

Missouri Resources

Winter 2019 • Volume 36 • Number 1



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ABOVE

On November 15th, the statue of Ceres, goddess of agriculture, was removed from the Missouri State Capitol for restoration and repair. The statue has rested on its lofty perch since 1924.

MoDNR PHOTO BY BEN NICKELSON

ON THE FRONT COVER

An early season snow adorns tree branches, framing the water tower ruins at Ha Ha Tonka State Park, south of Camdenton.

MoDNR PHOTO BY BEN NICKELSON

ON THE BACK COVER

Hikers visit a winter wonderland after a November snow at the rock bridge in Ha Ha Tonka State Park.

MoDNR PHOTO BY BEN NICKELSON

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CONNECT WITH MISSOURI STATE PARKS



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BY TONI PRAWL

Fifty years ago, America's irreplaceable historic places were disappearing at an alarming rate. In 1966, the federal government put its weight behind a solution and Missouri's SHPO was born.

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ABOVE

Icicles form as the snow melts from the giant granite boulders at Elephant Rocks State Park in Iron County.

MoDNR PHOTO

A large, dense pile of discarded scrap tires is the central focus of the image. The tires are stacked high, filling the lower two-thirds of the frame. They are surrounded by dry twigs, branches, and some green foliage, suggesting a natural, unmanaged dumpsite. In the background, several trees with green leaves stand against a bright, slightly overcast sky. The overall scene conveys a sense of environmental neglect and waste.

Missouri's Scrap Tire Fee

Gaining Traction Against Illegal Tire Dumps

by Brian Quinn

Have you ever wondered what really happens to the millions of motor vehicle tires when they eventually have to be discarded? They all have to go somewhere, but where?

The Environmental Protection Agency estimates that 6 million scrap tires are generated in Missouri every year. While most are handled appropriately, tens of thousands of old tires are illegally dumped.

To address this massive problem, in 1990 the Missouri legislature established the Scrap Tire Fee, a 50-cent-per-tire charge on new tires purchased. The fee supports statewide cleanup and market development initiatives, in addition to permitting, inspections and enforcement activities. Since its creation, the fee has helped remove more than 17 million illegally dumped scrap tires from the environment.

Yet, while efforts to curb illegal tire dumping have been successful, an estimated 250,000 scrap tires will continue to be illegally dumped each year, and undiscovered dumps may hold another half-million old tires. It's a long-term problem that requires a long-term solution. Experts believe the key to success is a strong scrap tire program that promotes increased recycling opportunities.

Massive waste tire piles like these are mostly a thing of the past, thanks to Missouri's scrap tire fee.

MoDNR FILE PHOTO

For more information go to <https://youtu.be/5sJPfWkv1f8>.

Not Just Ugly, but Dangerous

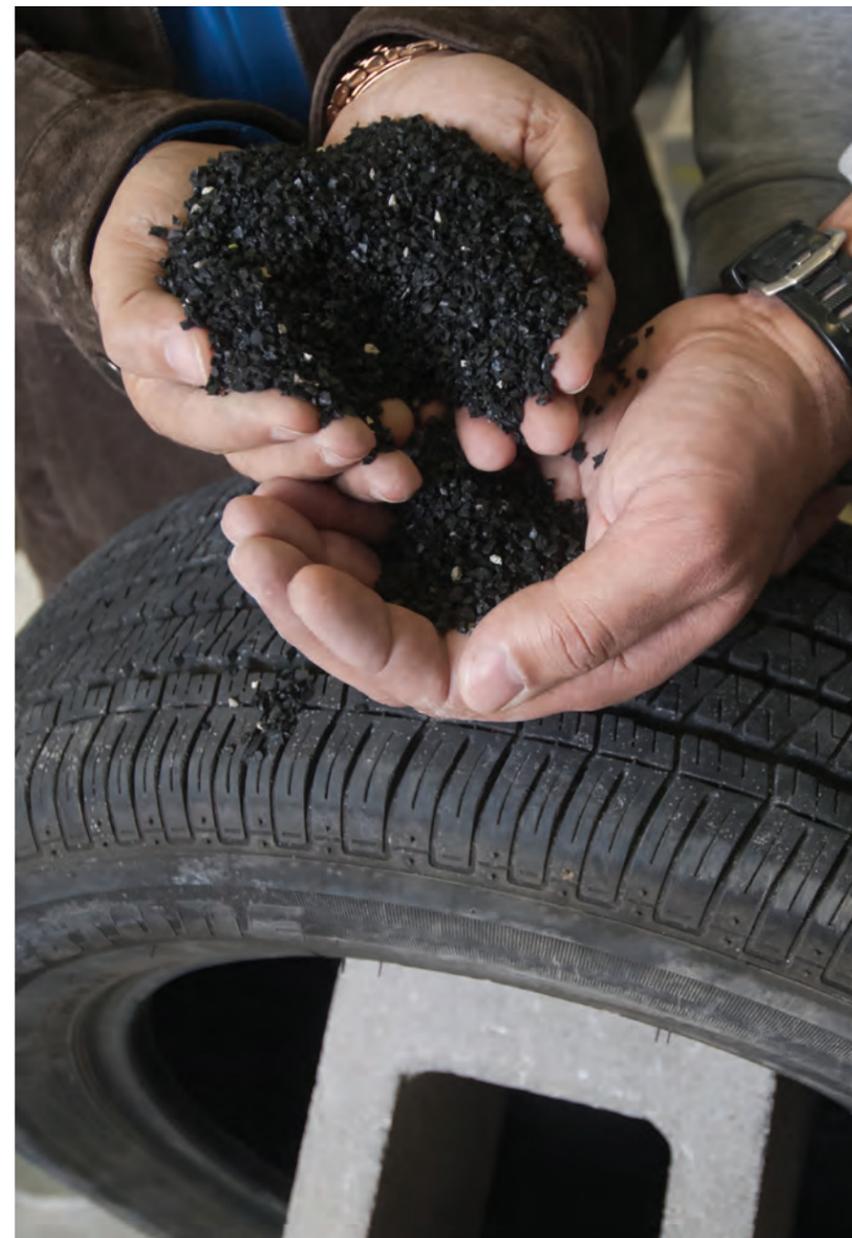
Not only are piles of illegally dumped scrap tires unsightly, they present a host of serious risks. Scrap tire piles attract illegal dumpers of all kinds and even vandalism, which can lead to fires. Tire fires release toxic contaminants into the environment and scar the landscape. These fires can smolder for months – even years – and are nearly impossible to extinguish.

Old tires also are breeding grounds for mosquitoes, some of which may carry West Nile virus, Zika virus and other diseases. Accumulated rainwater inside sun-warmed tires creates a perfect incubator for mosquitoes to lay their eggs. In fact, some mosquitoes and their eggs can even survive through the winter, only to become active again the next spring.



(Above and below) Researchers at Missouri University of Science and Technology have used grant money, made possible by the scrap tire fee, to research ways to use waste tires as a component in highway paving applications.

MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY PHOTOS



New Life for Old Tires

Hundreds of products can be made using scrap tire rubber, such as synthetic mulch, picnic tables and livestock mats, as well as cushioning on playgrounds and athletic fields. Up to 45 percent of Missouri's scrap tire fee goes to scrap tire material grants and product market development.

Missouri's scrap tire fee also supports research on new uses for recycled tire material. Missouri University of Science and Technology recently received grants for two such research projects. One will explore using recycled tire rubber in new highway paving applications and the other will study its use in a new type of masonry building block. If successful, these two projects alone could help divert millions of tons of scrap tires from Missouri's landfills.

Brian Quinn is the division information officer for the department's Division of Environmental Quality.



(Top) Dr. Mohammed ElGawady, right, and Missouri University of Science and Technology Ph.D. candidate, Ahmed Ghani, sit on masonry blocks created with scrap tires during a research project financed through a grant from scrap tire fee funds.

MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY PHOTO

(Above) Automotive service centers must collect a 50-cent-per-tire fee on new tires purchased. This fee supports statewide cleanup and market development initiatives, as well as permitting, inspection and enforcement activities.

MoDNR FILE PHOTO BY ANDREW RICHMOND

(Left) Ground-up pieces of scrap tires were used to make masonry bricks in a Missouri University of Science and Technology research project. Projects like these, if successful, could divert scrap tires from landfills in a big way and create new solutions for recycling waste tires.

MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY PHOTO

Up to 45% of Missouri's scrap tire fee goes to scrap tire material grants and product market development.

