc.mo.gov/4fr.



PADDFISH SEASON BEGINS MARCH 15

Paddlefish — named for their large, paddle-shaped snouts — are an ancient species that can grow to 7 feet and weigh more than 100 pounds. Our state's major paddlefish snagging waters include Lake of the Ozarks, Harry S. Truman Reservoir, and Table Rock Lake.

The paddlefish snagging season for these and most other waters in the state runs March 15 through April 30. The season for the Mississippi River is March 15 through May 15 with a fall season of Sept. 15 through Dec. 15.

A fishing permit is required, unless exempt. The daily limit is two paddlefish, and the possession limit is four. No person shall continue to snag after taking a daily limit of two paddlefish on these waters. Learn more about paddlefish, snagging regulations, minimum lengths, snagging reports, and more at short.mdc.mo.gov/Z9B.

WHAT IS IT?

SPOTTED SALAMANDER EGGS

Spotted salamanders make their way to breed in shallow, fishless woodland ponds during the first warm rains in late February to mid-March. Sometimes numbering in the thousands, these courting salamanders engage in a nuptial dance. The eggs, laid on submerged branches or aquatic plants, are fertilized within one to two days of courtship. The eggs hatch in four to six weeks, and the larvae live in the water until mid-June to early September.





MOTU

TRACKING BIRDS AND GROWING PARTNERSHIPS ACROSS THE HEMISPHERE

by Sarah Kendrick

Motus station antennas, like these at right, detect birds, bats, or large insects fitted with Motus transmitter tags that travel past or stop over to fuel up on migration over landscapes, like our extensive Ozark forest.

PHOTOGRAPH BY DAVID STONNER
WARBLER (INSET) BY SARAH KENDRICK



S



WHAT IS MOTUS?

Taking its name from the Latin word for “movement,” the Motus Wildlife Tracking System is a collaborative research and conservation network that uses automated radio telemetry to study the lifecycles of small flying animals, including birds, bats, and insects. Motus began in 2014 and is a program coordinated by Birds Canada in partnership with collaborating organizations and researchers around the world. A network of Motus receiver stations on the landscape detects signals from miniature VHF transmitters attached to migratory animals and tracks their movements locally, regionally, and even across the hemisphere as animals move throughout the array of stations. Motus tags are the only VHF tags small enough to be fitted to our smallest threatened birds, which allows us to learn more about their migratory pathways, speeds, distances, and routes. The system depends on many researchers and managers collaboratively placing and maintaining Motus stations across the hemisphere, which increases the likelihood of Motus-tag detections and strengthens the network.



Top: Ten biologists from five countries met in Costa Rica to Motus-tag golden-winged warblers. From left: Nick Bayly, SELVA; Rhonda Smith, RFS Scientific; Stu Mackenzie, Birds Canada; Yuly Caicedo, SELVA; Andy Forbes and Mike Wells, USFWS; Paz Irola, SELVA; Adam Smith, American Bird Conservancy/Birds Canada; Ernesto Carman, SELVA; and Sarah Kendrick, USFWS.

Bottom: Male golden-winged warbler fitted with a Motus tag.

In spring 2023, a group of 10 bird conservation professionals from five countries met in Costa Rica to place radio transmitters on 50 golden-winged warblers on their wintering grounds to track their northward spring migration using the Motus Wildlife Tracking System. For most of these partners, this was the first time they had met in person despite crossing paths in virtual meetings on various projects for more than six years.

A year before, in the spring of 2022, a smaller sample of 25 golden-winged warblers were fitted with Motus tags in Costa Rica and Nicaragua by SELVA, a bird conservation nonprofit based in Bogotá, Colombia. These birds breed in northern forests and spend their winters in Colombia. The 2022 tagging effort was funded by a U.S. Fish and Wildlife Service (USFWS) grant to MDC and nine other partners from across the Western Hemisphere that placed 60 new Motus stations in the Midwest, Mexico, Costa Rica, and Colombia, and supported a few Motus-tagging research projects. One of these funded projects was SELVA and MDC tagging 25 golden-winged warblers and 25 wood thrush on their wintering grounds prior to spring migration. The goal was to increase detections on the more numerous Motus stations in the U.S. and Canada during their migratory journeys north.

Uncanny Detections

In spring 2022, I traveled to Costa Rica as Missouri’s then-state ornithologist to deploy some of these 25 tags with SELVA. On this trip, the group had to learn how to net these birds on the wintering grounds, as the approach is different than netting on the breeding grounds. During the week, we tagged five golden-winged warblers and eight wood thrush, hoping that the birds would fly within range of Motus stations in the U.S. and Canada during spring migration.

Separate from this work, the Columbia Audubon Society funded the placement of a Motus station in Columbia in honor of former Missouri State Ornithologist Brad Jacobs, a fierce advocate of protecting migratory birds while they

SELVA Costa Rica's Ernesto Carman puts together a Motus station to track the Motus tags of golden-winged warblers tagged in spring 2023.



are beyond our borders during migration and on wintering grounds. The station became active in December 2021, and we began watching for any Motus-tagged birds to fly within range.

A few months later in May 2022, the Columbia station had its first detection — a golden-winged warbler. It was one of the five golden-winged warblers that I had helped tag in Costa Rica two months prior. In fact, I had a photo of the exact golden-winged warbler that was detected. At that time, there were only two Motus stations in central Missouri, so the odds that a bird that I photographed would fly within range were slim to none.

