

# MISSOURI CONSERVATIONIST

VOLUME 83, ISSUE 1, JANUARY 2022  
SERVING NATURE & YOU







## Enjoy the Experience

Winter is a good time to start birding. At home, put out a feeder and heated water source. This is especially helpful with snow cover or very low temperatures. Bundle up and head outside for a walk. Use a guide like Merlin to help identify birds and learn about their habitat, and log your sightings on eBird. Less foliage means you may see more birds and hear more sounds. Remember to wear proper footwear and clothes. For a better view take along binoculars.

Birding is a fun way to  
**Never Lose Touch.**



For a place to go birding, check out [short.mdc.mo.gov/Zvs](https://short.mdc.mo.gov/Zvs).

# Contents

JANUARY 2022  
VOLUME 83, ISSUE 1



## FEATURES

### 10 Annual Review

Serving Nature and You:  
Fiscal Year 2021.

## 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



## MISSOURI CONSERVATIONIST



### ON THE COVER

Frost from a cold  
January night

📷 **NOPPADOL PAOTHONG**

100mm macro lens, f-16  
1/16 sec, ISO 800

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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](mailto:Magazine@mdc.mo.gov) or write to us:

MISSOURI  
CONSERVATIONIST  
PO BOX 180  
JEFFERSON CITY, MO 65102

**BEYOND PHOTOS**  
Your November issue was superb. Aside from the amazing photographs, I especially enjoyed the article *Moles and Shrews* [Page 18].

Randal Craft  
Brooklyn, NY

## BEYOND BEING THERE

Thank you so much for running the article on the MDC photographers [*Beyond Being There*, November, Page 11]. I've enjoyed the fruits of their labor for many years. It was a pleasure reading the commentary by each of them on some of their favorite photos. Gentlemen, your work is amazing.

Daniel Morton St. Louis

I have been a reader of your fine publication for over 40 years, and I must say your November issue has attained a new level of excellence. It is simply the best I have ever read. Apart from the usual wonderful photos and useful hunting articles, there are very informative articles about lesser appreciated and seldom seen wildlife and an even greater acknowledgement of the photographers who make your publication so special.

Joel Alves St. Louis

I was so happy to see the article in the November issue featuring photographers Noppadol Paothong and David Stonner. I've enjoyed their photos in your magazine for years. It's about time we had a feature article on the two of them. Do it again.

Linda Hillemann Ellsinore

I'm not terribly artistic, so I didn't think I would be interested in *Beyond Being There*, but I was so

wrong! I enjoyed it so much that I read it aloud to my husband and our little son. We had a lively conversation about each story, complete with our son acting out several of them.

Mary Hudson Lee's Summit

I thoroughly enjoyed the recent article about the photographers for MDC. Photography is an art form for Noppadol Paothong, and his pictures are easily identifiable, as he presents his subjects in an entirely different way for the viewer. Stunning!

I also got reacquainted with some of my favorites by David Stonner. Fabulous!

Just reading the background stories about finally getting those perfect shots makes me appreciate their talents and dedication to their craft even more. We are so fortunate to see our beautiful state through their lenses.

Janet Gremaud via email

Thank you for the article highlighting the work of photographers David Stonner and Noppadol Paothong. It was their contributions to your magazine that attracted me to it. As a hobbyist photographer, I can appreciate the efforts required to produce such intriguing photos. I like that they share the lens and settings used to get the shot. Keep up the great work.

Curt Lewis Battlefield

## Connect With Us!



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## Have a Question for a Commissioner?

Send a note using our online contact form at [mdc.mo.gov/commissioners](http://mdc.mo.gov/commissioners).

## MISSOURI CONSERVATION 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-2022](https://www.flickr.com/groups/mdcreaderphotos-2022)  
or email [Readerphoto@mdc.mo.gov](mailto:Readerphoto@mdc.mo.gov).



1

1 | Empty  
hornets nest by  
**Karen McGillis**,  
via email

2 | Bird print  
in snow by  
**Mark Duchesne**,  
via Flickr

3 | Winter fishing  
on Bull Shoals  
Lake by **Allison  
Harrell**, via email



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

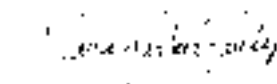
with Sara Parker Pauley

✱ I often get reflective as I head into a new year. As I listened again to the speech given by Simon Roosevelt (great-great grandson of Theodore Roosevelt), our 2020 Partners Roundtable keynote speaker, his words captured me anew in contemplating not only where we are as the conservation community in effecting positive change for our resources, but also as individuals. Taking a page from Thoreau, Simon reflected, “Every moment is a meeting of two eternities, all that is past and all that is yet to come.”

The perspective is a powerful one not only for the long view, but even as we launch a new year. As I contemplate the decisions I need to make today that will build a healthier and wiser version of the leader I want to be, it certainly resonates deeply as I consider my role of helping steward Missouri’s natural resources.

Will we as a society take the time to reflect on what we’ve learned from the past and what new thinking will be required to best steward our natural resources — or will we decide it is someone else’s responsibility? Will we rise to the challenge or wither with the status quo?

My hope for all of us in this new year, as we contemplate choices in how we will care for ourselves, others, and the precious resources that our lives depend upon, is that we will use this present moment to contemplate the past, present, and future, and then choose courageously.



**SARA PARKER PAULEY**, DIRECTOR

[SARA.PAULEY@MDC.MO.GOV](mailto:SARA.PAULEY@MDC.MO.GOV)

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[mdc.mo.gov](https://mdc.mo.gov) **3**

# Nature LAB

by Dianne Van Dien

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

## MOUNTAIN LION DETECTION

### Making Sense of the Evidence

✳ **Mountain lions are extirpated in Missouri, but** in 1994 MDC confirmed the first mountain lion in the state since 1927. It's the job of MDC's Large Carnivore Response Team (LCRT) to field reports from the public and confirm which ones are truly mountain lions. The majority have no supporting evidence or turn out to be something else — bobcats, house cats, coyotes, or even hoaxes. In 28 years, only 87 reports have been confirmed as lions.

Most confirmations come from photos. When LCRT staff investigate, they go to the area a photo was taken and attempt to confirm that the picture is that of a lion. Some reports may have other types of evidence, such as scat, hair, tracks, or a lion-killed deer or elk. Whenever possible, staff collect samples for DNA testing.

"When we find a suspected lion-killed deer, we look for bite grip marks on the deer's throat and swab that area to pick up saliva," explains Conservation Agent Brad Hadley.



Most mountain lion sightings are reported with photos, often from game cameras. Sometimes it is difficult to tell whether the photographed animal is a mountain lion, bobcat, or house cat. To assist with identification, the Large Carnivore Response Team brings cardboard cutouts of these cats to the photo location and places them against the background to determine the size of the animal in the photo.

MDC staff collect evidence to unravel details about mountain lions that pass through the state

Getting quality DNA from scat or saliva left in the wounds of a lion-killed animal is challenging because DNA degrades with exposure to sunlight and precipitation, and if scavengers feed on a carcass, their DNA gets mixed in. Sometimes samples yield no results.