Annual water sampling is recommended to detect potential contamination and prevent illness. This can be arranged by contacting your county health department at health.mo.gov/living/lpha/lphas.php.
MoDNR PHOTO BY KYLE ROLLINS



WELL INSTALLATION SECTION

YOUR GROUNDWATER GUARDIANS

by Justin Davis

Staff with the Missouri Department of Natural Resources' Well Installation Section are dedicated to helping protect our groundwater from contaminants. Protecting groundwater helps protect the water many Missourians drink daily.

These employees, with the department's Missouri Geological Survey, work to ensure the proper construction and plugging (permanently closing) of wells by developing and implementing construction standards, and by testing and licensing contractors who install them.

More than 218,000 water, geothermal and monitoring wells are on record in Missouri. Of these, 140,000 are residential water wells.



(Above) Well installers drill a pilot hole for a public water well. Pilot holes are used to obtain groundwater data to determine if the water quality and quantity are suitable for a public well. Department staff develop and implement water well construction standards, and test and license contractors who install wells in Missouri.

MoDNR PHOTO BY KYLE ROLLINS

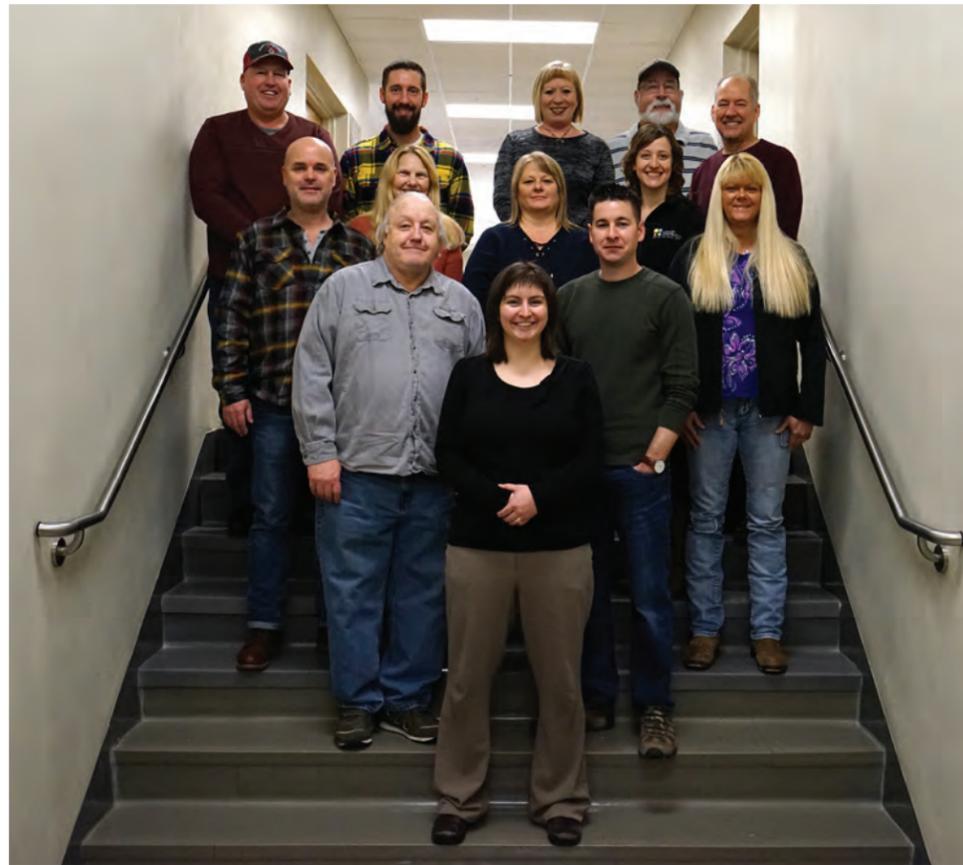
Water Wells in Missouri



More than
218,000 water,
geothermal and
monitoring wells
are on record in Mo.

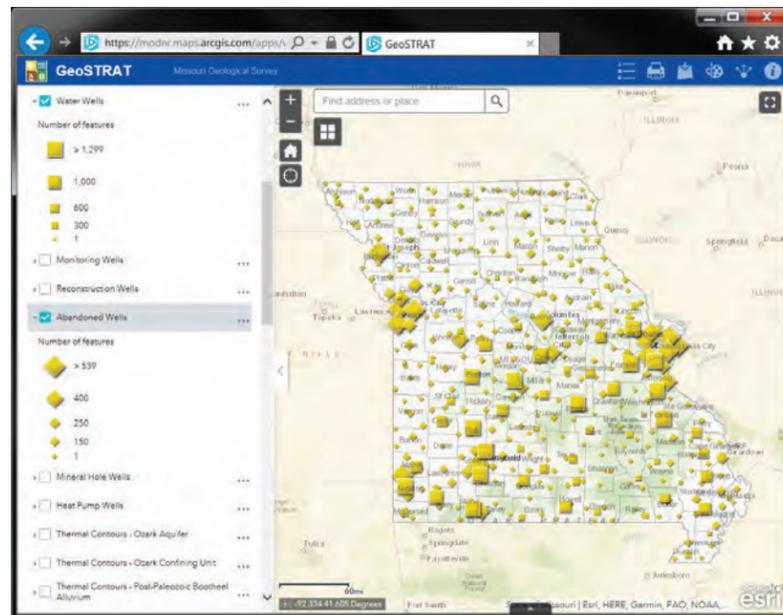
140,000
of these are
residential
wells.

Each year, Missourians
install approximately
3,100
residential wells
for home use.



Twelve people make up the department's Well Installation Section. Front: Airin Haselwander. Second Row: Eric Hohl, Andrew Combs. Third Row: Brad Mitchell, Jeannie Hoyle, MaLinda Bassett, Amber Steele (Geological Survey Program director), Lori Miller. Back row: Dan Nordwald, Justin Davis, Karen Smith, Matt Parker, Kyle Rollins (Section Chief).

MoDNR PHOTO BY MARK GORDON



Locations of and information about water wells, abandoned wells and other features are available using the department's Geosciences Technical Resource Assessment Tool. GeoSTRAT is available for use online at dnr.mo.gov/geology/geostrat.htm.

MoDNR FILE PHOTO

“I sent an email to staff with the Well Installation Section and I received prompt, professional assistance regarding my well inquiries. The Well Installation Section provides valuable service to Missouri citizens.” – Dr. Russ Woodbury, Aurora

Each year, Missourians install approximately 3,100 water wells for home use.

Materials like casing and grout provide barriers that help prevent contaminants from entering the well. If a well is not properly constructed, it becomes a pathway for contaminated surface water to enter groundwater from our clean underground aquifers.

Ensuring abandoned wells are plugged is key to helping protect groundwater. Abandoned wells are wells that have not been in use for a period of two or more years and pose a threat to groundwater, because they present a pathway for contaminants to migrate and

infiltrate the aquifer.

Every year, staff investigate dozens of reports of abandoned wells, yet many remain unknown. State law requires abandoned wells be plugged. To report an abandoned well or another environmental concern, visit the department's website at dnr.mo.gov/concern.htm.

Services are available to well drillers, well owners and other Missourians. Services include permit testing and renewal, record certification, geologic guidance and other benefits. Well owners may request help with construction, water quality and abandoned wells.

“I sent an email to staff with the Well Installation Section and I received prompt, professional assistance regarding my well inquiries,” said Dr. Russ Woodbury of Aurora. “The Well Installation Section provides valuable service to Missouri citizens.”

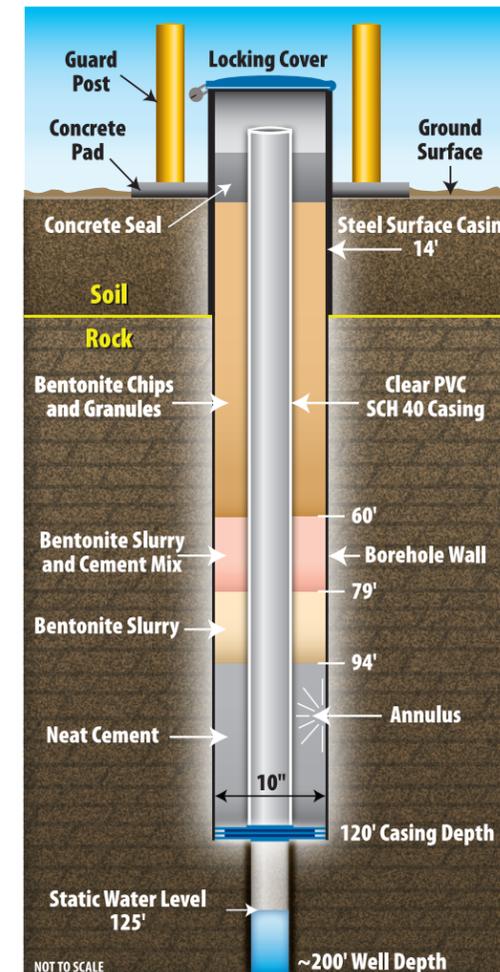
More information about well installation is available online at dnr.mo.gov/geology/geosrv/wellhd/wellsanddrilling.htm. The department's Geosciences Technical Resource Assessment Tool (GeoSTRAT) provides an interactive way to explore geologic and geotechnical data including well locations.