But that wasn't the only mid-Missouri detection of golden-winged warblers that were tagged by our group. The detections of these 25 golden-winged warblers taught us more about migration timing and routes for the species, which led to a second Motus-tagging mission. In spring 2023, SELVA tagged 50 golden-winged warblers.

In May 2023, a new Motus station at Big Muddy National Fish and Wildlife Refuge, 20 miles west of Columbia, was installed. Within a week, the station logged its first detection — the 50th golden-winged warbler tagged by SELVA in late March as part of our international group project. That bird came from the exact same coffee farm as the previous year's golden-winged warbler. The odds of two birds, tagged in the same wintering location, taking nearly identical routes on migration, and being detected on the same stations are even slimmer.



Photo of the golden-winged warbler that was the first Motus detection on the Columbia station placed in honor of former Missouri State Ornithologist Brad Jacobs, a proponent of migratory bird conservation.

Motus Stations 2018–2024

● Active Motus stations across the U.S.

The global Motus network of stations has grown over 400 percent in the last seven years. Eight states in the Midwest have experienced over 600 percent growth in the number of stations from 35 in 2018 to over 214 in 2024.



Motus Growth

The Motus network has grown exponentially. Between 2016 and fall 2023, the number of receiver stations increased 400 percent, from 430 to more than 1,785 in 34 countries. The number of projects increased six-fold in that time and 206 peer-reviewed publications and scientific documents

have been published. The network's growth means more opportunities to track species and identify survival pinch points in declining species and target conservation actions across their full annual cycle.

Missouri's Motus network is no exception to this growth. Between

2018 and 2023, MDC placed and maintained 37 stations — some funded by birding groups like the Missouri Birding Society, Burroughs Audubon Society, Greater Ozarks Audubon Society, Columbia Audubon Society, and other generous private donations by bird lovers.



Spring migration tracks of 50 golden-winged warblers (color-coded by individual) Motus-tagged in spring 2023 on overwintering sites in Costa Rica.

WHAT DID WE LEARN ABOUT GOLDEN-WINGED WARBLERS?

Of the 50 golden-winged warblers tagged in spring 2023 in Costa Rica, 13 birds were detected on two or more stations north of Costa Rica, two birds were detected on four stations, and two birds were detected on five stations. For 20 birds detected north of the Gulf Coast (five detected on Missouri stations), there was a strong pattern of migratory connectivity with pathways through the Midwest for 16 birds with final destinations in population strongholds in Minnesota and Wisconsin. We expect that further analysis of this information will reveal important insights into habitat quality and its carryover effects on migratory timing. Golden-winged warblers' population status will be formally assessed by USFWS in coming years, so any new data on these birds' survival or migration patterns will be valuable.

as well as handheld antennas for local tracking. This research revealed overwinter survival for 30 Motus-tagged cerulean warblers — about half of the tagged birds were tracked daily throughout the winter months; the other half showed birds making mid-winter movements after the first month around the region. SELVA researchers were even able to decipher the daily activity of tagged birds using signal strength of the detections and determine whether birds in range were alive or dead based on their movement patterns. They were able to deduce that a few of the tagged ceruleans had died by tracking the active tags that were unmoving — one was recovered buried underground, possibly by a predator.



Top: A Motus station is installed in the Colombian Andes to track cerulean warbler overwinter survival, a project co-funded by Missouri birding groups.

Bottom: A male cerulean warbler fitted with a Motus tag to track overwinter survival in the Colombian Andes.

Birding Groups Support Motus

In fact, Missouri birding groups have helped directly fund Motus-tagging research that has uncovered new data to science. In winter 2022–2023, through a partnership with USFWS and MDC, SELVA researchers tagged 30 cerulean warblers in the Colombian Andes to learn about this species' survival over the winter months — a huge knowledge gap in the natural history of this songbird that is relatively well-studied on its breeding grounds and whose populations are declining. SELVA tagged half the birds in a native shade-grown coffee farm and the other half in more traditional tropical forest to investigate any differences in these overwinter habitat types. The birds were tracked using Motus stations with antennas directed toward the mountainsides where the birds were tagged