"Opportunities to collect DNA are limited," says MDC State Furbearer and Black Bear Biologist Laura Conlee. "Although only 20 percent of our confirmations have had potential DNA, the samples we collect are still giving us pieces of information about lions coming through Missouri."

No breeding has been documented in Missouri. "Mountain lions can travel very long distances when they disperse, and current evidence indicates that lions here are just passing through," says Conlee.

## Mountain Lion DNA Evidence at a Glance

Genetic samples are analyzed by the U.S. Forest Service's National Genomics Center. DNA is compared to reference samples in a national database.



### Depending on sample quality, DNA can tell us:

- If it is from a mountain lion (lowest quality)
- If lion is male or female
- Probable population of origin
- If the lion has been detected elsewhere (highest quality)

### Results from DNA so far:

- Only 1 female lion has been detected in MO
- Lions are coming from western states, most often the Black Hills region
- Only one lion has been detected more than once in MO





# In Brief

News and updates from MDC

## MDC REPORTS SUCCESSFUL BEAR SEASON

HUNTERS HARVEST 12 BEARS  
DURING HISTORIC SEASON

➔ During the state's inaugural bear hunting season, Oct. 18–27, hunters harvested 12 black bears from the three identified zones. More than 6,330 hunters applied for 400 permits for the season with the maximum total harvest for the season being 40 bears.

"This was an incredibly successful first bear hunting season for Missouri given that we have a highly regulated season, that bears in the state are widely distributed throughout some pretty rugged wilderness, and that many hunters had never hunted bears before," said MDC State Furbearer and Black Bear Biologist Laura Conlee. "A harvest of 12 bears in our first season is testament to the hunters. Bear hunting is an extremely challenging endeavor, especially under the framework that we established. This was a new experience for many hunters, and they put in the work to be successful and take advantage of this new hunting opportunity."

Conlee added that MDC took a conservative approach in developing its bear hunting regulations.

"Our highly regulated and limited season included a sustainable maximum harvest of 40 bears, which is about 5 percent of our total bear population," Conlee said. "We also prohibited baiting and the use of dogs, limited hunting to 10 days, and restricted the number of hunters who could participate. With any new season, it is difficult to predict hunter success, so we took a conservative approach to limiting the number of hunters and length of the hunting season to ensure a sustainable harvest in each bear management zone."



Congratulations to Kelsie Wikoff, Hume, on her harvest of this 268-pound boar (male bear) during Missouri's first bear hunting season. She was among 12 Missouri hunters to harvest a bear.

Learn more about bear hunting in Missouri at [mdc.mo.gov/bearhunting](https://mdc.mo.gov/bearhunting). Learn more about black bears in Missouri and MDC management efforts at [mdc.mo.gov/bears](https://mdc.mo.gov/bears).



### GIVE A HOLIDAY GIFT BACK TO NATURE

MDC foresters remind you not to throw that cut Christmas tree into the trash after the holidays. Recycle it!

Many communities have a Christmas tree recycling program. If your community is not among them, there are several creative ways to make further use of your tree.

Place the tree in the backyard to offer cover for wildlife or under bird feeders to provide nesting locations in the branches. Add some post-holiday treats as ornaments by coating pinecones with peanut butter and adding bird seed.

Have your tree shredded or chipped for mulch, or place cut branches over dormant plants to provide a bit of insulation during the winter and to add organic matter as the needles fall.

You can also sink the tree in a pond to enhance fish habitat by giving them a place to rest, nest, and escape predators. Multiple trees make the best cover so work with friends, family, and neighbors to combine efforts. Anchor the trees with concrete blocks and sink them at a depth of about 8 feet with the trees placed in a row.

If you used a balled live evergreen and your ground is still soft enough to dig, add it to your home landscape for years of enjoyment and wildlife cover.

### WINTER TROUT HARVEST BEGINS FEB. 1

MDC staff have stocked about 80,000 rainbow trout in more than 35 urban area lakes around the state for winter trout fishing. Many of these areas allow anglers to harvest trout as soon as they are stocked, while other areas are catch and release until Feb. 1. Find locations at [short.mdc.mo.gov/ZF3](https://short.mdc.mo.gov/ZF3).

Beginning Feb. 1, all urban area lakes allow the harvest of trout. The daily limit at these locations is four trout with no length limit. All Missouri residents older than age 15 and younger than age 65 must have a fishing permit. All nonresidents over age 15 must have a fishing permit. To keep trout, all anglers regardless of age must have a Missouri trout permit.

Learn more about trout fishing at [short.mdc.mo.gov/ZtL](https://short.mdc.mo.gov/ZtL).

## Ask MDC

### Got a Question for Ask MDC?

Send it to [AskMDC@mdc.mo.gov](mailto:AskMDC@mdc.mo.gov)  
or call 573-522-4115, ext. 3848.

**Q: What animal ate this deer? I've never seen an animal pluck the hair and eat the skin of a deer?**

➔ Probably a coyote. Usually when you find a carcass intact, one lone coyote has fed on it. When you find a carcass torn up, with pieces of hide and bone scattered around, several coyotes have had a meal. The alpha coyote feeds on the main carcass while younger and smaller coyotes run in and tear off pieces. The longer the carcass lays there, other scavengers, such as vultures and opossums, feed on the remains. Since hair lacks food value, it tends to get pulled out or scratched off.



**Q: What happened to this tree?**

➔ This bark damage is related to emerald ash borer (EAB) infestation. It's caused by woodpeckers pursuing insect larvae inside the ash trees, popping off pieces of bark as they forage.



Bark blinding

That lighter-colored inner bark is noticeable when freshly exposed, leading foresters to refer to the process as "blonding."

Bark blinding on ash is directly related to insect infestation — the woodpeckers aren't going to tear up a tree if there's nothing inside to eat. Native borers can attack stressed ash trees, but only the unchecked populations of emerald ash borer larvae lead to woodpeckers blinding an entire tree or several in one area.

The good news is that EAB will only attack ash trees. The bad news is that trees with extensive bark blinding are past the point of being saved by insecticidal treatments. EAB-infested trees are brittle and potentially hazardous. If infested trees are near a home or other valuable property, it is important to remove them immediately. The infested wood can be utilized or burned at the homeowner's discretion.



Within about five years, EAB will kill nearly every ash tree (sometimes younger, smaller trees escape death) in the vicinity, unless the nearby trees have genetic resistance. But that's rare; only about one in 1,000 trees exhibit natural resistance.

If an ash tree seems relatively healthy as spring approaches, insecticide treatments in late April through May can be effective. For more information, visit [short.mdc.mo.gov/ZtV](http://short.mdc.mo.gov/ZtV).



European honeybee combs

**Q: I ran across this unusual looking beehive on my farm in Gasconade County. Is this a normal beehive? What kind of bee constructed it?**

➔ These are European honeybee (*Apis mellifera*) combs. They typically seek out enclosed tree cavities, but this swarm appears to have taken up residence in the wrong spot, as far as winter survival goes. It's uncommon, but not incredibly rare.

