

The Missouri
Master Natu-
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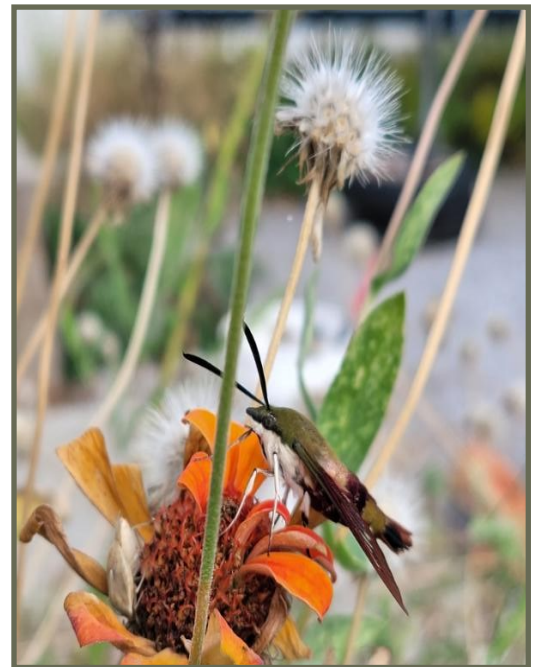
Small Park with a Big Impact

By Bella Erakko with Kristy Trevathan

What has eight raised beds filled with native shrubs and wildflowers, a lovely secluded bench for sitting, two murals, butterflies, birds, and beneficial insects?

Most of us have driven past this “pocket park” on the second block of Broadway ... and never seen it ... let alone visited it. Abutted on both sides by three-story brick businesses, this park replaces a building that had to be removed about 40 years ago for safety reasons.

Enter Hannibal Parks & Recreation. In 2019, Andy Dorian saw native plant potential and approached master naturalist Kristy Trevathan. He offered, “We’ll build the raised beds, fill them with topsoil, and give you a budget to purchase plants.”



Clearwing Sphinx Moth

The Missouri Master Naturalist program is a community-based natural resource education and volunteer service program for adults, sponsored by the Missouri Department of Conservation and the University of Missouri Extension.

Its purpose is to develop a corps of well-informed volunteers to provide education, outreach and service dedicated to the beneficial management of natural resources and natural areas within their communities for the state of Missouri.

The Mississippi Hills Master Naturalist Chapter is located in Hannibal, Missouri and serves the surrounding counties. We are involved in citizen science, community projects, nature interpretation, and community nature education.

FIND US ON THE WEB: <https://www.mississippihills.missourimasternaturalist.org/>

And on Facebook [@MississippiHills](#)

Small Park With Big Impact, Cont.



For the Mississippi Hills Master Naturalists chapter, Dorian's proposal fit as neatly into their vision for Hannibal as the garden fit into the niche between two businesses.

"It was kind of a blank slate,"
Kristy enthuses. **"Oh my gosh,**
we have to FILL 8 flower beds!"
So they did.

With experts Wendy and Robert Hendrickson and Forrest Keeling nurseries advice, a team selected and planted 49 shrubs: Witchhazel, Spice Bush, Black Chokeberry, Brilliant Service Berry, Nanny Berry Viburnum, Saskatoon Service Berry, and a Lead plant (which can live for centuries). Native plants offer so much: food for wildlife, medicinal uses for humans, shade and respite for the weary, but ... that first summer was brutal.

With virtually no rain, and there wasn't even a water spigot. The Board of Public Works put a hose-friendly attachment on a water main, and MHMN volunteers Toni and Donna Black-Blackman along with Kristy showed up every three days or so to water this entire park by hand.

Today, this still unnamed oasis makes a perfect verdant respite for those who like to sit, hidden, in the very middle of this native greenery filled with insects, butterflies, and some birds. Recently, Kristy stopped by to weed. As she worked her way through the beds, she spied a hummingbird-sized butterfly she had never before in her life seen. She snapped a photo, and learned from an expert that this Broadway visitor was a Clearwing Sphinx Moth. Though present throughout the United States, it is rarely seen—kind of like a winged version of the snow leopard.

To attract more attention, an archway entrance to the park has been commissioned, and there is interest in educational signage. But in the meantime, all are welcome ... from butterfly to weary Hannibalean.



Master Naturalist Training 2021

Reflections on the Journey

By Carolyn Trower

Everybody needs beauty as well as bread,
places to play in and pray in,
where nature may heal and
give strength to body and soul.
John Muir

I feel like my path to becoming a Missouri Master Naturalist has been simmering for a long time. My childhood was filled with reading about John Muir and Indian tribes, Robin Hood in Sherwood Forest and pioneers rolling across the vast prairies. Later I tempered those with images from Tolkien's Middle Earth and Charles de Lint's desert myths. As an English major I read Thoreau and Mark Twain, and Neihardt's *Twilight of the Sioux*. I worked for the archaeologists excavating several sites before the Clarence Cannon Dam was built, interspersing what I learned there with the stories my father told me about farming the "home place" with mules in the 30's. I meditated deep in a kiva in the southwest and roamed the English countryside. An incredible deluge of characters, places, and events hum through my subconscious. And the journey has now led me to the Missouri Master Naturalists.

What is a Missouri Master Naturalist? What do they do? How do you join? I've been a member of the Ralls County Groovy Gardeners, a part of the Missouri Master Gardeners, for several years, and checking out the Naturalists seemed like a logical next step. I confess to having a wide, though shallow, knowledge of nature. Specific details and real-time conservation topics were explored while teaching elementary science, but that was it. The quest for deeper knowledge, and the gentle nudging of a fellow Groovy Gardener, led me to an introductory session by members of the Missouri Department of Conservation. The facilitator, Kathi Moore, described the Naturalists as a community-based program for adults centered on natural resource education and service



through the MDC's volunteer program. Their goal is "to create a corps of well-educated Master volunteers" to help the MDC with its Stewardship Programs.