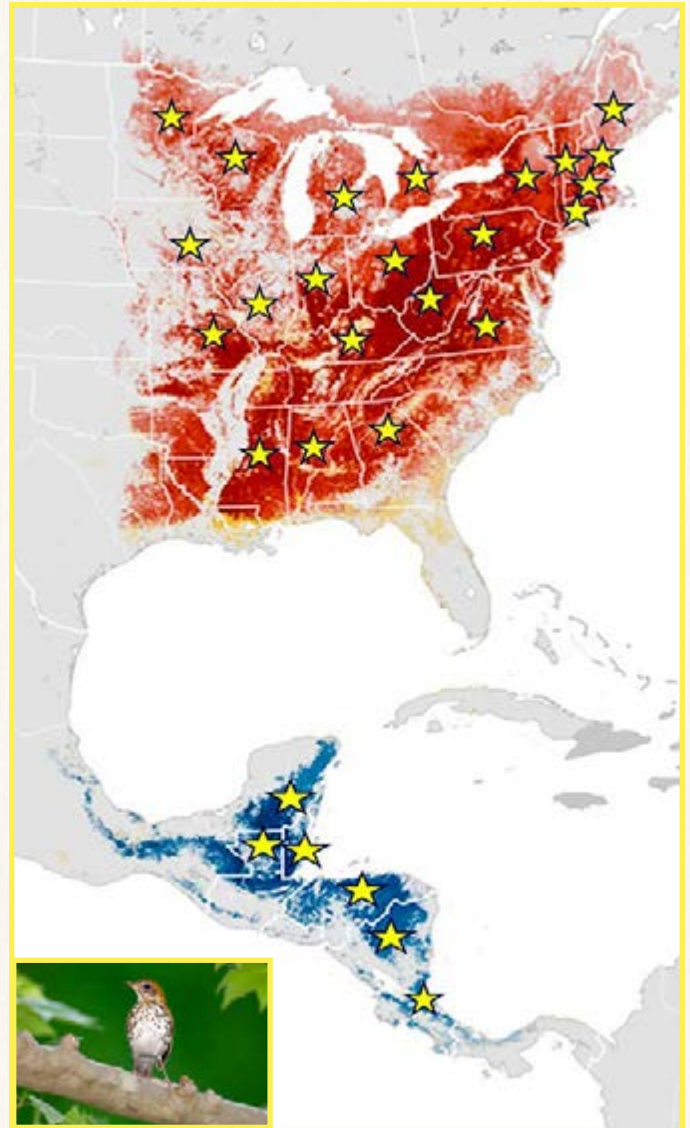
Left: Spring migration tracks of 25 wood thrush Motus-tagged on wintering grounds in 2022 showing general migratory connectivity to the northeastern U.S. and southeastern Canada.

Unprecedented Motus Project on the Horizon

As mentioned earlier, MDC and SELVA also tagged 25 wood thrush in spring 2022. The northward spring migratory tracks of these birds show us that these thrushes overwintering in Costa Rica and Nicaragua are clearly traveling to the northeastern U.S. and southeastern Canada to breed. That made us wonder what we could learn if we were to tag wood thrush across their entire wintering and breeding ranges. This has led to the rangewide wood thrush Motus-tagging project, which will tag over 500 wood thrush across 22 states and Ontario during the 2024 breeding season. SELVA will simultaneously coordinate the tagging of 150 wood thrush across six countries of their wintering range, making this the largest Motus-tagging project to date across a species' entire range.

Conservation for Migratory Birds

Full annual cycle conservation means working to protect migratory birds throughout their annual cycle, which includes four general phases: breeding, spring and fall migrations, and nonbreeding/wintering. Many of us in the U.S. likely see the birds who breed here as “our” birds, but about half of all birds in North America migrate to the tropics for up to eight months of the year. We are simply hosting them for a few months while they benefit from seasonal abundance of resources like



A map with stars noting locations where wood thrush will be Motus-tagged as part of an unprecedented project across the species' entire range with tagging across the winter range coordinated by partner SELVA.

insects and breeding habitat, defend breeding territories, and raise young. Because these birds are beyond our borders for most of the year and face different threats to their survival during migration or on their wintering grounds, conservation agencies and organizations across the hemisphere must be strategic about partnerships and projects that will help fill knowledge gaps on our shared and often declining migratory bird populations.

Bird Declines

In 2019, ornithologists across North America, led by Ken Rosenberg, wrote a landmark article that was published in the journal *Science* that quantified the net loss of 2.9 billion birds, or 29 percent, in North America since 1970. For many species, the causes of the population declines are unclear. Habitat removal and landscape-level changes have been substantial in the last 50 years. Additionally, habitat loss and land-use changes are occurring on stopover sites during migration and on wintering grounds. Threats like outdoor and feral cats, window collisions, and pesticides continue to increase at a pace that birds cannot match. For many species, there is much we still don't know, like migration timing, routes, and departure dates. We know much less about species survival on wintering grounds or during migration, which could be affecting populations of migratory birds significantly. Using Motus to track birds locally to assess survival or long-distance on migration can help to fill these knowledge gaps. Taken as a whole, these data teach us more about what conservation actions need to occur and at which stages of a bird's annual cycle.



Motus-tagging experience was shared by Colombian partner Yuly Caicedo (SELVA), who holds a tagged golden-winged warbler in Costa Rica.



Hartell station



Pigeon Hill station

Motus Brings Partners Together

Both statewide and international conservation partnerships, like these Motus projects, illustrate that bird conservation networks are stronger and more holistic across a species' annual range. With diverse partners and their perspectives across the hemisphere, we can work together more efficiently to plan conservation efforts for declining bird species through their full annual cycle. Missouri maintains an extraordinary conservation network that only continues to grow and broaden its reach south of our border — to the benefit of our shared and beloved migratory birds. ▲

USFWS Migratory Bird Biologist Sarah Kendrick works on conservation and research of migratory birds throughout their annual cycle with international partners. She is located in Columbia and loves her Conservation Department.

Fishing is a favorite activity for students attending the Boone County Nature School, and learning new casting skills for largemouth bass, channel catfish, and hybrid sunfish is at the top of the list.



Show Me a Place

BOONE COUNTY NATURE SCHOOL
TAKES EDUCATION OUTDOORS

by **Brian Flowers**

A new idea has taken hold in one Missouri community that will have long-lasting effects in the lives of students and teachers alike. The Boone County Nature School, a partnership between MDC and the Columbia Public School District, will fully open its doors in August.