European settlers introduced the honeybee to North America hundreds of years ago, and wild

populations occur throughout Missouri. The nest "comb" is suspended vertically and consists of parallel double-layered sheets of hexagonal cells. These are made from wax secreted by worker bees, who also use the nectar from flowers to produce honey in their stomachs. The bees thicken the honey by regurgitating it onto their mouths and exposing it to air. Honey and pollen stored in nest cells nourish the adult bees in winter. For more information on bees, visit [short.mdc.mo.gov/Ztj](http://short.mdc.mo.gov/Ztj).

## What IS it?

Can you guess this month's natural wonder?

The answer is on Page 9.



**Zachary White**  
CLINTON COUNTY  
CONSERVATION AGENT

*offers this month's*

## AGENT ADVICE

The winter months usher in another season of outdoor opportunity — trapping, a long-held tradition in Missouri. Permits to harvest furbearers by trapping methods were first required in 1953. Missouri is fortunate to have a wide range of furbearing species. From larger mammals like coyotes and bobcats to the small and rare long-tailed weasel, our natural areas contain an abundance of furbearers. If you are new to the sport, start out with basic gear needed to trap one or two species. For guidance, visit [short.mdc.mo.gov/Zvx](http://short.mdc.mo.gov/Zvx). The Missouri Trappers Association is a good resource for new trappers. To find out more, visit [missouritrappers.com](http://missouritrappers.com).

FOR MORE INFORMATION ABOUT TRAPPING, SEASONS, AND PERMITS, CHECK OUT A SUMMARY OF MISSOURI HUNTING AND TRAPPING REGULATIONS 2021 AT [SHORT.MDC.MO.GOV/ZTA](http://SHORT.MDC.MO.GOV/ZTA).

# SPECIES OF *Conservation Concern*



## ENDANGERED

### Topeka Shiner

The U.S. Fish and Wildlife Service (USFWS) listed the Topeka shiner as a federally endangered species in 1998. Topeka shiners inhabited the western tallgrass prairie region of the Midwest from Missouri and Kansas to South Dakota. It occurred in headwater streams of central and northern Missouri but is now limited to two isolated, native populations.



Experimental reintroductions of Topeka shiners in north Missouri.

#### WHY IT'S IMPERILED

Topeka shiners have declined dramatically due to habitat destruction, reduced water quality, altered stream hydrology, barriers to fish movement, and extreme weather, including droughts and floods.

#### MDC RESTORATION EFFORTS

Topeka shiner restoration began in 2013 in the Grand River watershed. Topeka shiners were reintroduced during 2013–2017 into Little Creek and East Fork Big Muddy Creek. Monitoring showed survival, reproduction, and expanded distribution. These experimental populations persist today without additional stocking.

#### WHAT CAN YOU DO?

Avoid activities that reduce water quality, encourage natural stream flows and streamside vegetation, and follow best management practices for projects near streams.



## FIRST ELK HARVESTED BY ARCHERY

Congratulations to Chris Irick, Pleasant Hope, who harvested the first elk by archery methods in Missouri's modern elk hunting history. Irick took the 6-by-6 bull elk in Shannon County on Oct. 18.

The elk hunting season by archery methods ran Oct. 16-24. The elk hunting season by firearms methods ran Dec. 11-19. MDC issued five permits to hunt elk in 2021. Learn more about elk hunting in Missouri at [short.mdc.mo.gov/Ztb](http://short.mdc.mo.gov/Ztb).

Chris Irick is shown with his historic first elk harvested by archery methods in Missouri's modern elk hunting history. With him is Conservation Agent Logan Brawley.



## APPLY ONLINE FOR SPRING MANAGED TURKEY HUNTS

Missouri youth, archery, and firearms turkey hunters can apply online for 2022 spring turkey managed hunts starting Feb. 1 at [mdc.mo.gov/springturkeyhunts](http://mdc.mo.gov/springturkeyhunts). Managed hunt details and application procedures are outlined on the site. Drawing results will be posted starting March 15.

Spring turkey hunting youth weekend for 2022 will be April 9 and 10 with the regular spring season running April 18 through May 8.

Detailed information on spring turkey hunting will be available in MDC's 2022 *Spring Turkey Hunting Regulations and Information* booklet, available where permits are sold beginning in February. To learn more about turkey hunting in Missouri, visit [short.mdc.mo.gov/Ztu](http://short.mdc.mo.gov/Ztu).

Buy Missouri hunting permits from vendors across the state, online at [mdc.mo.gov/buypermits](http://mdc.mo.gov/buypermits), or through the MDC free mobile app — MO Hunting — available for download through Google Play for Android devices or the App Store for Apple devices.



## WHAT IS IT? SYCAMORE SEED BALL

Sycamore trees fruit from September through October in the form of 1-1½ inches-wide solitary seed balls, which persist through winter. Each ball droops on a 3-6-inch-long stalk and contains hundreds of seeds. The seeds, loosely held together, disperse on the wind, propelled by hairs attached to each one. Birds will feed on the seeds, although they are not preferred. By spring, seed balls dry up and fall to the ground.







Sunset over  
Lake Wappapello

PHOTOGRAPH BY  
JIM RATHERT





# Annual Review

SERVING NATURE AND YOU  
FISCAL YEAR JULY 1, 2020 - JUNE 30, 2021



# Message From the Director

**I**t has been suggested that change is happening at the fastest rate in history and yet at the slowest rate it will happen during the rest of our lifetimes. This is as true in resource conservation as it is in any other field.

There are 12,000 species in the United States — over 680 of those in Missouri — classified as species of greatest conservation need, meaning species with low, declining, or rare populations or facing threats and in need of conservation attention. And the challenges that face these species are only on the rise — challenges such as habitat loss, introduction of invasive species, disease, and more.

We are fortunate because Missourians' commitment to conservation allows us to do long-term planning and implementation — taking the long view, being science driven, and aligning our actions with our strategic vision.

In practice, this long-view approach is critical because conservation doesn't happen overnight nor rarely if ever in the short-term. Examples of long-term conservation efforts include our multi-state restoration of tallgrass prairies and a century-long study of our forests. It also means the restoration of game species, such as whitetail deer, turkey, and elk, as well as nongame species, such as the brown-headed nuthatch, Ozark hellbender, and American burying

beetle. The long-term funding and authority granted to us by the citizens of Missouri are key to our success, and we do not take this for granted. We strive daily to earn your support by taking care of — and connecting Missourians with — nature and doing so under the umbrella of maintaining the trust you've placed in us.

In this year's annual review, you will see the strides we continue to make in protecting Missouri's fish, forests, and wildlife, improving opportunities to get outdoors and enjoy nature, while keeping the public trust always top of mind.