The training course consists of thirteen sessions of volunteer training education in natural history and natural resources management. Participants complete 40+ hours with classroom instruction and field trips for "hands-on" experience. After completing the course, members commit to 40+ hours of volunteer service and 8 hours of advanced training per year to achieve and keep their status as a Missouri Master Naturalist.

The members of this class have been bolstered by Master Naturalists from the Mississippi Hills Master Naturalists. Their input and anecdotes have been enlightening. The class is a mixture of ages and gender. Some of us come from a MDC or DNR background, several of us are retired teachers, and a few are young adults eager to learn and raise budding Naturalists.

***All of us have a desire to
make our area a
better place, a safer place
for wildlife and humankind.***

Reflections, Cont.

Advanced training can be done in plant/animal identification, native plants, wildlife restoration, bird banding, and entomology among others. So far, I've chosen at least three of them to pursue. There are many topics that branch out from these broad categories, you'll have no trouble finding one that intrigues you.

The class is about half-way through now, and we've had a variety of speakers and presenters. No matter their area of expertise they all exhibited a passion for their subject. Excited to share their knowledge and initiate us into the world of insects or have us burrow deep into the many layers of soil. Each one has shown us the complexity of their topic, delving deeper and deeper until we see the whole and not just the surface.

One thread that runs through our class discussions is the belief that balance is the key.

The past and the present must work together to sustain a natural world for future generations. Humans have depleted many of the world's natural resources and humans are the only ones who can conserve our natural resources. Moore paraphrased Aldo Leopold when she stated that the one goal is to create a state of harmony between people and the land.

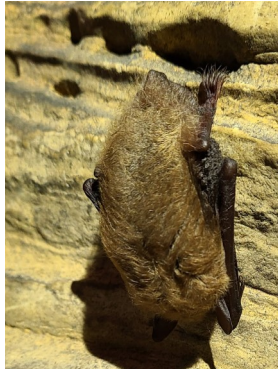
In one session an equation between ecology and theology was discussed. Depending on your viewpoint, this can be a valid statement. How many songs echo the blend of nature and the divine? When I was in elementary school we sang a song, "I Know a Green Cathedral," and I still remember the words. The melody often runs through my mind on a hike around the lake. Hiker's journals extoll the grandeur of the natural world. Artists like Georgia O'Keefe and photographers who follow in the footsteps of Ansel Adams try to capture the majestic sweep of the creator's handiwork.

It seems that humans have always struggled to live at peace with the natural world.

There was a cartoon that argued whether there was a place in the grand scheme of things for mosquitos. I haven't yet learned anything positive about mosquitos, but I do know that no living thing is without merit. Someone, something in the web of life needs it, and so I will learn to adapt and make peace with the "nasties" of the universe as well as the wildflowers. This class is helping me make that peace.



Master Naturalists from all 3 classes (and others) participate in the Fish Habitat project at Mark Twain Lake



Going Batty

by Quintin Heaton

“1...2...3..4567.....8
.....”

It's dark out, past twilight, and the moon hasn't yet risen in the east. My back is facing the cave entrance. I hear the dripping of percolating groundwater seeping out of the limestone rock falling to the cave floor. I am facing an opening in the trees that provides a window of backlit sky filled with the slight light from the town's lights below me. As I lie back slightly to get a full view of the sky, my eyes are tuning into the naturalist's scan to pick up any movement going through the sky. The nearly silent flutter of leathery wings lilt the tiny furry bodies of bats out on their nocturnal hunt and frolicking.

This has become a common practice for me in the last few years. It is the action of an exit count for bats emerging from the Sodalis Nature Preserve mines in Hannibal. Hannibal has become a hot-spot for bat studies in recent years. I knew little about our much misunderstood only true flying mammal when I was invited on my first bat count in the summer of 2014. Since, I have learned lots and been able to take part in some very exciting and valuable bat studies in our area.

There are 14 species of bats that live in Missouri. Their biology is amazing. Even the largest bat in Missouri is only a few inches of furry body that gets supported by a wing formed from the fingers and arms connected by skin. The group microchiroptera, the bats we have here in Missouri, are specially known for their use of echolocation to forage and hunt. If you ever bug a bat, you'll find out that they do have audible vocalizations, but they navigate by sending out pulses of high-frequency sound and hearing the echoes.

Each species uses a different pattern of ultrasonic “chirps” that scientists use to identify them as they fly around. Even though some think that bats look like flying mice, they are more closely related to Primates (which we are part of) than Rodents.

Seven of the 14 species are vulnerable, threatened, or endangered. The biggest threat to these bats is disease, specifically White Nose Syndrome (WNS.) WNS is caused by a fungus, *Pseudogymnoascus destructans*, that eats away the flesh of bats and spreads prolifically during hibernation. This disease began to take hold in the eastern U.S. in 2006 and has spread throughout a large portion of the United States and parts of Canada. WNS has the largest effect on hibernating bats, and can decimate 60+% of a hibernaculum when an outbreak occurs. This happened locally at Cameron Cave in 2011. This devastation led to some groundbreaking studies on treatments to help bats overcome WNS that were studied inside Cameron Cave. At the same time, a large population of Indiana bats was noticed inside an abandoned mine right here in Hannibal. The number of bats hibernating inside the mine increased the known population of Indiana bats by 300%! This brought an onslaught of researchers and environmentalists to town to protect the hibernaculum. The result is the nearly 200 acre Sodalis Nature Preserve.