Connecting with Nature

Most of us can recall a unique experience that took place in nature. It may have been while viewing wildlife along a woodland trail or exploring a gurgling stream tucked in a deep, dark forest. Whatever the experience, most of us can remember the sights, sounds, smells, and feelings of visiting a special place in nature. The connections we make with the natural world can be some of the longest lasting memories we carry through life.

You might have explored solo or been accompanied by a mentor, teacher, friend, or family member. In today's busy world, it is easy for us to get distracted, lose our sense of place, and become disconnected from those natural places and experiences. It is the same for young people to whom those connections are more important than ever.

For many young people, nature is unfamiliar, sometimes scary, and something interacted with through a computer or phone screen. In his book *Last Child in the Woods: Saving Our Children from Nature Deficit Disorder*, Richard Louv remarked, "Time in nature is not leisure time; it's an essential investment in our children's health." That investment can be made by all of us, young and old, and the benefits of being in nature are many and varied.

"Learning should not be confined to the four walls of a classroom," said Peter Stiepleman, recently retired Columbia Public Schools superintendent. "As we began exploring new ways to engage and inspire children, we asked ourselves, 'What if we could create an incredible learning environment right here in mid-Missouri?'"

Developing a Sense of Wonder

As discussions began between MDC and Columbia Public Schools, a steering committee was formed and met for the first time in September 2018. Leading the effort and staff from their respective organizations was Stiepleman and MDC Director Sara Parker Pauley.

"It is important for us today to inspire future generations of conservationists," Director Pauley said about the Boone



Conservation Educator Jenna Stiek discusses fish identification with a Nature School student.

County Nature School. "Here in Missouri, we're lucky to inherit such a wide and unique tapestry of natural resources and habitats. This would not be possible without an engaged public that truly cares for our fish, forest, and wildlife resources. The Boone County Nature School will be a place for young people to develop a sense of wonder and stewardship of nature."

Others rounding out the new committee and supporting the effort included Marilyn Bradford and Dave Murphy, former members of the Missouri Conservation Commission. Murphy, who is also a former Columbia science teacher and coordinator, had a special connection and love of the project.

"In many significant ways, the modern history of conservation began right here in Boone County on September 10, 1935," Murphy said. "Teaching children about their great legacy can best be accomplished by providing firsthand experiences at the Nature School. Nature is necessary. It is the source of our health, well-being, and livelihood. This opportunity for every elementary student in Boone County — and many teachers — will prove to be the most visionary and effective path forward, come what may."

Former Columbia School Board President Jan Mees and her husband, Bill, representing the Columbia Chapter of the Audubon Society, also loved the idea of helping students engage in nature.

"Columbia Audubon Society's pledge of financial support for the school springs from its belief that for our natural world to thrive, it requires understanding, appreciation, and stewardship, leading the youth of today in developing a conservation ethic for the future," Bill said.

Members of the committee were given the task of shaping the concept of what a nature school could be. Staff created a planning document to encompass natural features and infrastructure developments that would be needed at the school.

Initial planning efforts culminated in an agreement between MDC and Columbia Public Schools to operate the Nature School on MDC property. At this same time, a community fundraising campaign also began. No project of this scope would be successful without members of the community at all levels, and many contributed financially.

A Tapestry of Wonders

Three streams — Turkey, Bass, and Bonne Femme — come together in an extraordinary place in Boone County. The Boone County Nature School campus sits on a 111-acre addition to Three Creeks Conservation Area (CA) donated in 2019 by Vicky Russell and the late Hank Waters. Russell and Waters, who both enjoyed long careers in media and publishing in the Columbia area, cared deeply about sharing nature with others. The family planted over 40,000 trees on the land and wished to preserve the place, which had been their home since 1981.

“It would have become a subdivision, and we’ve got too many of those,” Waters said in a 2019 interview. The pair wanted to share this special place, and through the nature school, they would see that reality come to life.

Bordered by U.S. Highway 63 to the east, the communities of Columbia to the north, and Ashland to the south, the area known as Three Creeks has a deep rich past. The ancient Hopewell culture flourished here along the big rivers between 100 B.C.E. and 500 C.E., leaving behind many earthen mounds that dot the landscape even today. Later, Native Americans, such as the Wahzhazhe (Osage) and Niutachi (Missouria), called the area home. In the early 1800s, the surrounding uplands saw some of the first farms and agricultural crops grown. After the Civil War, these rough hills and hollows were settled by formerly enslaved families, and the area was the boyhood home of famous Missourian Tom Bass. Bass, himself born enslaved on a Three Creeks plantation, explored this area in his youth. He later became a famous horse trainer of the early 20th century, invented the Bass Bit, and in 1905, founded the American Royal Horse Show in Kansas City.

The area today is a tapestry of geological wonders and natural habitats — including streams, caves, springs, forests, and trails — and abundant wildlife. The area is more reminiscent of the deep Ozarks rather than the typical Missouri River hills. At the center of this area is the nearly 1,600-acre Three Creeks CA, an area which was first acquired for public recreation in 1983. It’s on this canvas that the Boone County Nature School was built.

Place-Based Education

Place-based education is an approach where students learn through the lens of their local community or “place.” Students learn what is unique to their place in the world by studying its culture, history, art, economy, and nature. The principles of this type of education include moving outside the classroom and learning in the community and environment. First-hand personal experiences are favored over reading examples from a textbook. This inquiry-based learning requires students to formulate questions, generate ideas, and record observations. Exploration and experiences expand

student involvement resulting in higher student engagement, stronger connections to community, increased curiosity, deeper levels of design-thinking, and problem solving.