**Sara Parker Pauley,**  
Director



# State of Missouri Operating Budget

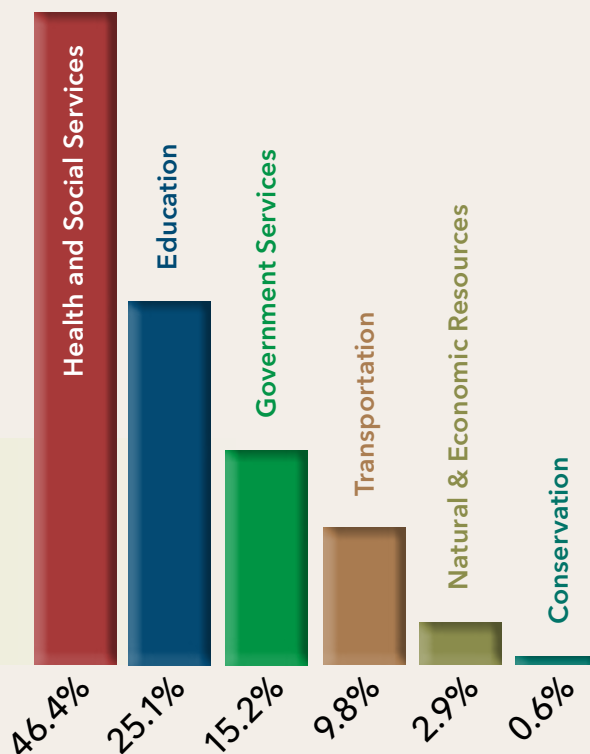
Total State of Missouri Operating Budget for Fiscal Year 2021

**\$30,569,672,922**



## Missouri State Operating Budget

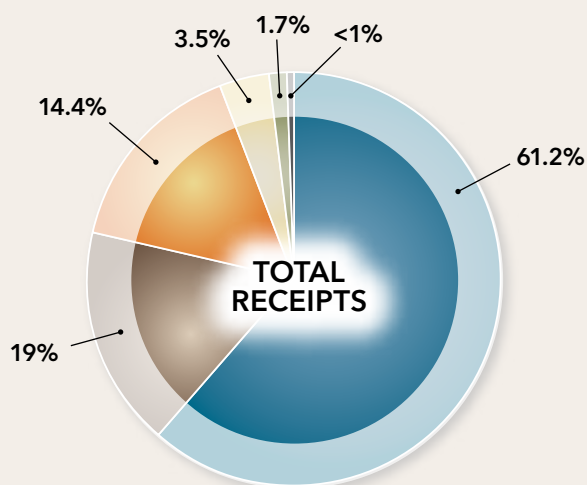
MDC represents **less than 1 percent** of the total state budget and **receives no** state general revenue.



## MDC Receipts

MDC gets the majority of its funding through the **conservation sales tax**. For every \$8 spent on taxable items, one penny goes to conservation.

Conservation Sales Tax	\$133,764,427
Permit Sales	\$41,501,740
Federal Reimbursements	\$31,356,723
Sales and Rentals	\$7,715,213
Interest	\$3,660,830
Other Sources	\$501,707



## MDC Disbursements

Funds are distributed throughout MDC to accomplish the **state's top conservation priorities**.

Habitat Management	\$45,151,049
Fish & Wildlife Management	\$41,110,406
Recreation Management	\$21,142,189
Education & Communication	\$22,805,857
Conservation Business Services	\$31,550,743
Staff Development & Benefits	\$6,749,588
Capital Improvements	\$17,479,400
Land Conservation & Partnerships	\$3,074,615
County Assistance Payments	\$1,668,919

NOTE: Disbursements include all operating, other agency, and capital improvements from the Conservation Commission Fund. Other agency disbursements are appropriated outside the Department of Conservation operating budget. Fuel, benefits, and other disbursements were allocated to the appropriate branches.

SOURCE: Missouri Office of Administration

# MDC Takes Care of Nature

WE PROTECT AND MANAGE MISSOURI'S FISH, FORESTS, AND WILDLIFE,  
SO YOU CAN ENJOY HEALTHY AND SUSTAINABLE RESOURCES  
NOW AND IN THE FUTURE.









A man and his dogs enjoy a walk as the sun peaks through the morning fog at Marais Temps Clair CA.

## Implement Comprehensive Conservation Strategy

Conservation agencies will only meet future fish and wildlife commitments to the public within a system of healthy and connected habitats. MDC is proactively integrating its conservation priorities and its partners' priorities into a common framework, which includes the identification of a prioritized network of lands and waters. The focus of the habitat-based portion of the work will be within conservation opportunity areas (COAs) and subset landscapes, called priority geographies, that have specific objectives to accomplish measurable goals at a landscape level.

The Missouri Comprehensive Conservation Strategy (CCS) integrates the Missouri State Wildlife Action Plan, Forest Action Plan, and other conservation priorities into a comprehensive plan, meeting the requirements of both the U.S. Fish and Wildlife Service and U.S. Forest Service. The CCS, approved by the U.S. Forest Service in May 2021, serves as a model framework, informing key conservation opportunities and prioritization in community conservation, public access to nature, climate change resiliency, and ecosystem services.

This is the first time that a state has combined their State Forest Action Plan, State Wildlife Action Plan, and other conservation strategies into a single framework and document. Missouri's plan is serving as an example across the nation on how conservation work is completed today and into the future.

## Maintain, Improve Missouri's Watersheds, Wetland Systems

Several research projects grew from a revised focus on the ecological functions of Missouri's watersheds and wetland systems:

- Coordinate aquatic conservation tools to prioritize landscape decision making
- Develop a comprehensive bio-criteria for Missouri stream fish communities
- Create a framework for ecological limits of hydrologic alterations
- Formulate fish community response to stream flow alterations

These projects will guide future management decisions within and between priority geographies, better analyze stream fish communities, and predict potential impacts on aquatic communities.



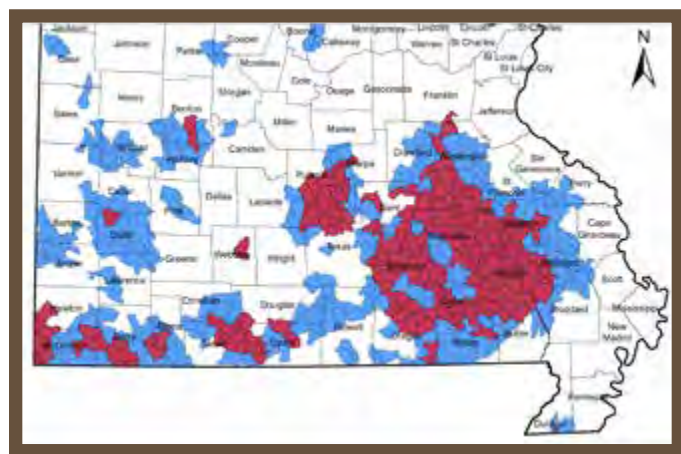
## Eliminate Feral Hogs

The Missouri Feral Hog Elimination Partnership is made up of agencies and organizations that are all committed to elimination of feral hogs from Missouri's landscape. In calendar year 2020, the partnership established a unified incident command system to manage feral hog elimination efforts in the state.