Going Batty, Cont.



No, not all bats hibernate in caves. As a matter of fact, most bats don't even live in caves all year; only grey bats use caves year round. Most other bats leave the caves during spring to roost in dead snags and under loose bark. The females leave their hibernation site in the spring pregnant. They may travel over a hundred miles to reach a roosting site, usually in a colony with other females. There they give birth and rear their young throughout the summer. Near the end of summer the young are big enough to travel on their own and all begin returning to their winter hibernaculum.

This behavior is where I have come to find my own naturalist niche. The mixture of mystery and calmness that surrounds you while sitting in the dark woods alone at night is actually very peaceful and enjoyable to me. To use that time to collect scientific data is a special bonus. After being initiated into bat censusing, I decided to begin my own study of the bat populations using the limekiln mine at Sodalis Nature Preserve. As a citi-

zen science project for my high school ecology class, in the fall of 2018, I began bringing students out to monitor the fall swarm when the bats begin returning to the limekiln hibernaculum. We surveyed the different mine entrances to find where the majority of bats were entering and exiting the mine, set up some standard procedures to make our data consistent and began a study that has endured for its fourth fall of bat counts.

Each week from the end of August through the beginning of November, my students and I hike up to the mine entrances to count the bats that are using the hibernaculum. It is one thing to notice a few bats flying around as you walk the Sodalis trail shortly after dusk, but if you sit and watch you will be amazed at how many bats are actually there. In the peak of the fall swarm, we can count over 2,000 bats in a ten minute period of time. The exciting part of this citizen science project is that the data has been used by researchers from the Missouri Department of Conservation, U. S. Forestry Service, U. S. Fish and Wildlife and other agencies as groundwork for further studies.

My interest in our nocturnal friends has brought me tremendous joy. There are many opportunities for someone to get involved with bats. You are welcome to join me on a bat count in the fall or you could participate in other events throughout the year.

Volunteers Needed

“Secrets of the Night” event at Sodalis Nature Preserve will NEED VOLUNTEERS! We will have 3-4 sensory stations (seeing-night vision, hearing, and smelling) where groups of 15-20 will come through every 30 minutes with first group starting at 5:30pm from the Sodalis parking lot & last group at 6:30pm. We could use help with set-up, and we should be finished by 8:30-9:00pm.

Contact Gale Rublee for more information

Deer Ridge Conservation Area

By Mark Wetherford

Mississippi Hills Master Naturalists Help Missouri Conservation Department by Walking and Assessing Trails.

Storms over a period of time have a tendency to deposit debris on the trails creating safety issues for bikers, hikers and horse riders.

MHMN was contacted about volunteering to walk the trails at Deer Ridge when blockage on some of the trails was reported by users. I was asked to take pictures of existing issues, GPS the trails to update the maps of current trails and give any other recommendations for improvements.

I used the Avenza Maps App to download a geo-referenced map of Deer Ridge Conservation Area and off I went to explore. This is an incredible app that proved to be very useful and with a little practice, easy to use. A few of the trails were lacking adequate markers to guide hikers/bikers/horse riders in the right direction.

Without this App, there were a few times that I would have been confused on which direction to go. (Adding additional markers is one of the recommendations for improvements).



I walked the trails and found myself curious, wondering what lay around the next corner.

Experienced trail builders had incorporated a variety of different terrains into each and every trail which totaled over 17.5 miles in all. Each trail is color coded and provides a designation on the purpose of each...be it hiking, biking or horse trail.

You are one moment challenged to conquer a steep incline only to be followed by a peaceful stroll through gentle rolling wooded hillsides. I found elevation variances of over 150' on most trails making your hiking/biking challenging but rewarding.

The pictures are examples of some of the hazards we found, noted with GPS location, and will be addressed through proper channels. Through experience, I know horse riders have a special appreciation for "obstacles" over the course of a trail be it a creek, ditch, or fallen tree.

I found this collection of trails to be well designed and carefully constructed for the full enjoyment of those who travel over them. A trail without a challenge is nothing more than a sidewalk. I fully recommend Deer Ridge Conservation Area.

Special Note: Unless you are an exceptionally competent and avid biker, these series of trails lend themselves more so to hikers and horse riders.

Missouri Department of Conservation:
OUTDOOR RECREATION SPOTLIGHT
FIVE LONG HIKES
IN NORTHEAST MISSOURI

by
Robert Hemmelgarn
Sep 07, 2021



KIRKSVILLE, Mo. - The Missouri Department of Conservation (MDC) encourages Missourians to discover nature this fall by seeking out remote trail hiking experiences on conservation areas in northeast Missouri.

Traversing longer trails on foot, forces us to slow down; to observe and appreciate elements of the natural world on a more intimate level. While bicycling, horse riding, or even a car ride can take us to remote places of natural beauty, hiking forces us to engage with the very ground on which we walk. Small, quiet interactions of tiny pollinators feeding from the fall's final flowers, field crickets rustling beneath dry grasses, or the silent flight of a watchful owl, all become harder to miss. And the splendor of trees changing color and dropping leaves, turns forests into wooded wonderlands.

Autumn offers opportunities to engage with the natural world during a season of change. Finding a remote nature trail can provide a powerful reminder of how we're all connected to these natural communities and seasonal cycles.

Many conservation areas are in remote settings, and most have no potable water onsite. Before hitting the trail, remember to make a plan, tell someone where you're going and when you'll return, and pack water, food, and any other provisions you'll need for your time on the trail.

MDC's [free MO Outdoors App](#) for mobile devices provides a convenient way to carry digital maps and other information, even outside of cellphone service range. Always pack a paper map and compass, too, as a failsafe.

