

Lake Monitors Needed



The Missouri Department of Natural Resources Water Protection Program is seeking monitors who live near a small lake to assist with its lake monitoring program.

Small residential lakes are ideal for this program as well as publicly owned lakes.

Monitoring includes temperature and Secchi disk measurements every 3 weeks during the recreational season (April through October). Monitors need access to a boat, canoe or other means to monitor the deepest part of the lake. Staff will come to your site to train you and will provide necessary monitoring equipment.

If interested, contact Susan Higgins at 573-526-1002 or susan.higgins@dnr.mo.gov.

Pesticide Pickup Campaign Continues

The Department of Natural Resources kicked off a series of events in March aimed at helping Missouri residents rid their homes and farms of unwanted pesticides and chemicals.



With an event March 9 in West Plains, the department kicked off the second round of the Missouri Pesticide Collection Program. The series of collections are scheduled to run through June while funding lasts. The pickup program allows Missouri households and farmers to safely and legally dispose of pesticides, fungicides, insecticides, rodenticides, dewormers, fly tags and fertilizers containing herbicides or pesticides.

The collection events for 2012 were completed in October with more than 68,000 pounds of waste collected from nine different locations across the state. Currently, about half of the project funds have been expended.

More information on the Missouri Pesticide Collection Program is available online at dnr.mo.gov/env/hwp/pesticide. The program is funded through a hazardous waste enforcement settlement that resulted in more than \$1 million being set aside for the cleanup effort.

An independent contractor, The Environmental Quality Co., of Wayne, Mich., will conduct the collection events under the supervision of the Department of Natural Resources.

Park Attendance Contributes to Economic Recovery

Attendance at Missouri's state parks increased in 2012, another sign of Missouri's economic recovery. More than 18 million guests visited Missouri's state parks in 2012.

Increased attendance at state parks also strengthens our state's economy. An economic impact study for the Missouri state park system released in 2012 reported that the total annual expenditure of state parks visitors in 2011 was approximately \$778 million. The overall economic impact of these expenditures is estimated at \$1.02 billion in sales, \$307 million in payroll and related income, and \$123 million in federal, state, and local taxes. Visitors' expenditures also support 14,535 jobs in Missouri.

Parks Host 2013 Learn2 Series



Missouri State Parks will again host its Learn2 series in 2013, providing opportunities for visitors to learn various outdoor skills.

June will focus on camping in several scenic state parks. New participants that are selected to participate in the program will be taught the basics of camping in the outdoors. This will include proper tent placement and setup, how to prepare, activities to do while camping, emergency preparedness, building campfires, outdoor

cooking, and of course, s'mores. Campers will also be treated to an outdoor program by a park naturalist and will get the chance to explore the participating park.

Learn2Paddle in July and August will take place on flat water lakes within Missouri state parks. Learn2Paddle will introduce beginning kayaking to those new to the sport. Participants will be taught essential techniques and procedures including basic paddling strokes, essential equipment, different types of kayaks, communicating in the water, how to get back in the kayak after tipping over, and most importantly, safety.

Registration for the programs is available online at mostateparks.com/learn2camp.

Sinkholes in Missouri



The tragedy following a sinkhole collapse that killed a Tampa man is reported to be the first to claim a life in

Florida. Sinkholes are a natural and common feature of Florida's landscape and also occur in Missouri. Periods of drought followed by rain events can contribute to sinkhole formation and collapse.

Sinkholes are depressed or collapsed areas formed by the dissolution of carbonate bedrock or the collapse of underlying caves. They range in size from several square yards to hundreds of acres and may be very shallow or hundreds of feet deep. Sinkholes are part of what is referred to as "karst" topography, which also includes Missouri's caves, springs and losing streams.

Much of the state is underlain by soluble carbonate bedrock that has the potential for karst development. Water moving through tiny cracks in limestone and dolomite slowly dissolves the rock and carries it away in solution. Through this process, large caves and caverns can develop at depth. As rock is removed, the soil above washes into the void space.

With time, sinkholes can eventually form on the surface.

The department's Division of Geology and Land Survey provides technical assistance to the citizens of Missouri by evaluating the causes and repercussions of sinkhole development and collapse. Staff geologists perform visual reconnaissance to determine if collapse or landslide is attributed to a natural karst feature or failure of a man-made feature. Learn more about sinkholes and other geologic hazards at dnr.mo.gov/geology/geosrv/geores/geohazhp.htm.