Go to dnr.mo.gov/geology/geostrat.htm.



Abandoned wells are wells that have not been in use for a period of two or more years and pose a threat to groundwater. They present a pathway for contaminants to migrate and infiltrate the aquifer. Cisterns and wells with wide openings pose a serious physical hazard, especially to children and animals.

MoDNR FILE PHOTO



Justin Davis is a geologist with the Missouri Geological Survey, a division of the Missouri Department of Natural Resources.

This graphic illustrates the construction and components of the Missouri Geological Survey's educational water well. The focal point of this well is the 120 feet of clear PVC casing, coupled in 10-foot increments, that allows observation of the grout between the clear casing and bedrock.

DNR ILLUSTRATION BY MARK GORDON

Natural Resources



First Place JANE LINDERS, Maryland Heights
Reflections Shaw Nature Reserve, Gray Summit, Franklin Co.



Second Place JOY PORTER DRENNAN, St. Louis
Ice Sheets Lincoln Shields Recreational Area, West Alton, St. Charles Co.

"The most beautiful gift of nature is that it gives one pleasure to look around and try to comprehend what we see."

- Albert Einstein

Look Around and See the Beautiful Gift of Nature

2018 MissouriDNR Photo Contest

by Renee Bungart

This year marked the fifth year of the MissouriDNR Photo Contest and this year's 498 entries didn't disappoint. Albert Einstein wrote, "The most beautiful gift of nature is that it gives one pleasure to look around and try to comprehend what we see." From reflections of wintry trees providing a double vision of beauty, to a young trout enthusiast who tagged her limit, to hundreds of billions of stars spilling radiant light from the Milky Way across the mill at Montauk State Park, the visions of Missouri's nature are a beautiful gift for all to enjoy.

Roxanna Cummings enjoys spending time in Elephant Rocks State

Park and often finds natural places are different each time she visits them. On the day Cummings captured her second place Unique Places photo, the pools in the granite changed her visual perspective, as did the approaching storm. "Although the granite elephants stand the test of time, nature always gives me something new to see when I go there," Cummings said.

The department asked amateur photographers to photograph the beauty found in Missouri and selected first, second and third places, as well as honorable mention, in three categories: Natural Resources, Unique Places, and People Enjoying Missouri's Natural Resources.

Congratulations to the winning photographers and all those who participated in the contest. See the top 10 photographs selected in each category and learn about the 2019 MissouriDNR Photo Contest by visiting dnr.mo.gov/photocontest.

Nature provides us with a gift every day – be sure to step outdoors and take time to unwrap the beauty.

Renee Bungart is deputy communications director for the Department of Natural Resources.

Natural Resources, continued



Third Place

JENNIFER MISHRA, Edwardsville, Ill.

Lake's Calm Busch Conservation Area, St. Louis

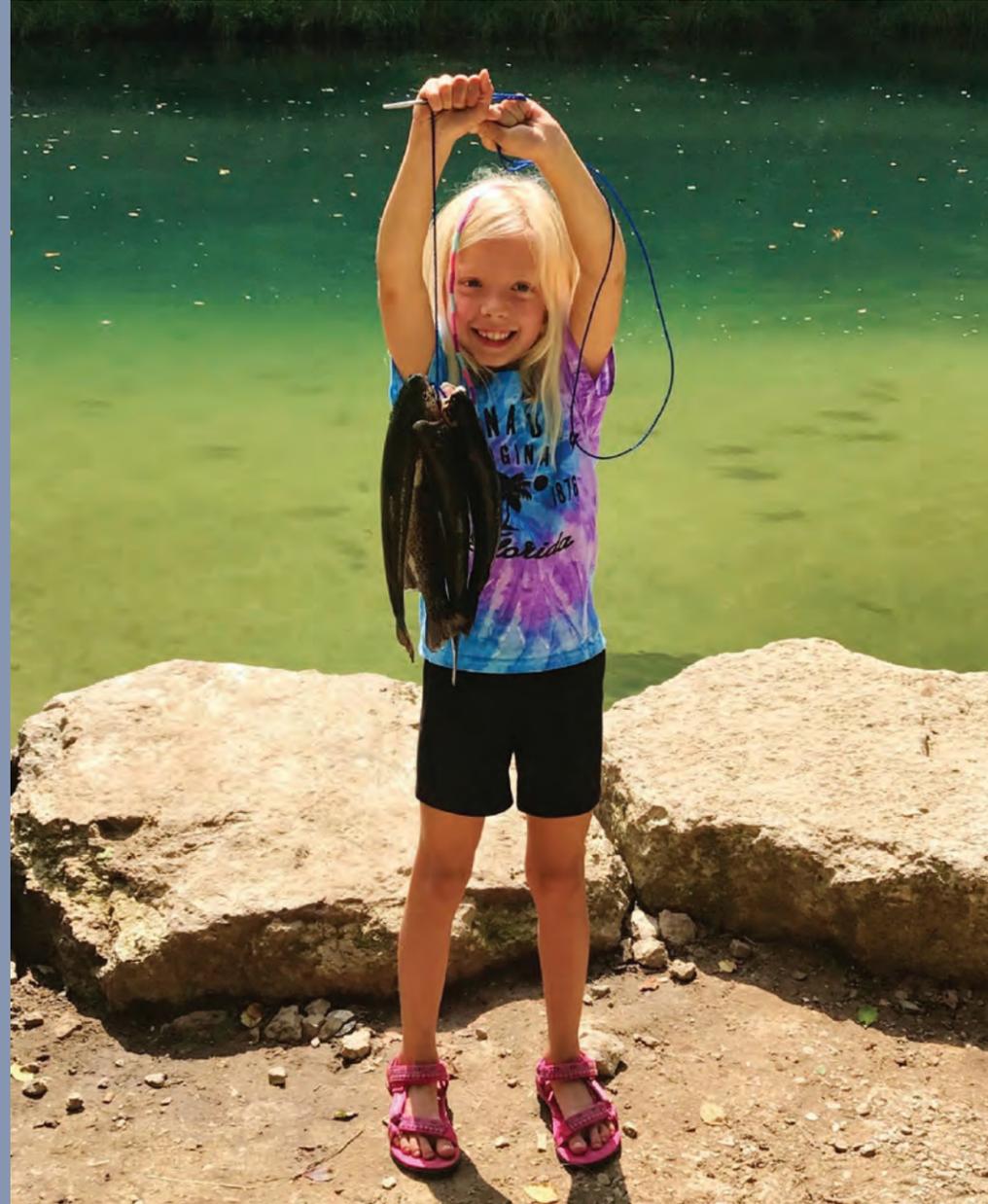


Honorable Mention

JAMES SMITH, Moro, Ill.

Dear Fawn Lone Elk Park, Valley Park, St. Louis Co.