Always check [hunting season dates](#) before hiking during the fall. If hiking during an open firearms season, wear hunter orange clothing to ensure you're seen and identifiable as a human hiker.

Many conservation areas in northeast Missouri offer excellent trails for long nature hikes this fall, just a short drive from home. Some areas feature more than ten miles of designated paths, and many of these areas offer multiple loops, allowing hikers to customize their experience. Learn more about these, and other hiking opportunities at nature.mdc.mo.gov/discover-nature/places.



[Union Ridge Conservation Area](#)

Located north of Greencastle in Adair, Sullivan, and Putnam counties, this area offers 35 miles of service roads. MDC mows these paths periodically during the summer, but hikers should expect to walk through shaggy grass if the paths haven't been mowed recently. These service roads are open to hiking and travel throughout the area, forming several distinct loops, as well as many out-and-back segments. Trails take hikers through savannas, woodlands, prairies, and forests. Union Ridge Conservation area contains a restored savanna and prairie in the scenic Spring Creek Ranch Natural Area. Primitive hike-in camping is allowed, and designated campsites are also available year-round on a first-come, first-served basis.

“There are so many great trails on conservation areas, it's easy to find the experience you're looking for,” said
MDC Recreational Use Specialist,
A.J. Campbell.

LONG HIKES IN NORTHEAST MISSOURI, Cont.



[Charlie Heath Memorial Conservation Area](#)

Located near the Iowa state line in Clark County, this area offers 6 miles of multi-use trail with two distinct loops. Both loops take hikers, bikers, and horseback riders through forested hills and bottomlands along the Fox River and Burnt Shirt Branch Creek. The trail is open year-round for hiking, but closed to bikes and horses during firearms hunting seasons for deer and turkey. Primitive hike-in camping is allowed, and designated campsites are also available year-round on a first-come, first-served basis.

[Deer Ridge Conservation Area](#)

Located north of Lewiston in Lewis County, this area offers 18 miles of multi-use trail with several distinct loops. This trail takes hikers, bikers, and horseback riders through hilly forests and woodlands, and near wetlands along the North Fabius River. The trail is open year-round for hiking, but closed to bikes and horses during firearms hunting seasons for deer and turkey. Primitive hike-in camping is allowed, and individual campsites with gravel parking pads are also available year-round on a first-come, first-served basis. The area also offers excellent day-use facilities near its 48-acre lake.



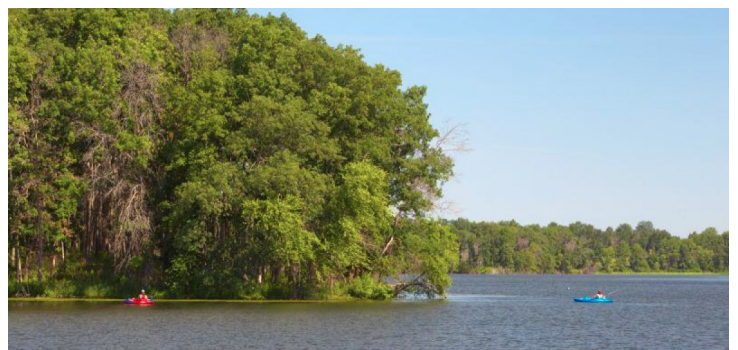
[Sugar Creek Conservation Area](#)



Located just south of Kirksville in Adair County, this area offers a 2-mile hiking loop (The Ironwood Trail), and 10 miles of multi-use trail with three distinct loops. Each multi-use trail loop is blazed with a different color. All loops take trail users through hilly oak forests, and the longest loop (Yellow, 5 miles), travels near a waterfall on Elm Creek. Trails are open year-round for hiking, but the multi-use trail is closed to bikes and horses during firearms hunting seasons for deer and turkey. Primitive hike-in camping is allowed, except during firearms hunting seasons for deer and turkey. Designated campsites are also available year-round on a first-come, first-served basis.

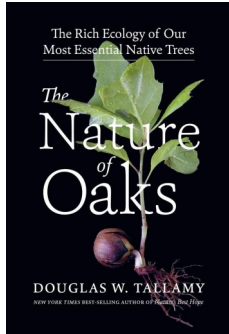
[Henry Sever Lake Conservation Area](#)

Located just north of Newark in Knox County, this area offers a 7-mile, multi-use trail that forms a partial loop around Henry Sever Lake. Trail users can complete the loop by hiking rural roads on the north and east sides of the area. The trail takes hikers, bikers, and horseback riders through woods and prairies. The trail is open year-round for hiking, but closed to bikes and horses during firearms hunting seasons for deer and turkey. Individual campsites with gravel parking pads are available year-round on a first-come, first-served basis. The area also offers excellent day-use facilities near its 158-acre lake.





Reader's Review



The Nature of Oaks

By Douglas Tallamy

Did you know Blue Jays and oak trees have a symbiotic relationship? This is just one of the many relationships author Tallamy enables his readers to discover in his book, *The Nature of Oaks*.

Tallamy shares his knowledge of oak trees and his vast knowledge of the insects that interact with them. Since reading this book, I observe oak trees more closely than I ever had before. I especially look for new oak trees in our yard, what kind they are and look for the insects that are interacting with them.

For Master Naturalists this is a must read!

by Toni Black-Blackman



Master Naturalists enjoying the shade of a beautifully huge pecan tree near Steyermark Woods CA. Having helped measure the tree during our July meeting, we are waiting for news as to whether it will qualify as a Missouri Champion tree.

Volunteers Needed

For the Farmers Market in Hannibal at Central Park on October 23rd, 8:00am-Noon. The theme will be a Tree Program with the Hannibal Tree Board. We will have a couple trees to raffle off and need MHMN's to help set-up and take down booth, and to provide information. **Gale Rublee** is doing a "Tree Friend" program at 10am and could use a volunteer helper to assist.