National Trails Day Celebrations

On June 1, Missouri State Parks will celebrate National Trails Day, the nation's largest celebration of trails. Last



year, Missouri residents, parks, and businesses hosted a combined 40 events, giving Missourians the opportunity to connect with their local communities, forests and parks.

National Trails Day is a series of outdoor activities designed to promote and celebrate the importance of trails in the United States. Individuals, clubs and organizations from around the country host National Trails Day events to share their love of trails with friends, family, and their communities.

Troutapalooza Events Continue

Missouri State Parks unveiled Troutapalooza on March 1, proclaiming



2013 the Year of the Trout. Troutapalooza will continue throughout the season, featuring a series of events designed to engage experienced anglers and introduce new participants to the activity. The trout catch-and-keep fishing season runs until Oct. 31, and Missouri State Parks has three trout parks for visitors to enjoy: Roaring River State Park near Cassville,



environmental notes

Bored with Wood? Try Composites!



Spring and summer are times for backyard barbecues and lazy days in the shade. Many people enjoy both of these activities on a deck behind their dwelling. Decks are great for entertaining, but sometimes their upkeep can be a chore. If you are in the market for a new deck or updating an old one, consider composite decking instead of traditional wooden lumber.

Composite decking is not an entirely new product, but in recent years it has grown in popularity. Composed of recycled wood particles and plastic from milk jugs and shopping bags, it carries many benefits over its wooden counterpart. Composite decking is a low-maintenance alternative that never requires staining or resealing. It will not stain, is durable, comes in a variety of colors and textures, and usually only requires a power washing once or twice a year. It will not rot, termites will not damage it, and most manufacturers claim that it will last 2-3 times as long as wooden decking. Combine these features with a product made from 70 percent to 95 percent recycled materials, and it is hard to not consider it as an option.

While the benefits seem to make composite decking a no-brainer, it is important to make sure you choose the right material for the job. Some composite decking can have a tendency to sag over time, depending on the types of plastic used. If the particular brand chosen does not include UV protection, boards could fade as they get older. In addition, once wood particles have been combined with plastic, these boards are difficult to recycle again. Composite decking is generally more expensive than traditional wood but also can vary widely in cost. While composite decking may end up being more expensive, this may be offset by a savings on maintenance, when compared to traditional wood decks over their lifespan.

If considering composite decking for your home, make sure to understand the differences between brands. The material should come with a manufacturer's warranty and may need to be installed by a professional. In addition, you should ask to see examples of stress-tested boards to see how they look after some outdoor exposure. Finally, following proper maintenance procedures will keep your deck in tip-top shape for years of enjoyment, whether you choose composite lumber or traditional wood.

Sources:

Recycled Plastic and Composite Lumber – BuildItGreen.org

EPA Background Document for the Final Comprehensive Procurement Guideline (CPG) III and Final Recovered Materials Advisory Notice

Cedar Vs. Composite Decks – Western Red Cedar Lumber Association

GreenExpo365.com. A Short Read on the Differences in Composite Decking

Bennett Spring State Park near Lebanon, and Montauk State Park near Salem.

Troutapalooza includes activities to promote fishing for all ages and skill levels. The following activities and events being planned to take place throughout the season: Trout Park Passport Program, monthly Learn2 Fish clinics, weekly drawings, tourna-

ments, coloring contests, and special programs and activities. To find the latest information on Troutapalooza in Missouri state parks, visit [Facebook.com/Troutapalooza](https://www.facebook.com/Troutapalooza).

Permit Modifications List Available Online

Facilities or businesses that actively treat, store – for more than 90 days

– or dispose of hazardous waste in Missouri must get a hazardous waste permit, which lists how and what kinds of hazardous waste the facility can manage. It also lists the facility’s operating conditions and closure, correc-

tive action and necessary financial assurance requirements.

The department or the facility can make changes to the hazardous waste permit throughout its life. Permit modifications are labeled as Class 1, 2, 3 or

department-initiated, depending on how much they change the original permit conditions.

The public is invited to review the Department of Natural Resources’ list of all approved hazardous waste per-

I was very excited to see the Time Exposures article about Lovers Leap, in the 2013 winter edition of *Missouri Resources*. I’m most familiar with Lovers Leap in Hannibal, since I was born and raised here and have lived here all of my life (64 years), except for six years.