Since 2016, the partnership has eliminated feral hogs from 194 watersheds in the state. These watersheds encompass over 4.8 million acres of land, which represents a decrease of 52 percent of area occupied by feral hogs in Missouri. During 2020, the partnership removed 12,635 feral hogs from Missouri's landscape and staff scouted over 1.5 million acres for feral hog damage and signs of hogs. Partnership staff also assisted 766 private landowners in 2020.

In FY 21, MDC hired six new full-time feral hog trappers. The department was also successful in securing federal Farm Bill grant funding for feral hog elimination. In May 2021, agreements were finalized that will provide MDC \$1.5 million from these grants for the next three years. Funds will be used to hire four feral hog outreach specialists in partnership with University of Missouri Extension. These specialists will develop additional landowner relationships, publish a quarterly landowner newsletter, communicate with county commissions, and collect damage information. Funding will also be used to purchase equipment for feral hog elimination efforts and to purchase equipment to aid landowners in repairing feral hog damage.

In 2021, the General Assembly passed and Governor Parson signed into law House Bill 369. This bill strengthens the penalties for possessing and releasing feral hogs in Missouri and clarifies the definition of feral hogs.



Probable feral swine distribution in 2021

Watersheds eliminated since 2016

**Above:** A map of the watersheds no longer impacted by efforts hogs due to elimination efforts.

**Right:** More than 12,000 feral hogs have been removed from Missouri woods.



## Climate Stressors and Ecosystem Resiliency

MDC is developing a climate adaptation and resiliency plan, integrating climate smart planning and adaptation efforts for department operations. This internal effort will identify and catalog existing efforts that can be strengthened, as well as identify future efforts to create more adaptive operations.

MDC formed a team made up of members from all branches of the department and identified outside advisors, including the University of Missouri, the U.S. Forest Service, and the U.S. Fish and Wildlife Service. A session on climate change was held at the annual partnership roundtable, which took place virtually in October 2021.



A brown-headed nuthatch is fitted with a radio transmitter. Efforts to restore brown-headed nuthatches from Arkansas' Ouachita National Forest to Missouri's Mark Twain National Forest have been successful.

### Brown-Headed Nuthatch Reintroduction

In August and September 2020, many conservation partners in Missouri and Arkansas worked together to restore a small population of brown-headed nuthatches from Arkansas' Ouachita National Forest to Missouri's Mark Twain National Forest. This pine-woodland-obligate may have left the state in the early 1900s when large swaths of shortleaf pines were logged from the Ozarks. But shortleaf pine management over the last two decades in the Mark Twain National Forest have restored enough acres of woodland to bring back the brown-headed nuthatch. Forty-six birds were relocated from Arkansas in 2020, followed by 56 more in 2021. Radio transmitter tracking post-release and monthly surveys have tracked survival, and nest success is being monitored. The project's first year was successful with no confirmed mortalities during trapping, transport, or release.

### Peregrine Falcon Removed from Endangered List

MDC approved the delisting of the peregrine falcon from the Missouri Endangered Species List in August 2021. Peregrine falcon populations nationwide plummeted in the 1940s–1960s due to the widespread use of pesticides like DDT (dichlorodiphenyltrichloroethane). The peregrine was placed on the federal endangered species list in 1970 and on the Missouri state endangered species list in 1974. Peregrines were removed from the federal endangered species list in 1999 due to intensive restoration efforts but remained on the state list.

The Missouri peregrine falcon recovery goal of 10–12 breeding pairs in the state was exceeded in 2013 and now stands at 14 active breeding pairs. These peregrine breeding pairs are distributed across seven counties, reducing the potential impacts of random events on the Missouri breeding population. All peregrine breeding pairs in Missouri use artificial nest boxes in urban areas around Kansas City and St. Louis. When nest boxes are placed, the birds use them, even though there are natural nesting sites available on rocky cliffs or bluffs on the Missouri and Mississippi rivers. Two breeding peregrine pairs have also been documented successfully nesting since 2012 in naturally occurring habitat along the rocky bluffs on the Illinois side of the Mississippi River, north of the greater St. Louis area.

Peregrines will remain a species of conservation concern in the state. If the breeding population declines below seven breeding pairs, the Peregrine Falcon Recovery Working Group, in conjunctions with partners, will determine if expanded monitoring or protection is needed.

Peregrine falcons have been removed from the Missouri endangered species list but remain a species of concern.





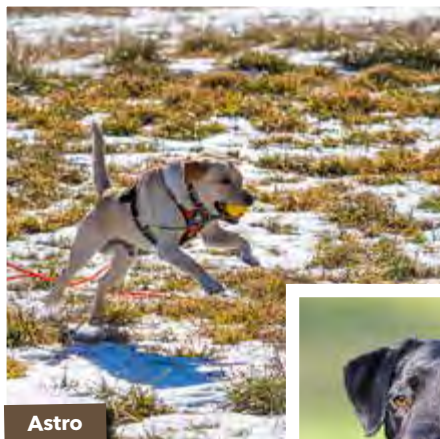
## Elk

The first modern elk hunting season was held in Missouri in October and December 2020. After a nearly 150-year absence, Missouri began restoring elk in the state in 2011 with help of numerous stakeholders, including the Rocky Mountain Elk Foundation. Over the past decade, the population has grown at a rate capable of sustaining a regulated hunting season. Prior to initiation of the first hunting season, Missouri's elk herd met three key biological benchmarks:

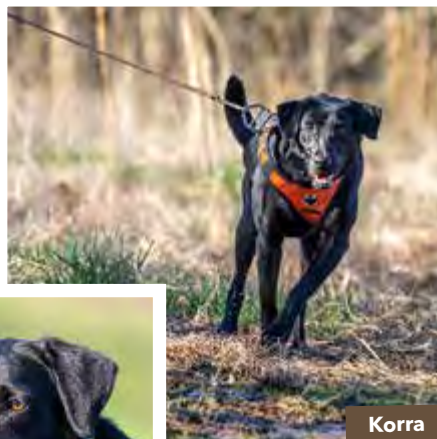
1. A population of approximately 200 individuals,
2. A population growth rate of approximately 10 percent, averaged over three years,
3. A minimum bull to cow ratio of one bull per four cows.

Five hunters were drawn out of more than 19,000 applicants for the inaugural hunt and the opportunity to pursue a bull elk. All five hunters harvested a bull elk during the season.

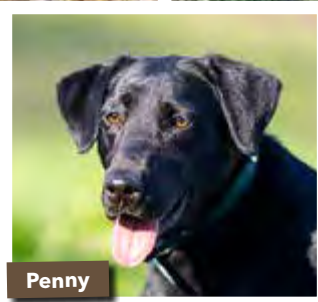
As of June 1, 2021, there were an estimated 241 elk in Missouri, not including the calves that were to be born later that year. The Missouri Conservation Commission again approved the department's recommendation to issue five bull elk permits for the 2021 elk hunting season, which was split between the months of October and December.