POPULATING POLLINATORS

Fall Migration . . Heading South

By Anne Coleman

Watching the swoop and attack antics at our hummingbird feeders is always entertaining.

The Ruby-throated hummingbird (*Archilochus colubris*) is the only species that visits our feeders and is the primary species seen in Missouri. In the first week of September, we noticed that we had double the usual birds visiting, and it was hard to keep up with filling the feeders so that food was always available. In the fall, hummingbirds are driven by instinct when fewer hours of daylight trigger hormonal changes that cause the urge to fuel up and head south. In preparation they will feed in a frenzied state called hyperphagia. The hummingbirds will add about 20% of their body weight as they prepare to fly hundreds of miles fueled by nectar. The Ruby-throated hummingbird winters along the western Gulf coast south through Central America.



A ruby-throated hummingbird waiting for its turn at the feeder. Photo taken by Dennis Foss



These little warriors are tough to capture in a photo, but I tried!

According to the Audubon Society, “Enough birds have been sighted for us to know that, as a whole, ruby-throats fly quite low during migration – just above the trees when over land and skimming the waves over water.”

The overland migration of these birds occurs at the peak of flowering of spotted jewelweed, or touch-me-not, whose nectar ruby-throats are fond of. Some ornithologists feel that this is not coincidental and that the flowering of jewelweed may even influence the timing of Ruby-throated hummingbird migration.

I was pretty sure that what we were seeing was a peak of just-passing through hummingbirds in our area. This proved to

Fall Migration, Cont.

Approximate Ruby-throated Hummingbird
Range / Distribution Map
Author Ken Thomas



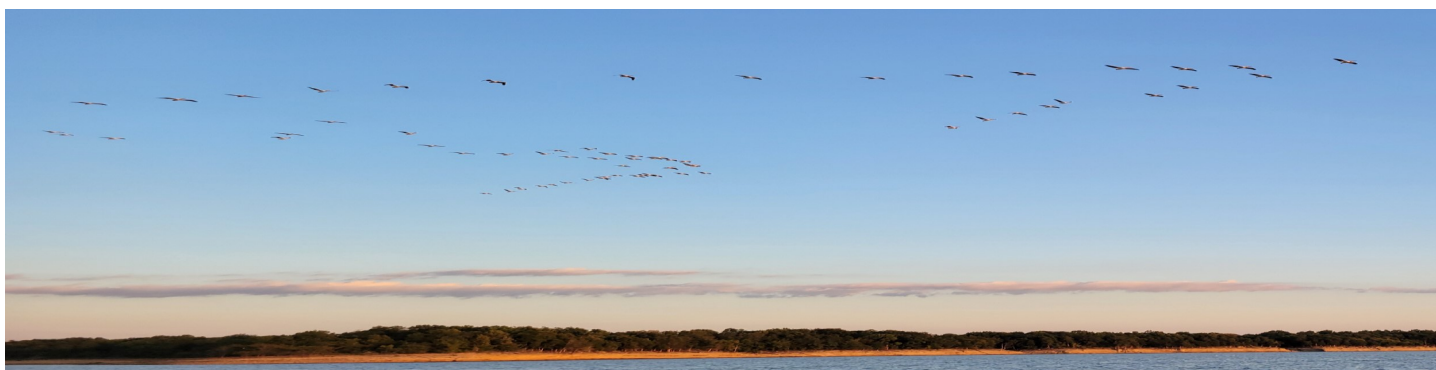
yellow indicates the summer-only range,
blue indicates the winter-only range, and
green indicates the year-round range of the species.

be true in the following weeks as fewer hummingbirds were feeding each day, and by the last week of September we saw only one over a period of several days.

Males leave first – as early as August – and then females follow. The last to go are the juveniles who are migrating for the first time.

According to my MDC calendar, most Ruby-Throated hummingbirds will have left Missouri by early October.

MDC advises leaving your hummingbird feeders up until Thanksgiving in case of stragglers coming through your area. According to experts, leaving feeders out will not delay migration.



Early September migrants over Mark Twain Lake

But it isn't just Hummingbirds, of course, that make their way through our area in the fall. Migrating birds comprise approximately half of the nearly 10,000 known bird species in the world.

Over the past decade, an average of 323 species are reported annually in Missouri with about 80 species that are casual visitors and are rare to see. Some birds live in Missouri year-round, while others only show up for brief "stopover" periods to fuel up during migration. Other birds are partial migrants, meaning that some individuals within the species migrate while others stay put. The American robin is a good example of this behavior as some remain near their breeding grounds while others migrate

Why some birds migrate and others don't is the focus of a complex and active field of research and this has long been a difficult question for ornithologists to answer. For migration to be worthwhile, the benefits must outweigh the risks – benefits coming in the form of improved survival and breeding success. Finding food generally is believed to be the main driver with the escape from extreme weather and reduced exposure to predators or parasites, especially during breeding season being additional factors.

Just like the hummingbirds, other migrating birds rely on their internal biological clocks to detect changes

Fall Migration, Cont.

in environmental conditions, such as the length of the day and possibly air temperature, may trigger migration by stimulating hormones, telling the birds it's time to fly.

Migrating birds follow celestial cues, such as the position of the sun, stars, and the moon, and adult birds use a magnetic compass to navigate.