People Enjoying Missouri's Natural Resources



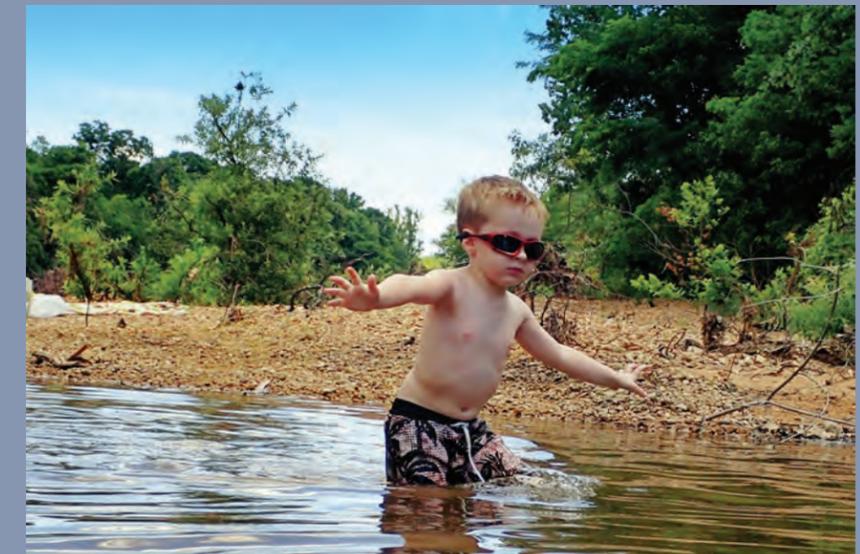
First Place **ROXANNA CUMMINGS, Bonne Terre**

Tag Out! Montauk State Park, Salem



Second Place **Jiamin Zeng, Chesterfield**

Boating in Moonlight Creve Coeur Lake, St. Louis



Third Place **Travis Abernathy, Piedmont**

The Water is Cold! Big Creek at Sam A. Baker State Park

People ..., continued

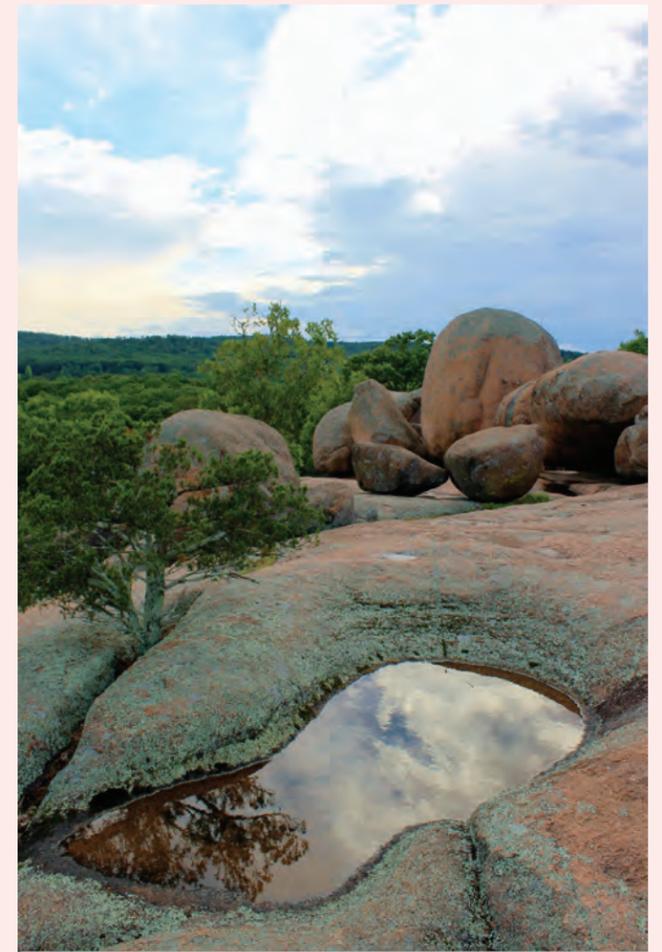


Honorable Mention CRAIG SMITH, Forsyth
Kayaking Swan Creek Swan Creek, Forsyth

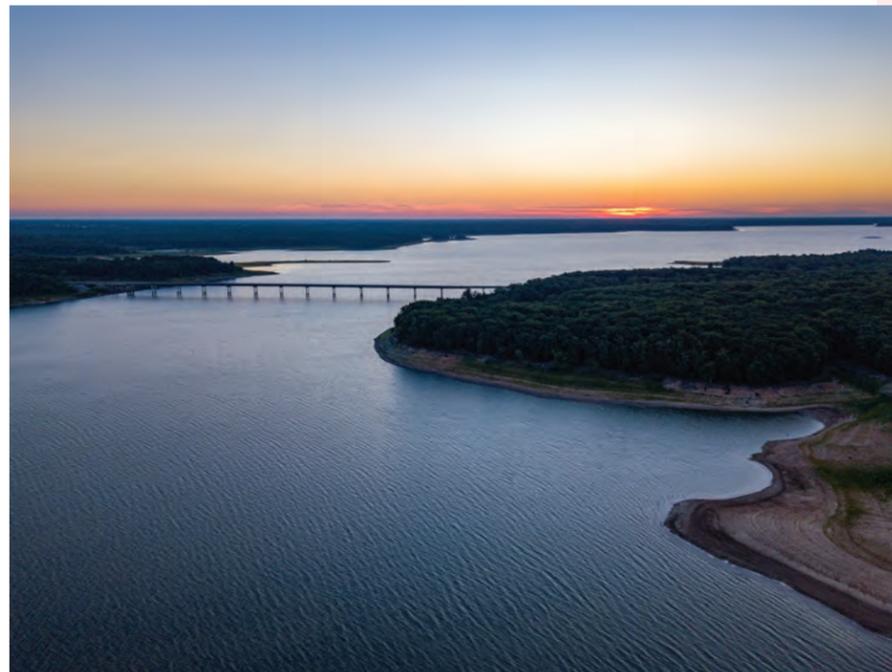
Unique Places



First Place RONNIE LEWIS, Licking
Montauk Under the Milky Way Montauk State Park, Salem



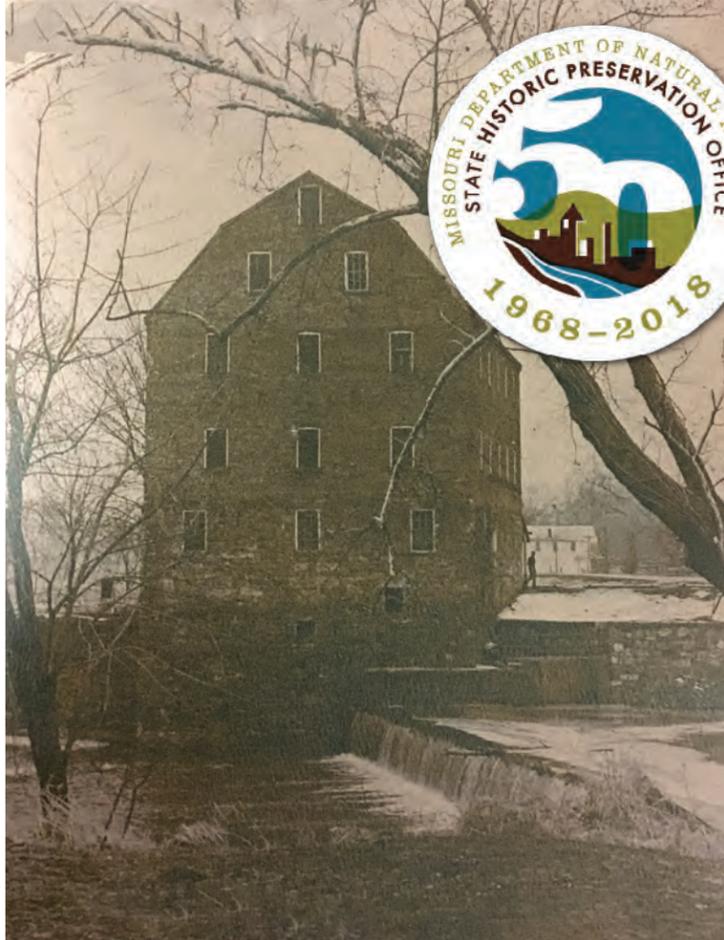
Second Place ROXANNA CUMMINGS, Bonne Terre
Granite Pool Elephant Rocks State Park, Belleview



Honorable Mention DAVID DENAGEL, Warrenton
Sandy Creek Bridge Sandy Creek Covered Bridge State Historic Site, Hillsboro

Third Place STEVE JETT, Wentzville
Boaters' Alarm Clock Mark Twain State Park, Florida, Mo.





MoDNR FILE PHOTO

Past, Present, Future: Missouri State Historic Preservation Program Celebrates 50 Years

by Toni Prawl

The Missouri Department of Natural Resources' State Historic Preservation Program is celebrating its 50th anniversary. As we reflect on Missouri's past and future, it's clear that preservation efforts are especially effective when we collaborate and work collectively. What started through grassroots efforts led by individuals and interest groups have grown to encompass a three-tiered preservation system among local, state, and federal governments. Missouri continues to benefit from preservation, thanks to the successes of its

(Left) Donated to the state in 1967, Bollinger Mill State Historic Site preserves a c. 1867 mill that was rebuilt after being destroyed in the Civil War.

constituents and leaders who support it.

Background

During the 1960s, the country, along with the landscape, changed dramatically. Beyond the tumultuous social issues and scientific advances of the decade, the physical fabric of our nation was transformed. The interstate system rapidly expanded, urban sprawl and its new pop-up communities spread, and urban renewal projects reshaped city skylines and neighborhoods.