“Place-based education utilizes the rich ecology and culture of the local community as the framework for learning,” said Joe Brown, Boone County Nature School’s first teacher. “It lifts ideas and information off the page and places them directly into students’ hands.”

For example, learning about ecology in a science class could be contextualized within a local ecosystem, such as a nearby forest, prairie, or wetland. Students learning about circumference in math could do so by measuring trees in a local forest. This forest could also serve as the setting for creative writing. Students in an art class learning about shading could use the harsh shadows found under the dense leaf canopy within the forest. Teachers share knowledge of native plants and how indigenous people, who first lived on this land, used them in their daily lives and how that relates to the area today.

“Giving teachers the opportunity to learn about nature and educating them in the Discover Nature Schools curriculum is a great way to provide the skills and confidence needed to pass that education to students,” said MDC Conservation Educator Jenna Stiek. “The Discover Nature School curriculum began in 2009 and is aligned to meet current state learning standards in many areas.”



Construction of the Boone County Nature School classroom building will be completed this summer and ready for its first group of students when it opens for the fall semester.



High school student Katie Koopman talks to younger students during an educational session on bird banding. Native bird conservation is the focus of a long-term monitoring project at the school by Andrew Kinslow, Columbia Public Schools' science coordinator for grades 6-12.



Nature Exploration

This August, the Nature School will open its doors to 2,200 fifth graders. Each session will be attended by four classes of students along with their teachers, and every day 100 students will engage in nature exploration as they rotate through seven days of education in three separate sessions. Teachers and students will cover a diverse suite of topics, including themes such as Nature School Expedition, Ecosystem Exploration, Connecting to Our Roots, Cycles in the Ecosystem, Our Changing Planet, Life Through the Seasons, and Agents for Change — Building a Better Place. Unique, meaningful cross-curricular learning opportunities and developing proficiency in various outdoor skills will inspire students as they create lasting change in their community and participate in a sustainability project benefiting their place.

When not in the field learning, students and teachers will have access to the new Nature School classroom building, which houses classrooms, meeting spaces, and displays a truly unique design by PWAarchitects Inc. of Columbia. While on the Nature School grounds, students will use educational areas, such as a pavilion and uniquely designed council house, ponds for fishing, archery range, and many miles of trails for exploration.

What will the future hold for this new conservation education endeavor? If the enthusiasm shown by teachers, students, and the community are any indication, the future looks very bright for the Nature School. Those educators, community leaders, and conservation professionals who were instrumental in its formation want this school to be a national model for how education should be done. Moving outside the typical framework and structure of what we see as a school to sitting quietly with students on the prairie, by that gurgling stream or alongside a woodland trail, and ultimately listening to the lessons nature has for us all. ▲



MDC Regional Education Supervisor Brian Flowers serves on the Boone County Nature School Education Committee. He and his wife, JoAnne, live in Columbia and enjoy traveling and spending time exploring nature.

To learn more about the Boone County Nature School visit boonecountynatureschool.com.

Infinite Healing

SPRING'S RENEWING
SPLENDOR USHERS IN NEW
BEGINNINGS

*There is something infinitely healing
in the repeated refrains of nature
— the assurance that dawn comes
after night, and spring after winter.*

— Rachel Carson

After months of cold temperatures, often resulting in the winter blues for many, spring reawakens us and our surroundings, bringing everything back to life. Spring is about new beginnings, fresh starts, and transformations.

Spring officially begins March 19. The coming days will usher in a multitude of change on Missouri's outdoor landscape. Fields will come alive with color as flowers burst forth in bloom. Trees will be abuzz with activity as squirrels race around their mighty trunks and birds build nests for their young. Shores will teem with anglers as they vie for "the one that got away" from last season.

The sights, the sounds, the smells — it's quite a season to behold.

In the next few pages, we try to capture the wonder and beauty that is springtime in the Show-Me State. Use this as your guide and inspiration and get outside! What will you discover this spring?



Eastern Tiger Swallowtail

Noppadol Paothong

400mm lens • f/5.6 • 1/800 sec





Wild Plum Tree

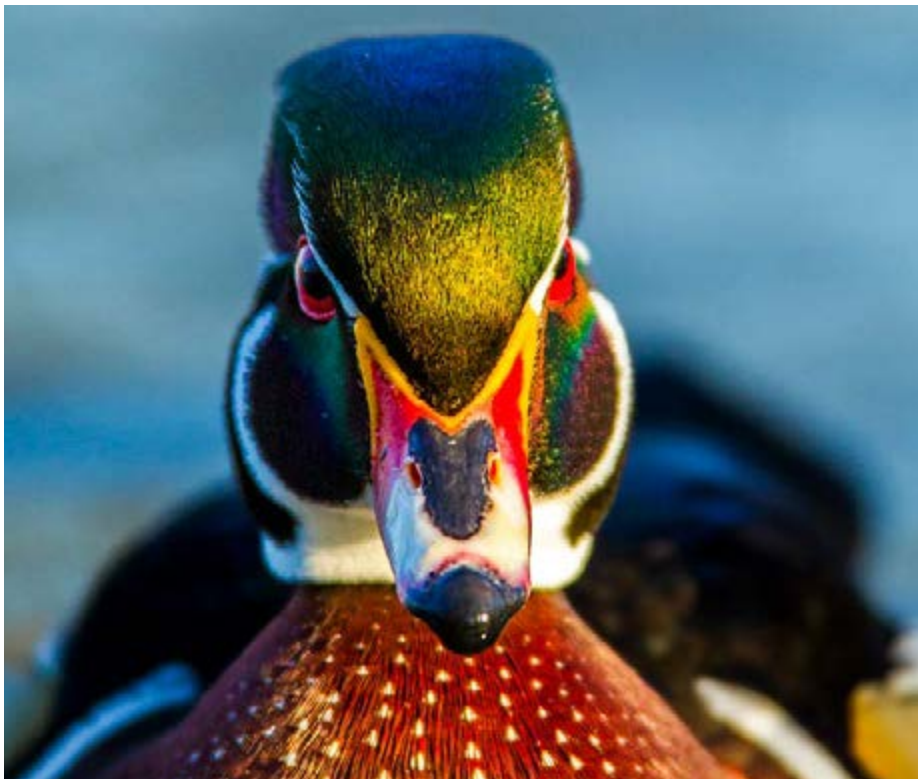
Noppadol Paothong
400mm lens • f/8 • 1/400 sec