Recent observations have noted that migration schedules seem to be shifting. "It looks like bird migrations are commencing a little earlier in the spring," says Kyle Horton, an aeroecologist at the University of Colorado who uses radar technology to

map real time and historical bird migrations in the United States. Some ornithologists believe this shift may be the result of climate change

The very nature of bird migration is perilous and tests the limits of endurance. Before migration, birds can store up to 50% of their body weight. They rely upon stopover sites to rebuild these reserves. Stopover habitat is increasingly becoming important for many bird populations in decline due to habitat alteration on wintering grounds and fragmentation throughout their ranges.

Here are some websites for learning more about bird migration:

[All about birds](#)

<https://journeynorth.org/>

<https://www.audubon.org/news/9-awesome-facts-about-bird-migration>

<https://mobirds.org/Birds/>

Sources: Beauty of Birds (Avian Web); National Audubon Society; National Geographic Society; Journey North; Birdwatchers Digest; Great Missouri Birding Trail; Missouri Department of Conservation



In addition to the natural hazards of migration, birds increasingly face a range of human-caused perils.

Illustration via Cornell Lab.

Actions to help migrating birds—

- ◆ Plant native plants & provide sources of open water to increase suitable habitat
- ◆ Turn lights off to avoid drawing in birds; Make windows bird friendly
- ◆ Support climate change research and greenhouse gas reduction efforts
- ◆ Keep cats indoor to reduce predation

For more information on how to make windows bird friendly:

<https://abcbirds.org/glass-collisions/stop-birds-hitting-windows/>

HISTORY OF EXTENSION

University of Missouri Extension has its roots in the federal acts that enabled the university to deliver the practical benefits of education and scientific research to the people to improve their economic prospects and quality of life.

The Morrill Act of 1862 established the University of Missouri as a land-grant university. The act gave grants of land to states with the provision that proceeds from the sale of those lands be used to establish public colleges or universities to educate citizens in agriculture, home economics, mechanical arts and other practical professions.

The Morrill Act of 1890, which established Lincoln University, provided additional funds to ensure that the land grants were open to all citizens without regard to race.

In 1887, the Hatch Act established agricultural experiment stations at land-grant universities. The University of Missouri currently conducts research to aid agricultural producers and to ensure a safe food supply at research farms and centers around the state.

The Smith-Lever Act of 1914 established the Cooperative Agricultural Extension Service, a partnership among federal, state and county governments allowing universities to extend their programs to all people — not just students.

Initially, the extension program concentrated on working with farmers and their families, which comprised the majority of the nation's popula-

tion, to improve their quality of life and standard of living.

Extension workers demonstrated how to produce more and better varieties of agricultural commodities; how to benefit from better nutrition, clothing and housing; and how to work together to bring about major improvements, such as electric cooperatives.

In 1955, state legislation required counties to establish county extension councils to advise the University of Missouri on educational programming needs. Today, some 1,600 elected, appointed and delegated citizens volunteer their time and effort to assess local educational needs and to work with extension faculty in delivering and evaluating the programs. Appropriations from county commissions provide operating funds for county extension offices and secretarial support.

In 2016, the new vice chancellor for extension and engagement reported directly to the chancellor of the University of Missouri. The Office of Extension and Engagement was created in 2018. This was an important step toward providing the people of Missouri greater access to the full breadth of the university. Also in 2018, the vice chancellor for extension and engagement took on the additional responsibilities of chief engagement officer for the University of Missouri System— leading outreach efforts and working with university leaders at all four campuses to develop an outreach and engagement strategy.

Spotlight on Species

Dragonfly

(*Odonata*, infra-order *Anisoptera*)

Adult-- Dragonflies measure ¾ - 5" long (varies with age and species) and their freely movable heads have compound eyes with 30,000 facets in each large bulging eye. Dragonflies have slender, elongated abdomens and 2 pairs of wings that are usually held flat and away from the body outstretched horizontally. The hindwing is broader at the base than the forewing and the four wings can move independently allowing them to move forward and backward. Many dragonflies have brilliant iridescent or metallic colors. Their long legs are unsuitable for walking; however, they are used for perching as well as holding insects captured in flight.



Nymph--

Larva measure from ¼ to 2½ inches (varies with age and species). The nymphs (or naiads) are aquatic with 6 legs, large eyes and small wing buds on the back off the thorax. The lower jaw is shaped like a scoop with bristles on the tip. Gills are located inside the rectum and they breath by drawing water in & out of their hind end. The nymph can also use this feature to propel themselves by powerfully expelling this water.

DIET

Adult dragonflies eat mosquitoes, midges, flies, bees, and sometimes moths and butterflies. Larvae eat anything they can catch and subdue — baby tadpoles and salamanders, microcrustaceans, small fish, and other aquatic larvae, including mosquitoes.

Adult North American dragonflies generally live from two to four weeks.

Human Connection

Both adult and dragonfly nymphs perform a beneficial service to people by preying on mosquitoes and other flying insects.

Man-made water bodies such as ponds have become ideal breeding grounds for dragonflies. As a pond ages and becomes richer with vegetation, more dragonfly species are drawn to the pond.

Humans can also use dragonflies as an indicator of changes in the ecosystem. Dragonflies are part of the standard biomonitoring surveys in many parts of the world and are used to study freshwater ecosystems and environmental changes.

Life Cycle

There are three stages in the dragonfly lifecycle—egg, nymph, adult. **Most of a dragonfly's life is spent as a nymph.**

The adult male dragonfly subdues the female by grabbing her head behind her eyes with forceps-like anal appendages called cerci. While linked, the male has to bend his abdomen up to transfer sperm. The female brings up the end of her thorax in contact with the male's, forming a closed circle. This has been termed the wheel formation--a shape that also bears resemblance to a heart.

Fertilization takes place in the air or a nearby perch. Male dragonflies can scoop the sperm of recent mating predecessors from the female's body and replace it with their own.

Some species lay their eggs in aquatic vegetation, some in sand, and some species

lay their eggs directly into the water.