These and many other mid-century development activities often occurred without consideration of the historic resources in their paths. The loss of historic properties,

many times by federally funded projects, helped fuel a national preservation movement focused on new public policy. With the realization that irreplaceable historic places were disappearing at an alarming rate, legislation was enacted to help recognize and protect these finite resources. On Oct. 15, 1966, the National Historic Preservation Act (NHPA) set forth a range of preservation provisions and federal funding to support them. Congress declared that the preservation of historic properties "is in the public interest so that its vital leg-

(Right) SHPO staff conduct a search of National Register files in the Cultural Resource Inventory in this photo from the 1990s.



MoDNR FILE PHOTO

Missouri State Historic Preservation Office • 1966-2018

Timeline

This timeline reflects the past 50 years of historic preservation in Missouri, beginning with a landmark piece of legislation, the National Historic Preservation Act of 1966. Missouri has a rich history of historic preservation.

1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989



1966 National Historic Preservation Act (NHPA) signed by President Johnson. It created the Advisory Council on Historic Preservation, directing states to establish State Historic Preservation Offices, expanded the National Register of Historic Places, and created grants to states for historic preservation responsibilities, among other specifics.

1967 The State of Missouri conducted a pilot program with an archaeologist and architectural historian to help determine what resources would be necessary to undertake its responsibilities under the NHPA. A report sent to the National Park Service detailed the amount of federal grant money Missouri would request and outlined the state's anticipated involvement for the 1969 fiscal year. The grant amount needed was estimated at \$75,000.



1968 The Missouri State Historic Survey and Planning Office was established as a section of the Historical Division of the Missouri State Park Board. The new office's responsibilities included conducting a statewide survey to identify and record historically significant buildings, sites and objects; to prepare a comprehensive statewide historic preservation plan; to nominate historic properties to

the National Register of Historic Places; and, "To promote generally the goals and ideals of historic preservation within Missouri."

1969 The first property in Missouri for which a successful nomination was prepared by Historic Survey and Planning Office staff listed in the National Register of Historic Places. Still standing today, it is the 1834 Lohman's Landing Building in Jefferson City.



(See photo page 21)



1970 The Louis Bolduc House, located in Ste. Genevieve, was declared a National Historic Landmark. Constructed in 1792 by merchant Louis Bolduc, it is a rare surviving example of a dwelling built using the French Colonial method of *poteaux-sur-sol*, or vertical posts on a wood sill. This example has a stone foundation and also retains its *bouzellage*, a mixture of clay and grass as a wall filling. Now a museum, the house and grounds have been fully restored and open to the public.

1971 The first publication produced by the Historic Survey and Planning Office was titled "Foundations from the Past." This large booklet discussed Missouri's Historic Preservation Program, and talked to state residents about the NHPA, the history of the state, what had been done previously to protect Missouri's historic resources, what still needed to be done, and recommended goals. It also contained three appendices that included all Missouri sites listed in the National Register, along with a photo of each, the criteria and information on how National Register sites are selected.

1972 A significant portion of the sites listed by the Historic Survey and Planning Office in the National Register this year were archaeological in nature. One of these, the Imhoff Site in Cooper County, is a small habitation site that was probably occupied for at least 500 years. It is considered to be an outstanding example of a Middle Woodland Period site and the Hopewell continuum theory.

1973 Missouri Advisory Council on Historic Preservation established. The council's primary responsibility is to approve nominations to the National Register of Historic Places for Mo.

1976 Missouri Heritage Trust founded, later known as the Missouri Alliance for Historic Preservation, and currently goes by Missouri Preservation. This is Missouri's statewide 501(c)3 not-for-profit historic preservation advocacy group. Its activities include an annual conference, bringing awareness through its annual list of Missouri's Most Endangered Historic Places, and providing recognition to individuals and organizations that have contributed to historic preservation efforts in Missouri.

1978 The 1860 Pelster House-Barn listed in the National Register of Historic Places. An extraordinarily rare resource type, where both the human



dwelling and the barn for livestock are built together under a single roof. House barns are often associated with traditional ethnic German heritage and are constructed using a technique known as *fachwerk*, where a heavy timber frame is erected and then infilled with limestone and plaster.

1979 Missouri State Revolving Fund established.

1980 A degree program in historic preservation was started at Southeast Missouri State University in Cape Girardeau. Through the years, the program has grown and many graduates have gone on to exemplary careers in the historic preservation field.

1981 The Mutual Musicians Association Building was declared a National Historic Landmark.

1985 The Harry S Truman Farm Home was declared a National Historic Landmark.

1986 The first Certified Local Governments (CLGs) were established in Missouri. The CLG Program, administered by the NPS, is designed to bring preservation decision-making and activities down from state and federal levels to the local level. Of the seven municipalities that attained CLG status in 1986, all are still participating in the program 30 years later. These CLGs, in order of admittance are: Kirkwood, St. Joseph, Liberty, Blue Springs, Washington, Joplin, and Kansas City. Today, Missouri has 59 CLGs.



Kirkwood-the first Mo. CLG.

1987 Missouri Unmarked Human Burial statute enacted. This law provides a detailed process for handling the discovery of unmarked human burials, with the exception of those within the boundaries of a recognized cemetery.

1988 The 1906 Shelley House on Labadie Ave. in St. Louis was at the root of the landmark U.S. Supreme Court case *Shelley vs. Kraemer*. In 1930, the Shelleys, an African-American family, emigrated from Mississippi to St. Louis, where many houses had legal covenants that precluded owners from selling to people of color. Several years later, they found a homeowner willing to ignore the requirements and the Shelley family purchased the house. Another homeowner sued the Shelleys. The Supreme Court's decision in favor of the Shelleys broadened equal access to housing for all Americans.



This precedent led to significant changes for ethnic minorities purchasing homes in areas they desired. The Shelley House was placed on the National Register for its historic significance in the areas of Law, Social History and Ethnic Heritage.

Congress declared that the preservation of historic properties “is in the public interest so that its vital legacy of cultural, educational, aesthetic, inspirational, economic and energy benefits will be maintained and enriched for future generations of Americans.”

acy of cultural, educational, aesthetic, inspirational, economic and energy benefits will be maintained and enriched for future generations of Americans.”

An outcome of the NHPA was the creation of the State Historic Preservation Offices (SHPO). Created as the Missouri State Historic Survey and Planning Office in 1968, Missouri’s was one of the first and is among the 59 SHPOs in the country and U.S. territories today. In 1991, SHPO became part of the Missouri Department of Natural Resources. The department director serves as the State Historic Preservation Officer and the SHPO director is designated as deputy.

Future

As we forge into the next 50 years of preservation, we must look more

broadly and deeper. With technology and new methods to assist us, we have opportunities to seek and obtain greater knowledge of our diverse past and the historic resources that more fully represent the stories of Missourians.

There is much more of our state’s prehistory and history to discover, share and protect – information that will influence our ever-evolving ideas about the state’s past and future.

In the words of historian David McCullough, “History is no longer a spotlight. We are turning up the stage lights to show the entire cast.”

Toni Prawl, Ph.D., is director of the department’s State Historic Preservation Program, and serves as Missouri’s Deputy State Historic Preservation Officer.



Current SHPO staff pose for a photo at Jefferson Landing State Historic Site, in Jefferson City (See timeline, 1969).