Six-Spotted Tiger Beetle

Noppadol Paothong
100mm lens • f/11 • 1/125 sec

Emerging Purple Coneflower

David Stonner
100mm lens • f/4.5 • 1/100 sec



Marais Temps Clair Conservation Area

David Stonner

24mm drone lens • f/5 • 1/200 sec

Wood Duck

Noppadol Paothong

840mm lens • f/5.6 • 1/1000 sec

Male Ruby-Throated Hummingbird

David Stonner

500mm lens • f/5.6 • 1/4000 sec





Gray Treefrog

Noppadol Paothong

100mm lens • f/8 • 1/50 sec

Morel Mushroom

David Stonner

35mm lens • f/5 • 1/160 sec

Spicebush Swallowtail

Noppadol Paothong

100mm lens • f/5.6 • 1/160 sec

Columbine Flower

Noppadol Paothong

400mm lens • f/5.6 • 1/640 sec

Trumpeter Swan

David Stonner

371mm lens • f/5.6 • 1/250 sec



Get Outside

in **MARCH** →



Ozark crayfish

Ways to connect with nature

VIRTUAL

The Mints: Fresh Breath for Pollinators

Tuesday • March 12 • 12-1 p.m.
 Online only
 Registration required by March 12.
 To register, call 888-283-0364 or visit short.mdc.mo.gov/4nf.
 All ages

There are few families of plants which are more sought after by native bees, hummingbirds, and butterflies than the aromatic mint family. This program will teach you to easily identify this family and many of its members. Additionally, we will discuss various mints to plant in your gardens and fields to attract and benefit local wildlife ... and freshen up your dinner table fare. This program is part of the Cape Girardeau Conservation Nature Center Native Plant Seminar, a week of virtual and in-person programs leading up to a native plant sale on Saturday, March 16.

White-throated sparrow



A Limited-Time Concert

Listen as white-throated sparrows tune up for their spring concert, which begins with two clear, slow whistles, followed by repeated three-syllable phrases on a higher pitch — *hew, hew, whe-he-he, whe-he-he, whe-he-he*, sometimes translated as *sweet, sweet, Canada Canada Canada*. Another version became a nickname for this species: *Old Sam Peabody, Peabody, Peabody*. But, this concert is a limited engagement. They'll be gone by May.

Fish Tales

If you want to tell the biggest fish story of your life, now is your chance. March 15 marks the opening of paddlefish season. These sharklike fish, with elongated, paddlelike snouts, can get up to 7 feet and 160 pounds or more! That's a whopper of a fish. For more information, visit short.mdc.mo.gov/4Zp.



Paddlefish

Natural Events to See This Month

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



Black bears become active.



Pawpaws bloom.



American toads call.

Head to the Water

As the temperatures increase, so does the activity of species inhabiting our waterways. Visit a fast-flowing Ozark stream on a sunny spring day and keep an eye out for caddisfly larvae, aquatic snails, aquatic sowbugs, crayfish, and more. Crayfish are fascinating and fun to watch. By mid-March females of most crayfish species are carrying eggs.



Eastern redbud

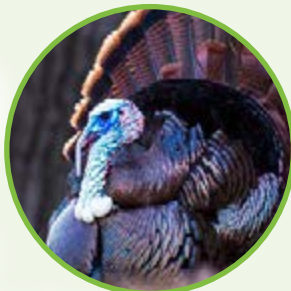
Signs of Spring

If you're searching for the first signs of spring, look up. Trees often offer the first pop of springtime color. Red maples bloom in March, and even though their reddish flowers aren't spectacular, not much else is blooming, so we have good reason to enjoy

them. Redbud trees also start blooming in late March. They're one of our showiest native flowering trees.

VIRTUAL

Turkey Hunting: Where Can I?



Wednesday • March 13 • 12-12:30 p.m.

Online only

Registration required by March 12.

To register, call 888-283-0364 or visit short.mdc.mo.gov/4ng.

All ages

Spring turkey season is just around the corner. Now is the time to be scouting and figuring out where to hunt. We will discuss the rules and regulations for spring turkey season and locations where you can hunt.



Copperheads leave winter dens.



Bald eagle chicks hatch.