Females lay thousands of eggs over a large area. Many dragonfly eggs hatch in two to five weeks and others won't hatch until the following spring.

Dragonfly larvae molt eight to 13 times, depending on the species. Some species go from egg to adult in about 30 days and the Hine's emerald takes four years from egg to adult.

When they are ready to transform into adults, they climb above the water to perform their final act of skin-shedding. Newly emerged adults need a short period to inflate their wings so they can harden and fly. Insect-eating birds consume many dragonflies during this vulnerable, flight-less stage.

Conservation Status

Nine Missouri dragonflies are Species of Conservation Concern: Bayou clubtail, Midland clubtail, Skillet clubtail, Golden-winged skimmer, Brimstone clubtail, Elusive clubtail, Hine's emerald, Ozark emerald, and Treetop emerald.

Hine's emerald is Endangered in Missouri and is the only dragonfly that is Federally Endangered.

OUR PRAIRIES

BY BOB KENDRICK



Sam Lord shares his passion for bringing native prairies back to life.



Senna in the legume family found at the prairie.

The 2021 Training Class was introduced to our chapter's commitment to prairie restoration on Saturday, October 2 at Buzzards Roost in Mark Twain State Park. The day began with a presentation from Sam Lord who is an ecologist botanist with DNR and the state park system. His responsibilities to the state park areas in the northern half of the state send him through a vast number of different prairie systems gathering data. He incorporates this data into his research at the University of Missouri objectively measuring through scientific analysis the different aspects of the soils of prairies and their value to the ecosystem. Sam shared with the group the benefits of prairie systems. They store more carbon than a pasture or even a woodland forest. The balance they create in the soil encourages percolation verses runoff, organic buildup and many other amending properties important to our soils.

The group went to the prairie restoration site at Highways 107 and U where invasive species removal and pre-site preparation, including the value of fire and controlled burns, was explained. The conversations were lively. Then on to the four year old restoration site where the prairies' development was amazing. Plants were identified, their attributes reported, and with Sam's permission, Liatris/Blazing star seeds were harvested for our library bank of seeds for future prairies.

Some in our group have committed to restoring several prairies on private and public lands in our area for the next several years. Since we are jumping into this program with such enthusiasm, yet limited knowledge, it was comforting to spend the morning with probing questions and interaction with such a person as Sam. Lunch was provided by members at Buzzard's Roost where discussion on the master naturalist's role in reclaiming prairies continued.

Mississippi Hills Master Naturalists at work . . .



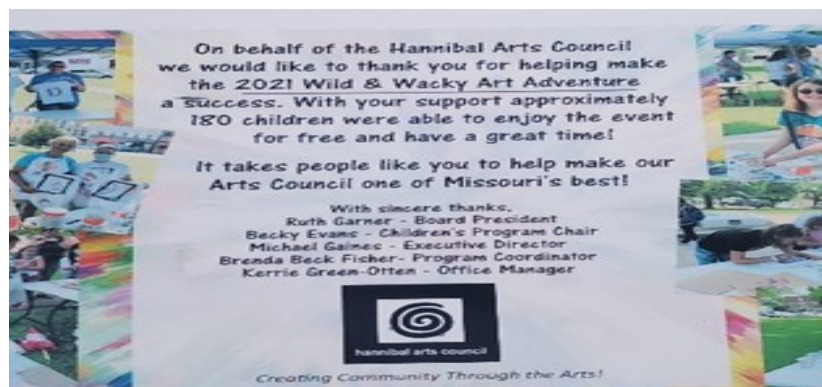
Here are a few of the moments captured by our naturalists at work in the community. Thanks to all of our volunteers who share their time, efforts and knowledge!



Pike County Farm Safety Day August 27, 2021 Barry, Theresa, Kristy and George covered venomous snakes, poisonous plants, ticks, mosquitoes, sunburn and more!

Swinkey Days July 14, 2021

Phil, Kent and Bob teaching kids about nature. Looks like a great turnout!



Wild & Wacky Art Adventure August 7, 2021

Joan, Theresa, George and others helped attendees create nature imprints on T-shirts to take home.

The Hannibal Arts Council sent us this very nice thank you card.

John Bursewicz

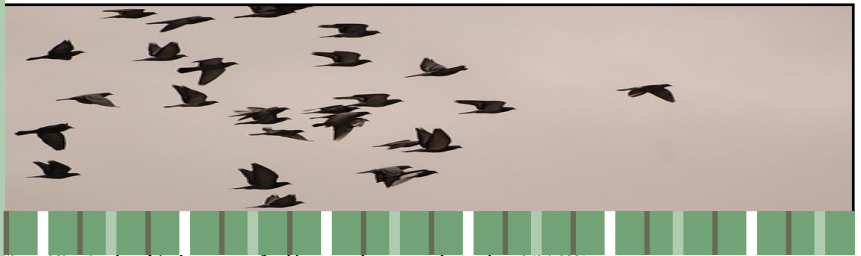
December 21, 1935—September 29, 2021

John Bursewicz, 85 of Canton, Missouri, was retired from Culver-Stockton College after 38 ½ years of teaching biology, botany, zoology, conservation, human anatomy and physiology. Along with many other accomplishments, he studied the Sandhill Crane Migration as well as planted trees on the Canton River Walk.

John was also a Missouri Master Naturalist, graduating with the class of 2019. He gave talks on winter bird study and furbearers of Missouri identification. John was very knowledgeable as a Naturalist and shared his passion for nature with others through his mentoring and teaching. He will be greatly missed. We are currently researching the best location to plant a tree in his memory.