MO DNR PHOTO BY BEN NICKELSON

National Register of Historic Places
Listings

42 new National Register listings
July 1, 2017 through June 30, 2018

representing **129** resources

2,486 National Register listings
representing **48,118** Missouri resources

Missouri State Historic Preservation Office • 1966-2018

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<p>1990 The Native American Graves Protection and Repatriation Act was enacted to address the rights of lineal descendants, Indian tribes, and Native Hawaiian organizations to their Native American cultural items, including human remains, funerary objects, sacred objects, and objects of cultural patrimony. This legislation changed the handling and disposition of these artifacts and encourages their repatriation to the descendants who have proven cultural affiliation to them.</p>	<p>1991 Gov. John Ashcroft signed the “State Historic Preservation Act,” defining the roles of the State Historic Preservation Officer, Historic Preservation Program and administering the Historic Preservation Revolving Fund. Equally important authority was created for historic preservation activities in Missouri at the local level. Local governments, counties and municipalities were authorized to enact ordinances and empower local commissions to implement these ordinances and duties.</p>	<p>1991 The State Historic Preservation Office’s first computerized Cultural Resource Inventory System was created. During its first year in use, information on more than 11,000 resources was entered into the system. Although “primitive” by today’s standards, CRIS was revolutionary for its time. The system made the retrieval of information related to simple queries faster. Prior to the system’s introduction, all information had to be retrieved by hand from multiple sources.</p>	<p>1992 Route 66, known as “The Mother Road,” which runs from Chicago to Santa Monica, Cal., celebrated its 66th anniversary. From St. Louis, Route 66 runs 300 miles and passes through 10 Missouri counties before exiting the state just west of Joplin. Many important historic properties related to the automobile culture, which Route 66 helped establish, are still in existence. One of these, the Boots Court Motel, is still open and operating.</p>	<p>1993 The Great Flood severely affected large areas of the state, and was particularly damaging to both above- and below-ground cultural resources. Due to the extreme height and duration of the flood, some historic properties were under water for an extended time.</p> <p>1997: Big Eddy excavations began and lasted five years. The discoveries made at this site increased the length of time humans were thought to have lived in Mo.</p>	<p>1998 Missouri State Historic Tax Credit went into effect.</p>	<p>2004 Missouri Main Street Connection, Inc. (MMSC) established after the state legislature eliminated funding for the Missouri Main Street Program. A private, not-for-profit organization, MMSC has grown from serving 12 Main Street Communities to working with over 140 Missouri communities. MMSC focuses on educating downtowns in how to use their unique historic resources as a catalyst for highly successful economic revitalization projects.</p>	<p>2006 Liberty Memorial, the World War I memorial in Kansas City, was declared a National Historic Landmark. Groundbreaking took place in 1921 and construction was finished in 1926. A local veteran, Harry S Truman, was chosen to present flags to the various military commanders present. The completed memorial was dedicated in 1926 by U.S. President Calvin Coolidge.</p>	<p>2008 After discovering that Missouri had over 35,000 barns built prior to 1960 still standing, second only to Texas at the time, the Missouri Barn Alliance and Rural Network was established.</p>	<p>2010 Ladue Estates, a post-World War II mid-20th-century development in Creve Coeur was listed in the National Register of Historic Places. It is historically significant as a planned suburban development representative of post-war urban flight when land in that area was cheap, plentiful, and acquired by the highest-quality builders. Constructed from 1956-1965, it is highly intact and still in use as a residential subdivision. It catered to an affluent Jewish community restricted through discriminatory practices as to where they could relocate.</p>	<p>2013 With the listing of the Stoutimore House in the National Register of Historic Places, Missouri now had National Register-listed properties in all 114 counties. Located in Plattsburg, the house is a superb example of Second Empire architecture. It was constructed in 1892 and features a concave mansard roof with dormers, typical of Second Empire-style residences.</p>	<p>2014 Known for having the most surviving examples of French Colonial architecture in the Mississippi Valley, the City of Ste. Genevieve also retains much of its original French Colonial agricultural landscape known as long lots. This very unique combination of original French Colonial architecture and landscape features caused the NPS to undertake a two-year Special Resource Study of the city to determine how best to preserve these resources in the future, perhaps by bringing some of them under NPS control.</p>	<p>2016 Two notable historic properties in Kansas City were listed in the National Register of Historic Places. The Kansas City Boulevard System is an extensive parks and boulevards system designed as part of the “City Beautiful” movement, popular during the late 19th century. The oldest parts of the system are still in use. Also listed is the 1974 Kemper Arena, considered an exceptional example of an enclosed multipurpose entertainment arena.</p>																

Bivalves

Shells of bivalves are composed of two separate valves, typically about the same size. They often nearly mirror one another. The valves are bound together with a bendable ligament (band of tissue) along a hinge line on the dorsal (back) side of the shell. Bivalves have a soft body with organs, gills, a foot, two siphons or tubes used for exchange of air or liquids, and two adductors (muscles) used to open and close the shell where it is not hinged.

The fossil record shows they are a hardy group that fared well through geologic time. Bivalves withstood the rigors of mass extinction events perhaps better than any other animal group. Bivalves have diversified and expanded to become dominant members of most marine ecosystems.

Bivalves typically range in size from 1 to 4 inches. The smallest are visible using weak magnification, whereas the largest can be massive. An extinct fossil representative from Cretaceous-age (approximately 145 to 66 million years ago) strata in western Kansas is 5 feet long and 3 feet wide. A modern clam living in the South Pacific and Indian oceans is 3 feet long and weighs more than 600 pounds.

Bivalves spend their lives either continuously or intermittently submerged in marine and freshwater environments. They inhabit several different environments such as reefs, beaches, bays, lagoons, swamps, rivers, streams and lakes. Some live permanently attached while others use their foot to crawl around slowly or burrow into sandy and muddy sediment. Others, like scallops, can swim a short distance by rapidly flapping their valves. Unusual bivalves, known as shipworms, can use their specialized shells to bore tunnels into wood.

Bivalves breathe and feed by circulating water with their system of siphons. Water is sucked in through the inhalant siphon, passes through a layered arrangement of gills, where carbon dioxide waste is exchanged for oxygen and microscopic food particles collect on cilia. Liquid and solid wastes are added to the flow before it exits through the exhalant siphon. Bivalves that live buried in sediment have long siphons that can be extended into the open water above.

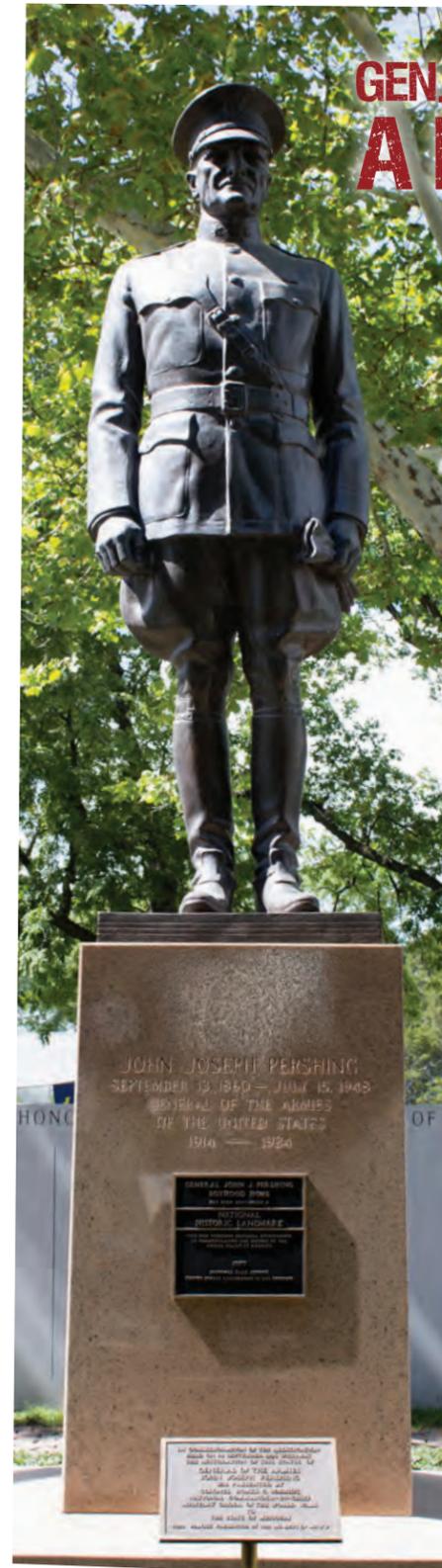
Bivalves close their shells tightly (clam up) when disturbed or subjected to adverse environmental conditions. When closed, they can wait out dry spells until water returns to submerge them once again. The burrowing and boring species are capable of withstanding dry conditions longer than those whose lifestyles make them vulnerable to becoming stranded out in the open direct sunlight.

Bivalves are a group of aquatic mollusks with shells usually made up of calcium. They include clams, mussels, cockles, oysters and scallops. Bivalves have been around more than 500 million years, with the oldest fossils found in sedimentary rocks deposited during middle Cambrian (approximately 500 million years ago) times. Today, bivalves are at their peak diversity with thousands of species.



(Above) Pictured is an extinct fossil bivalve *Allorisma terminale* Hall from Pennsylvanian-age limestone rock. An elongated shell with coarse, concentric sculpture is characteristic of this clam species. Its beak is located at upper right. The dorsal side and hinge line are on top; ventral side is at the bottom; the anterior end is on the right; posterior end is on the left. The specimen measures four inches from anterior to posterior.

MoDNR PHOTO BY BEN NICKELSON



Gen. John J. Pershing statue at Gen. John J. Pershing Boyhood Home State Historic Site, in Laclede.