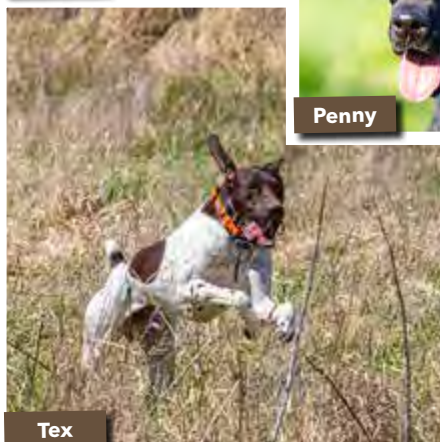
Astro



Korra



Penny



Tex



Waylon

## MDC Launches Canine Unit

MDC launched a new canine unit through its Protection Branch in the summer of 2021. The new unit, consisting of five dogs and their conservation agent-handlers, is stationed around the state and used as necessary to work throughout Missouri.

According to MDC, the capabilities of canines are extensive in conservation-related work, but common uses include tracking, evidence recovery, search and rescue, wildlife detection, and public outreach programs. Another rapidly growing use of canines is in the field of endangered and invasive species.

The launch of the MDC canine unit is supported through a partnership with both Diamond Pet Foods and Purina, which sponsored the canine team and is providing dog food. There are currently 36 other states using dogs in their conservation efforts.

In the summer of 2021, five dogs were commissioned as officers in the Protection Branch's new canine unit. Those dogs include, from top left, Astro, Korra, Waylon, Tex, and Penny.



# MDC Connects People with Nature

WE PROVIDE PLACES FOR YOU TO ENJOY  
NATURE AND OPPORTUNITIES FOR YOU TO  
LEARN ABOUT AND DISCOVER NATURE.







## St. Louis Community Land Trust

Community partners in St. Louis approved the formation of a new community land trust, seeded with a \$1 million funding pledge from MDC over four years and a \$1 million match from private foundations and public sources. The new land trust, formed by partners Build Missouri Health (an affiliate of the Missouri Foundation for Health), the St. Louis Development Corporation, and MDC, will acquire as many as 300 vacant lots and manage them as open green space in collaboration with neighborhood coalitions in north St. Louis.

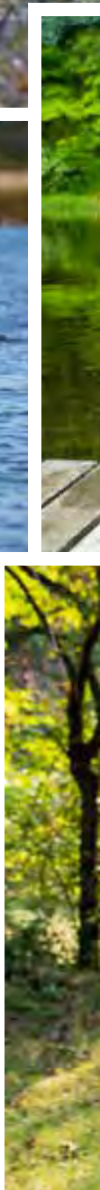
## More Access for Outdoor Recreation

MDC received a U.S. Department of Agriculture (USDA) grant to double the size of the Missouri Outdoor Recreational Access Program (MRAP) over the next two years. The program pays landowners to allow public access to high quality wildlife habitat for hunting, fishing, and nature viewing. The \$2.23 million grant will allow MDC to add 15,000 acres to the popular program. A record 14,000 visitors to MRAP properties pursued deer, quail, small game, and turkey in FY 21. Find out more about MRAP at [mdc.mo.gov/mrap](https://mdc.mo.gov/mrap).

**Top:** Managing wetlands provide duck hunting opportunities for hunters and their dogs.

**Middle:** MDC is exploring the expansion of outdoor recreational opportunities, including paddling sports like kayaking.

**Bottom:** Bowfishing is just one way to enjoy the bounty of fishing opportunities in Missouri.







**Top:** A young boy, with his two dogs, heads into the woods during squirrel season. Squirrel season in Missouri is an excellent way to introduce hunting to youth – the sport is active, the season is long, and the bag limits are generous.  
**Middle:** Missouri is a great place to fish, and these two anglers are learning that at a young age.  
**Bottom:** Conservation areas are a great place for birders.



## New Focus on Outdoor Recreation

MDC has a new team focused on expanding nature-based outdoor recreation on conservation areas. A recreational-use program lead and five regional recreational-use specialists are helping revise policies and update regulations to allow more activities on conservation areas statewide. The goal is to connect people with nature by providing a variety of activities and options including hunting, fishing, wildlife viewing, and hiking. This team is also exploring expanding opportunities for bicycle riding, dispersed camping, paddle sports, rock climbing, and more where appropriate and where it will allow different people to explore the outdoors. MDC manages more than 1,000 conservation areas statewide. Search for activities and features you are interested in at [short.mdc.mo.gov/Z9o](https://short.mdc.mo.gov/Z9o).

## Virtual Programs

In calendar year 2020, staff provided over 3,000 educational programs to help Missourians manage habitat and to facilitate participation in outdoor activities including hiking, birding, hunting, shooting, fishing, and more. Over 900 of these programs were hosted virtually to keep everyone safe during the height of COVID. During the peak of the pandemic, 47 percent of program attendees indicated they were first-time customers.

Additionally, teacher workshops were refined to include a virtual component. The new hybrid teacher workshop format has reduced the in-person time by 50 percent, which will make it more convenient for teachers to participate in trainings in the future. Nature-based education is often most effective while in nature and in-person. However, staff are confident lessons learned providing virtual programs can be used to connect with more citizens.



## Conservation Partner Roundtable

MDC hosted its fourth annual (and first virtual) Missouri Conservation Partners Roundtable in October 2020. While we missed in-person interactions, the virtual format allowed us to have record-setting attendance with more than 500 conservation partners (representing 230 organizations), college students, and MDC staff participating. Ten concurrent sessions were held on topics that fit the conference theme, A New Era of Conservation: Exploring our Past, Present, and Future. The event concluded with a question-and-answer session with MDC leadership.



## YAYA Campaign

Securing the future of Missouri's fish, forests, and wildlife will require the active participation of future generations. MDC is reaching out to the youth and young adult (YAYA) audiences with a new campaign aimed at generating more interest in outdoor recreation among young Missourians.

The campaign — Never Lose Touch — was developed by MOJO Ad, an advertising firm staffed by strategic communications students from the University of Missouri-School of Journalism. MOJO Ad developed a relevancy marketing campaign for fish, forest, and wildlife agencies to make nature more appealing to the YAYA audience. Three MOJO Ad teams conducted research, developed a campaign theme, and provided a marketing plan.

The goal of Never Lose Touch is to generate more interest in outdoor recreation within the YAYA audience. The campaign's effectiveness will be measured by youth engagement with MDC communications channels, including the MO Outdoors app and Nature Boost podcast downloads, *Missouri Conservationist* subscriptions, and web page hits.

## MDC Volunteer and Citizen/Community Engagement Programs

The work of MDC is multiplied by the dedicated corps of volunteers statewide who share the department's passion for protecting Missouri's fish, forest, and wildlife resources.



**Above and top right:** Stream Team chapters seek to keep our waters clean. This group removed numerous bags of trash, including a car bumper, from the Missouri River.