FOLLOW THE LEADERS



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CHAPTER BOARD MEMBERS

President –
George Wisdom

Vice President –
Opportunity to serve

Secretary –
Bella Erakko &
Brenda Weiss

Treasurer –
Kristy Trevathan,

Board Members at Large:
Bob Kendrick
Keith Cline
Vanessa Laatsch
David Mobley
Matthew Harris
Anne Coleman

COMMITTEE CHAIRS

Volunteer Service Project Coordinator
Opportunity to serve

Advanced Training –
George Wisdom

Hospitality –
Vanessa Laatsch

Website & Time keeper
Anne Coleman

Core Training
Bob Kendrick

We'd Love To Hear From YOU!

CHAPTER ADVISERS

 Kathi Moore –
Missouri Department of
Conservation

 Daniel Mallory –
University of
Missouri Extension

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Janet Golian	Newsletter	573-267-3729	golian@rallstech.com

BY THE NUMBERS

(rounded to nearest whole hour as of September 30, 2021)

2021

SERVICE PROJECTS
Volunteer Service Projects Total Hours = 1,667

ADVANCED TRAINING
Advanced Training Total Hours = 571

Annual Elections

Officer elections are held each year at the last General Meeting in December with terms starting the following January. Officer positions are:

- President
- Vice President
- Secretary
- Treasurer

More information on this important event will be shared in the upcoming months.

CONGRATULATIONS
ON ANNUAL CERTIFICATIONS
FOR
2021

Dennis Foss
Donna Black-Blackman
Theresa Casey
Brenda Weiss
Barry Casey

 Eastern Meadowlark
Recertification Pin

2021 Requirements
for
Re-Certification
30 Volunteer Hours &
8 Advanced Training Hours



Volunteer Opportunity Calendar for October, November & December 2021

Event Date	Event Time	Event Title
10/13/2021	09:00 am - 04:00 pm	Conservation Group Partnership :: Missouri Conservation Partners Roundtable
10/14/2021	09:00 am - 04:00 pm	Conservation Group Partnership :: Missouri Conservation Partners Roundtable
10/15/2021	06:00 pm - 08:00 pm	Parks / Conservation Areas :: Hannibal Parks :: Hannibal Parks & Rec Interpretive Programs :: Sodalis Night hike
10/22/2021	09:00 am - 12 noon	Parks / Conservation Areas :: Mark Twain Lake :: Frank Russell :: Work Day :: Fish Habitat Project
10/23/2021	07:00 am - 12 noon	Chapter Education & Interpretation Projects :: Hannibal Farmers Market Information Table
10/23/2021	08:00 am - 12 noon	Parks / Conservation Areas :: Mark Twain Lake :: Frank Russell :: Work Day :: Fish Habitat Project
10/26/2021	07:00 pm - 08:00 pm	Program Support :: Chapter Meeting :: (10) October
10/29/2021	05:00 pm - 09:00 pm	Parks / Conservation Areas :: Hannibal Parks :: Hannibal Parks & Rec Interpretive Programs :: Sodalis Night hike--Secrets of the Night
11/9/2021	06:30 pm - 08:00 pm	Program Support :: Executive Board :: Board Meeting :: (11) November
11/23/2021	07:00 pm - 08:00 pm	Program Support :: Chapter Meeting :: (11) November
12/14/2021	07:00 pm - 08:00 pm	Program Support :: Chapter Meeting :: (12) December

Monthly Meetings

Monthly Chapter Meetings are held on the 4th Tuesday of every month

Bi-monthly Board Meetings are held on the 2nd Tuesday of every other month

Watch for emails and check the Website calendar often as New Opportunities are added all the time.

Join the Christmas Bird Count

Audubon's 122nd Christmas Bird Count will take place
Tuesday, December 14, 2021 through Wednesday, January 5, 2022.

Watch for emails from George Wisdom for specific days and times that our chapter will be participating!



Now is a great time to enter your hours!

Please visit—<https://www.hills.missourimasternaturalist.org/>

Enter your hours for Advanced Training and Volunteer Service or send your Hours to Anne Coleman. Please let her know if you need assistance. Tracking hours helps you towards Certification and credits our Chapter for your hard work and conservation efforts.

THANK YOU!



Advanced Training Calendar for October, November & December 2021

Watch for new training that is added.

If you find additional training not on the calendar, please send to George and Anne so that it can be added.

If you aren't sure whether the new training qualifies please ask!

THANKS!!

Event Date	Event Time	Event Title
10/12/2021	06:00 pm - 07:00 pm	MDC: Mammals: Bats of Missouri (Virtual)
10/12/2021	06:00 pm - 08:00 pm	MDC: Wild Edibles: Missouri's Wild Hazelnuts-Virtual
10/13/2021	04:00 pm - 05:00 pm	MDC: Discover Nature: Woolly Bear Caterpillar: Nature's Weather Predictor
10/13/2021	04:00 pm - 05:00 pm	MPF: Native Gardening for Native Flies, with information on Natural Mosquito Control
10/18/2021	06:00 pm - 07:30 pm	MDC: Hiking: Backpacking Basics
10/19/2021	10:00 am - 10:30 am	MDC: Discover Nature: Naturalist Notes Virtual Series: Fall Color
10/19/2021	12 noon - 01:00 pm	MDC: Trees: All About Fall Colors (Virtual)
10/21/2021	07:00 pm - 08:00 pm	Chloride Monitoring Workshop
10/22/2021	02:00 pm - 03:00 pm	MDC: Native Plants: Beneficial Plants For A Healthy Pond (Virtual)
11/8/2021	05:30 pm - 07:30 pm	Core Training Class (11) :: Mussel biology and identification
11/23/2021	06:00 pm - 07:00 pm	Monthly Meeting--TBD