GEN. JOHN J. PERSHING WAS ... A FIRST AND ONLY

Born John Joseph Pershing, Missouri's famous general is honored at his birthplace in Laclede, central Linn County. The popular 3,566-acre state park and state historic site, Pershing State Park and Gen. John J. Pershing Boyhood Home State Historic Site, stand as proud testaments to one of Missouri's most famous and beloved warriors. But did you know that Gen. Pershing had a military distinction that he alone could claim, and could still claim today?

Pershing served his country in numerous battles, wars, skirmishes and administrative roles. The number of military titles he also achieved is not only impressive, it is difficult to fathom when you consider that, after graduating from West Point in 1886 at the age of 26, he nearly postponed his military future in order to help some classmates complete an irrigation project in Oregon. He decided, however, to continue the career for which he will forever be remembered. Soon, he would fight in the Indian Wars and Sioux Wars of the American West, Spanish-American War, Philippine-American War, among others, including the Mexican Revolution and, of course, World War I, the War to End All Wars.

When World War II began, Pershing mentored several key generals who fought and helped end the war. He was consulted by Eisenhower, Marshall, Patton and even MacArthur, among others. His list of citations, medals and awards was staggering. During his career, he attained the ranks of Cadet, Second Lieutenant, First Lieutenant, Major, Captain, Brigadier General, Major General, and General, as did so many of our famous wartime heroes and leaders of men and women. But on Sept.

3, 1919, Gen. John J. Pershing was promoted to the rank of General of the Armies, the highest military rank attainable. No other living American was ever bestowed this honor. Only one other American ever attained that rank, and it was awarded posthumously as a commemorative honor by President Gerald Ford during the 1976 U.S. Bicentennial. The recipient? Our first president, George Washington.



The historic site just welcomed a new addition – the “First World War Commemorative Garden,” on Sept. 15, 2018. The unique garden includes soil samples from eight American battlefield cemeteries in Europe – six from France, and one each from Belgium and England. Poppies, the flowers most closely associated with WWI and military conflict, were planted and should be in bloom by late spring 2019.

MoDNR PHOTOS BY AMY POOS

Airin Haselwander

Geologist

Missouri Department of Natural Resources
Missouri Geological Survey



Please introduce yourself and tell us how long you've been working for the Department of Natural Resources.

My name is Airin Haselwander and I'm a geologist for the department's well installation section. I have worked for MoDNR for more than five and a half years.

Explain where you work and describe your day-to-day job duties.

I work in Rolla as an office geologist. Some normal duties would be answering the phone, talking about well construction and the requirements for it. I also set casing lengths – the pipe that goes into the ground that prevents surface water from going into the groundwater. I do that by looking at the surrounding geology and determining the rock type for the casing to sit in, so as to prevent that contamination. I also review water well records that are reports of how the well installation contractor has constructed the well, and confirm it's not a groundwater contamination risk.

The phone calls are inquiries, usually about what the rules are, or information gathering, either about their well or the wells in the area. I use an online database that has every record since its inception in 1987 – anyone in the public can go look at that database. I also use GeoSTRAT, the Geosciences Technical Resource Assessment Tool. It's an online interactive map that accesses any layer that the survey has, and one of those is our water wells. You can go there and type in an address and look at the wells in that area. GeoSTRAT's also accessible to anyone online.

What do you like most about working at MoDNR?

Several things, such as the work environment and the people here. We all work for the same core value of protecting Missouri's natural resources and that reflects my values. MoDNR understands and respects your need to be rested to do your best. So I earn leave that I can use as needed and that's a great bonus for me.

How do you feel that your job helps to enhance Missouri's natural resources?

By protecting (natural resources) in the first place. With well construction, you're drilling down into these groundwater aquifers and: "A," we need the water, but "B," they



haven't been disturbed for quite some time. Yes, we started drilling in the 1920s and 30s to those depths, but on the geologic time scale, there've been millions of years that nothing has ever entered those aquifers other than what was going there naturally. So my job is to protect that aquifer and keep it from getting contaminated in the first place. We all need water but we can do it in a way that's safe and protects our resources so that our children's and grandchildren's water is safe.

What would you tell someone thinking about a career with MoDNR?

So the mission of DNR is to protect our natural resources and to make it easier for small businesses to do so, as well as in private industry. We have that "Let's get the job done" mentality, not, "Let's try and make as much money as we can." With (my job), I can focus on "Hey let's do this right and let's do it right the first time."

The workforce is aging and you can really see that, not just in private industry but also in state government. There aren't a lot of new people coming in and we really need more people because many of our managers are at or soon-to-be retirement age. They're going to want someone with experience to move into those positions and that opens up even more of these front line positions. So we've got a lot of room for growth, not just in the sciences but also in those soft skills that they talk about a lot in college. Here, you actually get to act on them and use them and can grow and move up from there.



Watch Haselwander's interview on YouTube.

(Top and above) Haselwander loads up a down-hole video camera and uses it to check the casing on an area well.

MoDNR PHOTOS BY ANDREW RICHMOND

COLD WEATHER BIRDING

Wakonda State Park offers winter viewing spectacular

by Amy Poos

photographs by Ben Nickelson

As the weather turned chillier and the days got shorter, we heard the distant calls of the Canada geese and other migratory birds. More than 325 different bird species take the round-trip from their breeding grounds in Canada and the northern U.S. to winter in the warmer lands along the Gulf of Mexico, Central and South America.



ON THIS TRAIL, YOU MAY EXPERIENCE:

Natural surface—dirt, mud, gravel, shifting rocks, slippery surface, etc.
Rocks, roots and/or downed vegetation on trail
Occasional water over trail



A flock of mallards takes flight off Agate Lake at Wakonda State Park. (Inset) Wakonda State Park is included on the Great Missouri Birding Trail, a partnership between the Missouri Bird Conservation Foundation, Missouri Department of Conservation and the Wallis Companies.



(Left) Visitors to Wakonda State Park photograph waterfowl while hiking Agate Lake Trail.
(Above) A bird watcher on the observation deck uses a field guide to identify swans that have congregated on Agate Lake.



(Top) Wakonda State Park, near La Grange in Lewis County, has several trails that allow visitors to view migratory birds on the lakes.
(Above) A bird observation deck can be accessed from Sand Prairie Trail, which is useful for spotting birds on Agate Lake.

DESIGNATED MIGRATION PERIODS

FALL: Nov. 1 - Jan. 31
SPRING: Feb. 15 - Mar. 31

MIGRATORY BIRDS:

Late August through December:

- blue-winged teal
- American white pelicans
- Canada geese
- bald eagles
- trumpeter swans
- multiple duck species

Mid-February through end of April:

- snow and blue geese
- white-fronted geese
- numerous duck species

This trip starts at the headwaters of the Mississippi and goes many miles south to the Gulf of Mexico. The path for birds in our area is known as the Mississippi Flyway. Wakonda State Park is perfectly situated in the flyway and offers these migrators a rest stop at the park's numerous lakes and wetlands as they journey south.

Wakonda realizes how special an opportunity their park has to provide a sanctuary to the birds and has designated Agate and Jasper lakes as waterfowl refuges during the fall and spring migration periods. During the refuge season, no boats are permitted on these two lakes. This allows the birds to rest undisturbed and provides an excellent viewing opportunity for bird enthusiasts. The park has trails going around the lake to observe the birds and a small bird observation deck on the Sand Prairie Trail overlooking portions of Agate Lake.

Never gone bird watching before? Not a problem. The most important thing you will need is a bird guide. One can always enjoy birds, but being able to identify what you see provides an extra bonus to the experience. Binoculars are important to help maintain respect for the birds. Through your optics, you can view birds from a distance and not disturb them. Patience is the last important piece of equipment needed. Without it, you will just have a great hike.

You can download a bird checklist found at Wakonda at mostateparks.com/park/wakonda-state-park.



Currently, 180 different species have been recorded at this park.

Not a fan of the cold? Come back for the spring migration when the birds return to their spring breeding grounds. Whenever you go, happy birding!

Amy Poos is the division information officer for Missouri State Parks.