Conservation Nature Centers



BURR OAK WOODS

Blue Springs | mdc.mo.gov/BurrOakWoods

CAPE GIRARDEAU

Cape Girardeau | mdc.mo.gov/Capecnc

DISCOVERY CENTER

Kansas City | mdc.mo.gov/DiscoveryCenter

POWDER VALLEY

Kirkwood | mdc.mo.gov/PowderValley

RUNGE

Jefferson City | mdc.mo.gov/Runge

SHOAL CREEK

Joplin | mdc.mo.gov/ShoalCreek

SPRINGFIELD

Springfield | mdc.mo.gov/Springfieldcnc

TWIN PINES

Winona | mdc.mo.gov/TwinPines

Discover nature with us.

Places to Go

SOUTHWEST REGION

Pilot Knob Conservation Area

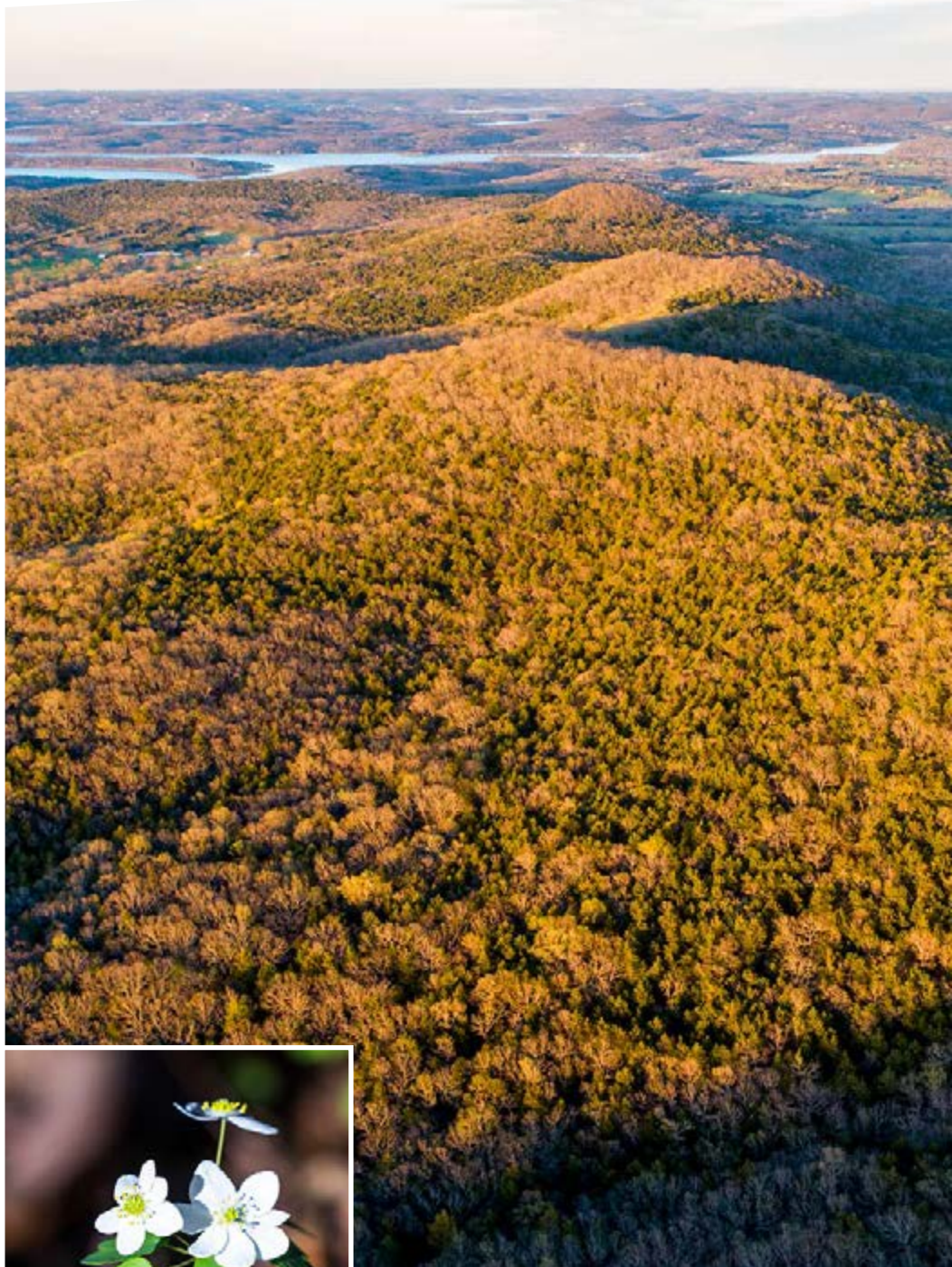
Navigating nature along the trail
by Larry Archer

✦ With technology, we can all go into the outdoors with any number of tools to keep us from getting lost — GPS, online maps, satellite phones. Pilot Knob Conservation Area (CA) reminds visitors of how people navigated nature before today's high-tech age.

Located on 1,360 acres in southwest Missouri's Stone County, Pilot Knob CA takes its name from an old-school technique of navigating one's way, using tall hills — or “knobs” — as reference points to determine your location. In some cases, the tops of these hills were cleared of all but one “signal” tree, making that hilltop a “pilot knob.”

Because of Pilot Knob CA's 6.6-mile out-and-back hiking trail, neither advanced technology nor historic outdoor skills are required (but your regular day hiking gear like maps, water, and phone are highly recommended). Starting at the area's parking lot on its western edge along Hwy. 39, the area's trail is considered moderately difficult by many users.