**Remaining pictures:** Never Lose Touch is a new campaign reaching young people and encouraging their connection with the outdoors, whether it be through fishing, birding, camping, hiking, canoeing, or more.





## Stream Team and the Mississippi River Plastic Reduction Pilot Project

Under the leadership of the Mississippi River Cities and Towns Initiative, the mayors of the Mississippi River in partnership with the United Nations Environment Programme, National Geographic Society, and the University of Georgia have launched an initiative to combat plastic pollution along one of the world's greatest waterways. The Stream Team Program partnered in this pilot project, which included the cities of St. Paul, Minnesota; St. Louis, Missouri; and Baton Rouge, Louisiana; in March and April 2021. The Greenway Network Stream Team kicked off the event in St. Louis with a launch of a GPS bottle tracker. Stream Teams in St. Louis tested the newly developed Debris Tracker App at over 70 target areas, surveying over 40,000 square meters and logging over 28,000 litter items. The results of these findings will be used to determine how best to address plastic pollution to protect communities, the Mississippi River, and the ocean.

## Master Naturalist Chapters Form Partnerships

The Chert Glades Master Naturalist Chapter in Joplin has been partnering with Webb City on a wetland and prairie restoration project at the city's wastewater treatment plant.

The Osage Trails Master Naturalist Chapter in Kansas City is partnering with the Missouri River Bird Observatory on a project called KC Strike where they are identifying buildings in downtown Kansas City that have a high rate of avian mortality due to bird strikes.

Bob and Barb Kipfer, members of the Springfield Plateau Master Naturalist Chapter, spend a considerable amount of their volunteer time teaching students at the WOLF school and hosting educational classes for students on their property in the Ozark hills in southern Missouri.





# MDC Maintains Public Trust

WE WANT YOU TO BE CONFIDENT THE FINANCES DEDICATED TO MISSOURI CONSERVATION ARE USED WISELY, AND DECISIONS CONCERNING MISSOURI'S FISH, FORESTS, AND WILDLIFE ARE GUIDED BY THE BEST AVAILABLE SCIENCE.





## Customer Experience

### Surveys

MDC expanded its standardized customer surveys in FY 21 to include more nature center programs. Results from the surveys are already being implemented. For example, through the surveys, program participants revealed an interest in native plant programs, so Kansas City staff partnered with Deep Roots to roll out additional native plant programming.

Those standard customer survey questions were added to some of the Science Branch's long-time post-season surveys beginning in FY 21.

Also, in FY 21, the team also rolled out an improved Conservation Monitor Survey, used to gauge what all Missourians think about MDC and the various programs and services offered. The surveys, performed on a quarterly basis, provide timely feedback so the data can drive improvement in various programs and services.

### Portal

MDC began working on an online customer portal in FY 21. The portal will provide citizens with a one-stop-shop for all the online or digital services frequently accessed. A single user ID and password for the portal will replace multiple IDs and passwords for each online service. Some examples of digital services offered in the portal include:

- Fish Kill Public Reporting
- Wildlife Health Public Reporting
- Stash Your Trash
- George O. White State Forest Nursery Story Map
- Missouri Lakes Fishing Prospects
- Missouri Outdoor Recreational Access Program Story Map
- Missouri Streams Fishing Prospects Story Map
- Missouri Trout Fishing,
- MO Outdoors
- MoFWIS
- MOMILLS
- Mountain Lion Sightings Story Map
- Small Mouth Bass Management Areas Story Map

### Continuous Improvement

MDC's reorganization took effect July 1, 2020, so the past year has seen work across all branches, reviewing and updating processes to redefine working groups, their roles, and responsibilities. The new Strategic and Operational Planning process, rolled out in FY 21, includes the development of FY 22 regional plans as well as the implementation of an annual cycle to review the Strategic Plan. ▲

# Get Outside

in JANUARY



Red-bellied woodpecker

→ Ways to connect with nature



Ohio horsemint

Moss and lichen

Mullein

## It's Not Easy Being Green

- **Ohio horsemint:** The basal leaves remain green through the winter and have a mild, pleasant, minty scent.
- **Mullein:** A variety of insects overwinter in the fuzzy basal leaves of this biennial, which colors the winter landscape.
- **Mosses and lichens:** With the leaves off the trees, the green of mosses and lichen really glow.

## Catch a Rainbow

Cast your line and catch a rainbow! MDC stocks rainbow trout in certain lakes and streams in winter. If you're interested in winter fishing but for other species, Missouri has you covered. Bass, crappie, walleye, and catfish are also popular for anglers during the winter months. For more information, visit [mdc.mo.gov/fishing](http://mdc.mo.gov/fishing).



VIRTUAL

## Primitive Skills: Virtual Bushcraft Series: Shelters

Wednesday • Jan. 19 • 12-1 p.m.

Location: Online only

Registration required at [short.mdc.mo.gov/Zt5](http://short.mdc.mo.gov/Zt5).

This virtual program will give you an introduction on building basic shelters in all types of situations. Start time will be 12:05 p.m. using the Webex platform and all registered participants will receive a link with the login information 24 hours prior to the event.

### Natural Events to See This Month

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



Great horned owl breeding occurs. Opossums



suffer damaged ears and tail tips due to freezing. Female



black bears give birth to their cubs.



Find more events in your area at [mdc.mo.gov/events](https://mdc.mo.gov/events)

## Feathered Excavators

Have you noticed some busy birds around your trees and wondered, what's going on? No need for concern – they are just foraging their next meal. Chickadees, titmice, nuthatches, and woodpeckers use their tweezerlike bills to pick insect and spider eggs and pupae from crevices in tree bark where they overwinter.



Carolina chickadee

**VIRTUAL**

## Primitive Skills: Virtual Bushcraft Series: Useful Cordage Plants

Wednesday • Jan. 12 • 12-1 p.m.

Location: Online only

Registration required at [short.mdc.mo.gov/Zti](https://short.mdc.mo.gov/Zti).

This virtual program will show common plants and materials to make different types of cordage. Start time will be 12:05 p.m. using the Webex platform and all registered participants will receive a link with the login information 24 hours prior to the event.

## Howl at the Moon

Red fox mating season peaks in January and February, as does their nocturnal barking. If you are near a forested area or open area at night, you are sure to hear them.



Red fox

# Call Before You Cut

## 5 REASONS TO CALL BEFORE YOU CUT

- ✓ Learn if harvesting is right for you and your woods
- ✓ Harvest the proper trees to ensure a healthy forest
- ✓ Find a trained logger for the job
- ✓ Maximize timber sale income and save \$\$\$ on taxes
- ✓ Ensure your overall satisfaction with the timber harvest

**Request a free  
informational packet  
about working with a  
professional forester to  
take care of your woods.**

**[callb4ucut.com](https://callb4ucut.com)  
877-564-7483**



# Places to Go

KANSAS CITY REGION

## Montrose Conservation Area

Former power plant water source continues to draw waterfowl, shorebirds

by Larry Archer

✳ For decades, Montrose Lake Conservation Area (CA) drew thousands of waterfowl during the winter due to the lake's consistently warm water coming from the nearby power plant. Now, even with the power plant gone, the lake continues to draw waterfowl, waterfowl hunters, and birders.