Top Spots for First Day Hikes



First Day Hikers view river ice as they walk along the Missouri River on the Katy Trail near Rocheport.
(Below) Table Rock State Park, near Branson, hosts a First Day Hike on the White River Trail.
MoDNR FILE PHOTOS



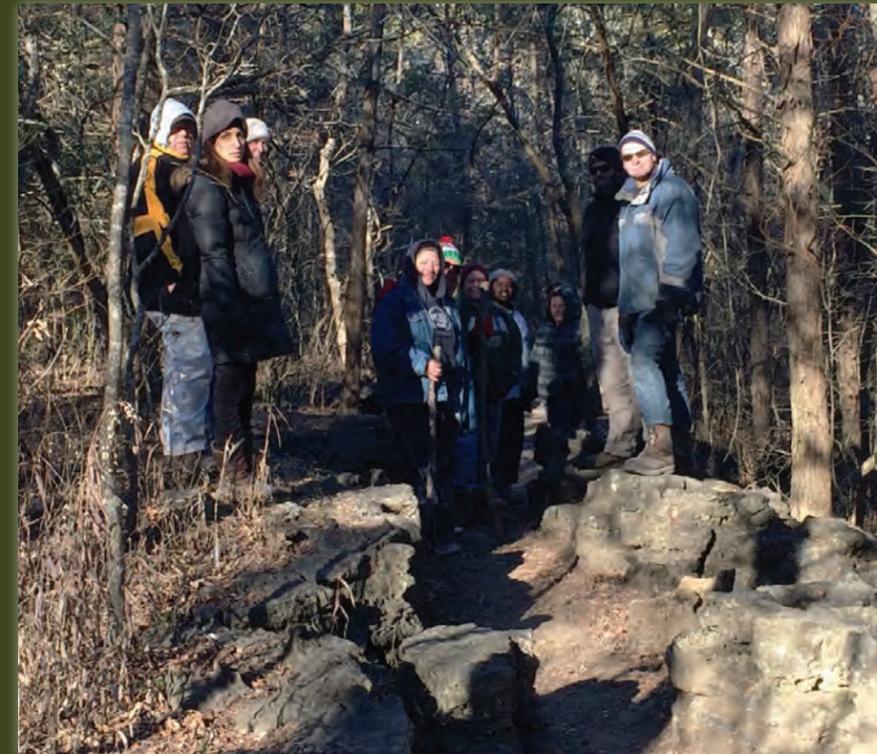
Enjoy a standing tradition with Missouri State Parks by taking part in America's State Parks' First Day Hikes. There's no better way to start off the year than with an outdoor hike. Throughout Missouri, our parks and historic sites will offer a wide-range of hikes from one-half mile to four miles on all kinds of trails.

If you are looking for birds or history along the northwest Missouri border, come to Lewis and Clark State Park for a hike along the Gosling Lake Trail. For those birding enthusiasts, this is a great place to find a large number of native and migratory birds such as bald eagles, ducks, swans, geese and other birds and waterfowl. Start off your hike while learning about the epic 1804 journey up the Missouri River at the Lewis and Clark Interpretive Plaza.

Prairie State Park sits on the southwest Missouri border and is home to our bison herd. Trek through the prairie grasses on one of the many trails this park has to offer. Which trail you ask? It all depends on where the bison feel like grazing that day. Hope for warmer weather than last year! Prairie hikers persevered and completed their hike during the nine-degree, blisteringly cold weather.

Mix a little mine history with a walk in the woods starting at Missouri Mines Trailhead and walking on the bike trail across the dam. St. Joe State Park and Missouri Mines State Historic Site are partnering up for the Number 9 Hills hike. Learn about the old Number 9 mine shaft and explore the Number 9 Hills on this hike.

For additional information on all of Missouri State Parks' First Day Hikes, check out mostateparks.com/events.



(Above left) Hawn State Park, near Ste. Genevieve, will host a hike on the White Oaks Trail, Jan. 1, 2019.
(Above) White River Trail at Table Rock State Park features a variety of scenic areas including unique rock formations and small waterfalls.
(Left) First Day Hikers in 2018 pose in front of a bluff covered with icicles on the Katy Trail near Rocheport.
MoDNR FILE PHOTOS

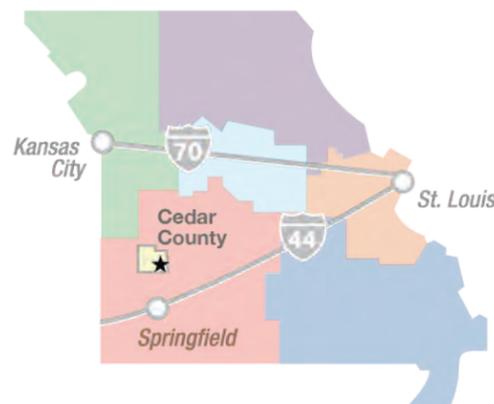


SORTOR'S BLUFF TRAIL AT STOCKTON STATE PARK

Stockton State Park is pleased to announce the opening of the new Sortor's Bluff Trail. Located in the southwest portion of the park, this new 3.3-mile multi-use trail is open to hikers and mountain bikers. The trail follows along a peninsula that juts out into the Big Sac River arm of the lake and runs along the namesake Sortor's Bluff for over a mile.

Whether on foot or on bike, visitors will experience great views of the lake while exploring what is thought to be some of the best woodland areas of the park. This area is one of the most remote sections of Stockton State Park and offers plenty of opportunities to experience the local flora and fauna. The Scenic Overlook is truly one of the trail's highlights, which is located approximately half way through the loop on the northwest point of the peninsula.

The loop trail is phase one of a larger trail system being planned. Phase two will include a 4.5-mile loop that will be located just south of the newly opened trail. Together the new trails will add 8.8 miles of single-track trails to the park, which already boasts more than 10 miles of trails. Park staff built the trail with the help of some great volunteers, including the Good Samaritan Boys Ranch, the Midwest Off-Road Cyclists, University of Missouri Nursing, and some tremendous volunteers from the public.



(Far left) Sortor's Bluff Trail is the newest multi-use trail at Stockton State Park, making the park a great destination for mountain biking.
 (Middle, top) Halfway through the trail loop there is a short spur to an overlook that rewards hikers and bikers with a beautiful view of Stockton Lake.
 (Middle, bottom) The 3.3-mile loop is phase one of a larger trail system that would add another 4.5 miles to the newly opened trail.
 (Top) The trail follows the edge of a peninsula on the lake, offering views through towering trees all along the way.
 (Above) Sortor's Bluff Trail cuts through sections of remote woodland where flora and fauna abound.

MO DNR PHOTOS BY BEN NICKELSON

Go to <https://mostateparks.com/trails/stockton-state-park> to learn more.

but not least

ROLLA SOLAR FARM SOAKS UP THE RAYS

In a ceremony on Feb. 3, 2016, ground was broken on the construction of a 20-acre solar farm in Rolla. The farm, developed by MC Power, a company that builds solar power facilities and owned by renewable energy developer Gardner Capital, has a capacity of 3.20MW – enough to offset the energy consumption of 350-400 average Rolla homes. The facility, located just off I-44 at 2301 Brewer Dr., Rolla, went into operation on April 1, 2016, and consists of 10,200 solar panels with state-of-the-art components that convert solar energy into voltage to match the current Rolla power grid.

The Rolla Solar Farm is connected to the Rolla Municipal Utilities electric system and generates electricity that is sold to the Missouri Joint Municipal Electric Utilities Commission, which operates Missouri Public Energy Pool No. 1 (MoPEP). MoPEP provides a diverse mix of renewable energy to municipalities that also includes wind and hydropower, in addition to solar. The added benefit of a public solar energy pool like MoPEP is that it makes solar projects more affordable for consumers by building on a

utility scale compared to the cost of a consumer installing solar panels on their own property.

Solar farms such as the one in Rolla help the environment by allowing local utilities to diversify the sources of the energy they sell to customers. Solar farms served by MoPEP also are located in Chillicothe, Trenton, Butler, El Dorado Springs, Farmington, Higginsville, Lebanon, Macon, Marshall, Rolla and Waynesville.

Perhaps we have learned something from the plants and flowers around us – they always angle toward the sun.

Andrew Richmond is a public information coordinator and assistant editor of Missouri Resources.

Located just off I-44 at 2301 Brewer Dr., the Rolla Solar Farm hosts 10,200 solar panels that collect enough clean energy from the sun to power 350-400 average homes.

ROLLA MUNICIPAL UTILITIES PHOTO



Check Before You Trek

As the winter chill hits the air, make sure to check the operating hours of Missouri state parks and historic sites. Hours change due to daylight and reduced usage. All current operating hours can be found by looking at the specific park or site webpages under "Park Hours." Go to mostateparks.com.

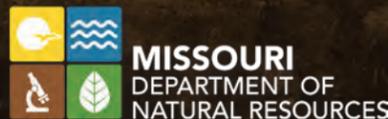


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