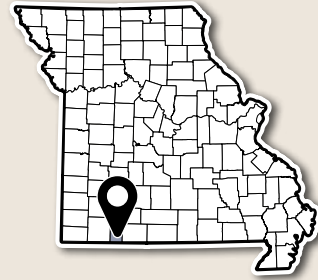
The mostly forested area is located between the National Audubon Society's Shell Knob Glades and Woodlands and White River Glades and Woodlands important bird areas, making it a birding destination for spring woodland and glade species.



Pilot knobs were common not only throughout the Ozarks but throughout the U.S., thus giving the name to many historic sites, conservation areas, parks, and refuges. Just a few: Battle of Pilot Knob State Historic Site (Missouri DNR, Iron County), Pilot Knob National Wildlife Refuge (USFWS, Iron County), Pilot Knob State Park (Iowa DNR), and Pilot Knob State Nature Preserve (Office of Kentucky Nature Preserves).



Hilltops — or “knobs” — such as these at Pilot Knob Conservation Area, were used to aid in navigation. Visitors might stumble upon the early spring blooming rue anemone (inset).



PILOT KNOB CONSERVATION CONSERVATION AREA

consists of 1,360 acres in Stone County. From Viola, take Hwy. 39 south 2.5 miles to parking area and trailhead on the east side of the road. From Carr Lane at the intersection of Hwy. 39 and Hwy. 86, take Hwy. 39 north 2.6 miles to parking area.

36.5405, -93.574

short.mdc.mo.gov/4eM 417-895-6880

WHAT TO DO WHEN YOU VISIT



Birdwatching The eBird list of birds recorded at Pilot Knob CA is available at short.mdc.mo.gov/4eA.



Hiking Out-and-back trail, totaling 6.6 miles.



Hunting Deer and turkey Regulations are subject to annual changes. Refer to short.mdc.mo.gov/Zjw for regulations.

Also **bear, rabbit, and squirrel**

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



Chipping sparrow



Coyote



Red-tailed hawk



Raccoon



Northern Map Turtle

Graptemys geographica

Status

Common in Ozark streams

Size

Females: 6¾ to 11½ inches;
males: 4 to 6½ inches

Distribution

Statewide, except
northwest and southeast



Did You Know?

Prime basking spots on Ozark streams are as important to northern map turtles as the availability of prey. The heavy use of many Ozark streams and rivers by canoes and inflated rubber tubes will send basking turtles scrambling into the water. This traffic prevents turtles from basking and may, in turn, reduce survivorship.

The northern map turtle is a medium-sized aquatic turtle with a brown or olive-brown upper shell and a netlike pattern of fine, squiggly, yellow lines that give the shell the appearance of a road map, hence its name. Northern map turtles are strong swimmers with fully webbed limbs. They are active from late March to October in small- to medium-sized rivers, reservoirs, sloughs, and oxbow lakes. They require basking sites and aquatic plants.

LIFE CYCLE

Courtship and mating usually occur from late March through May. Females travel on land from late May into early July, looking for suitable nest sites along edges of plowed fields, in patches of sand, or in clay banks. Typically, one to three clutches of six to 15 eggs per season hatch from August through September. Eggs laid late in the season can overwinter in the nest, and the hatchlings emerge the following spring.

FOODS

The northern map turtle's diet varies between males and females. Adult males eat snails, small mussels, and a variety of aquatic insects, especially caddisfly and mayfly larvae. The much larger adult females prefer crayfish, snails, a variety of other freshwater mollusks, and some insect larvae. The females' larger head allows them to crush their prey, discard their exoskeletons or shells, and swallow the bodies.

Outdoor Calendar

❖ MISSOURI DEPARTMENT OF CONSERVATION ❖



FISHING

Black Bass

Impounded waters and non-Ozark streams:
Open all year

Most streams south of the Missouri River:

- ▶ Catch-and-Release:
March 1–May 24, 2024
- ▶ Catch-and-Keep:
May 25, 2024–Feb. 28, 2025

Bullfrog, Green Frog

June 30 at sunset–Oct. 31, 2024

Nongame Fish Giggling

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

State trout parks are open seven days a week
March 1 through Oct. 31.

Catch-and-Keep:

March 1–Oct. 31, 2024



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.

HUNTING

Bullfrog, Green Frog

June 30 at sunset–Oct. 31, 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

Groundhog (Woodchuck)

May 6–Dec. 15, 2024

Pheasant

Youth (ages 6–15):
Oct. 26–27, 2024

Regular:

Nov. 1, 2024–Jan. 15, 2025

Quail

Youth (ages 6–15):
Oct. 26–27, 2024

Regular:

Nov. 1, 2024–Jan. 15, 2025

Rabbits

Oct. 1, 2024–Feb. 15, 2025

Squirrels

May 25, 2024–Feb. 15, 2025

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

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

March 1–April 14, 2024



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.



Serving nature and you[®]



**Follow us
on Instagram**

@moconservation

Bluebells are one of Missouri's earliest blooming native wildflowers, ringing in the arrival of spring. Get out and find these stunning beauties! What other wildflowers will you discover?

📷 by **Noppadol Paothong**

Free to Missouri households

To subscribe, cancel your subscription, or update your address, visit mdc.mo.gov/conmag.