Located on 2,750 acres in Henry County, the 1,600-acre Montrose Lake was created in the 1950s to provide cooling water for a coal-fired electrical plant. The warm water discharged from the plant prevented the lake from freezing over, said Wildlife Biologist Brian Bokern.

"The hot water was key in the wintertime because it used to keep the lake from freezing over, and waterfowl — no matter how cold it was — always had a place to have open water," Bokern said. "So, it has a long tradition of waterfowl using it."

Even though the plant is gone, the lake continues to draw large numbers and varieties of waterfowl, shorebirds, and more, he said.

"It just gets a little bit of everything," he said. "You can see it there — shorebirds, seagulls, seagulls by the hundreds and thousands at times."

Parts of the area are closed during waterfowl hunting seasons, so visitors should call before arriving.

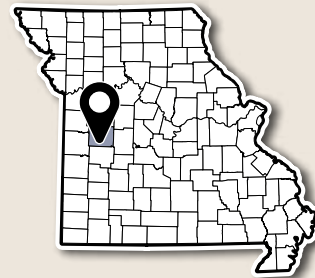


"It's nothing to have 60,000 snow geese on the area. You never know what you're going to have fly in it. It may be a hooded merganser or maybe a common merganser, a golden eye. You may have redheads, mallards, pintail, I mean we get everything."

—Montrose CA Wildlife Biologist  
Brian Bokern

DAVID STONNER





## MONTROSE CONSERVATION AREA

consists of 2,750 acres in Henry County. From Montrose, take Highway HH north 1.5 miles, then SW 1151 (RA) north 1 mile to area headquarters.

38.3113, -93.9741

[short.mdc.mo.gov/Ztx](http://short.mdc.mo.gov/Ztx) 660-693-4666

## WHAT TO DO WHEN YOU VISIT



**Birdwatching** The eBird list of birds recorded at Montrose CA is available at [short.mdc.mo.gov/Ztp](http://short.mdc.mo.gov/Ztp).



**Camping** Individual campsites.



**Fishing** Black bass, catfish, crappie, white bass.



**Hunting Deer** (archery methods only) and **turkey**. Regulations are subject to annual changes. Refer to MDC's regulation page online at [short.mdc.mo.gov/Zjw](http://short.mdc.mo.gov/Zjw) for current regulations.

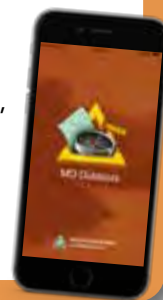
Also **quail**, **rabbit**, and **squirrel**



**Waterfowl Hunting** Morning draw.

## 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](http://mdc.mo.gov/mooutdoors).



## WHAT TO LOOK FOR WHEN YOU VISIT



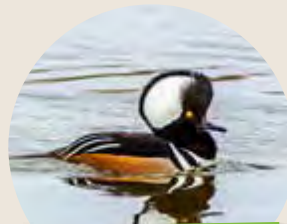
American white pelican



Bald eagle



Double-crested cormorant



Hooded merganser





## Horned Lark

*Eremophila alpestris*

**Status**  
Common

**Size**  
Length: 7¼ inches

**Distribution**  
Statewide

**H**orned larks prefer areas with extensive bare ground. Look for them in plowed agricultural regions, where they prefer to nest before vegetation has a chance to grow tall. Their camouflaged upperparts make them inconspicuous, but they often occur in flocks, and their movement against the ground, and their distinctively marked faces and "horns," can help you see them. Their song is a soft twittering and tinkling sound, usually delivered in flight. Their call is a lipping tsee or tzee-te-te.



### Did You Know?

Like other ground nesters, horned larks lose many young to predators such as raccoons, skunks, and weasels. Females avoid drawing attention to the nest. If a predator does draw too near, they perform a distraction display similar to the "broken-wing act" of killdeer.

### LIFE CYCLE

Considered one of Missouri's earliest nesters, horned larks begin nesting on bare ground or in short grass, on golf courses, airports, or open agricultural fields as early as February. Courtship songs and displays begin in January and February. The male flies up several hundred feet, giving a tinkling song at its highest ascent. Then it zooms, dartlike, to the ground, opening its wings at the last minute. Young often fledge before spring plowing, but many are lost during field preparation.

### FOODS

Their diet includes both seeds and insects. During nesting season, insects are eaten more frequently, as the growing young require the additional protein. Most seeds are picked up from the ground or from low plants.

### HUMAN CONNECTIONS

Early settlers in America, confronted with totally new species, often gave good-singing birds names such as "meadowlark" (which, for instance, is actually in the blackbird family).



# Outdoor Calendar

❖ MISSOURI DEPARTMENT OF CONSERVATION ❖



## Free MO Hunting and MO Fishing Apps

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

## FISHING

### Black Bass

Impounded waters and non-Ozark streams:  
Open all year

Most streams south of the Missouri River:

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

### Nongame Fish Giggling

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

### Trout Parks

Catch-and-Release:  
Nov. 12, 2021–Feb. 14, 2022  
State trout parks (except Maramec Spring  
Park) are open only Friday–Monday

## TRAPPING

### Beaver, Nutria

Nov. 15, 2021–March 31, 2022

### Other Furbearers

Nov. 15, 2021–Jan. 31, 2022

### Otters, Muskrats

Nov. 15, 2021–Feb. 20, 2022

### Rabbits

Nov. 15, 2021–Jan. 31, 2022

For complete information about seasons, limits, methods, and restrictions, consult the *Wildlife Code of Missouri* at [short.mdc.mo.gov/Zib](http://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](http://short.mdc.mo.gov/ZZf).

## HUNTING

### Coyote

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

Open all year

### Crow

Nov. 1, 2021–March 3, 2022

### Deer

Archery:  
Nov. 24, 2021–Jan. 15, 2022

Firearms:

- ▶ Alternative Methods Portion:  
Dec. 25, 2021–Jan. 4, 2022

### Other Furbearers

Nov. 15, 2021–Jan. 31, 2022

### Pheasant

Nov. 1, 2021–Jan. 15, 2022

### Quail

Nov. 1, 2021–Jan. 15, 2022

### Rabbit

Oct. 1, 2021–Feb. 15, 2022

### Squirrel

May 22, 2021–Feb. 15, 2022

### Turkey

Archery:  
Nov. 24, 2021–Jan. 15, 2022

### Waterfowl

See the Migratory Bird and Waterfowl  
Hunting Digest or visit [short.mdc.mo.gov/ZZx](http://short.mdc.mo.gov/ZZx)  
for more information.



ILLUSTRATION: MARK RATHIEL



**Follow us  
on Instagram**

@moconservation

The winter landscape in Missouri is like a blank canvas, just waiting for a dusting of snow and the shimmer and warmth of the winter sunshine. Get out and discover the natural beauty.

📷 by **David Stonner**