The two photos of 1915, are very interesting. The article states that “the horizontal photo was likely taken atop Cardiff Hill.” The photo was actually taken atop Lovers Leap and looking northward, over Hannibal, toward Cardiff Hill.

Thank you for a wonderful magazine!

Larry Bross
Hannibal

Editor’s Note:

As Larry pointed out, the photo in Times Exposures is indeed a view of Hannibal from atop Lover’s Leap. In the foreground of the view, you can see the location of the old railroad roundhouse as well as the river on the east side of town. We also have verified this with the Hannibal Convention and Visitors Bureau. Our apologies and thanks to Larry for taking the time to alert us to the error.

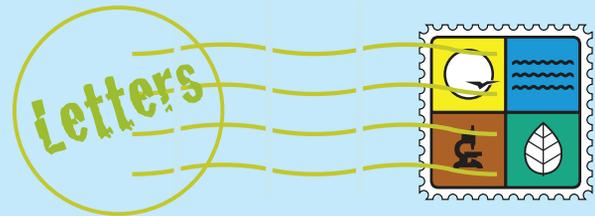
Congratulations to you and your staff for a very nice and interesting magazine. It is a good way for ordinary citizens to know what is happening in our state and to appreciate the work of DNR. Thank you.

Clyde Dickerson
Shell Knob

Thank you for the Huzzah Creek spillway picture featured on the back cover of the winter issue of *Missouri Resources*. Huzzah Creek begins on my paternal grandfather’s farm in southern Dent County and meanders through the little Howe’s Mill community (and my farmland) until it reaches the confluence with the eastern branch at the spillway.

I have fond memories of my childhood in this area.

Vivian J. (Mrs. Robert W.) Jordan
Salem



Please accept my very sincere congratulations and thanks for the winter 2013 issue of *Missouri Resources*. I found it to be the best yet! I enjoyed it overall, and found it informative on so many subjects. “Moo Juice” will go a long way to address the problems from concentrated animal operations we have.

In particular, thank you for the “Battle of Island Mound” article. I will be passing this one to friends that will, I know, be delighted to know of this new historic site. When I stumbled onto the national park site (George Washington Carver National Monument) in Diamond, Mo., (thanks to highway signs) I also shared that. It is amazing how little is done to promote these positive aspects of our history.

Ronald N. Carter
St. Louis

I have been fascinated by dye tracing in sinkholes for a long time. I am in my 85th year and I’ve often wondered what is the longest distance on record of dyed water emerging, and where did some of the dyed water emerge? Also where is the largest sinkhole in Missouri and how many sinkholes have been found? How deep do sinkholes get?

Thanks, I enjoy *Missouri Resources* and when I was teaching, I often quoted your magazine.

Frank Gruswitz
St. Louis

Editor’s Note – Peter Price, Division of Geology and Land Survey responds:

The longest dye trace we recorded is roughly 39 miles long (Eleven Point River to Big Spring). We have verified 15,981 sinkholes – and expect many more exist. The largest encompasses about 700 acres in western Boone County. Records aren’t kept about depth, but we know some are greater than 100 feet deep. For more information visit: dnr.mo.gov/geology/geosrv/envgeo/watrace.htm; dnr.mo.gov/geology/geosrv/envgeo/eau.htm; and dnr.mo.gov/magazine/2010-winter.pdf#page=25.

Letters intended for publication should be addressed to “Letters,” *Missouri Resources*, PO Box 176, Jefferson City, MO 65102-0176 or faxed to 573-522-6262, attention: “Letters.” Please include your name, address and daytime phone number. Space may require us to edit your letter. You also can email *Missouri Resources* staff at moresdnr@dnr.mo.gov.

Stream Team Notebook

Stream Teams Monitor a Fisherman's Paradise

Bennett Spring State Park near Lebanon, Mo., often called a “fisherman’s paradise,” is home to the Ozarks’ fourth largest spring, a fish hatchery, a unique natural tunnel and a Stream Team Volunteer Water Quality Monitoring project. Three Stream Teams represented by six individual members have monitored water quality at Bennett Spring every month for the past year. Billy Backues, Carolyn Solomon and Marvin and Lucy Silliman, representing Stream Team 4193, are working diligently with Carl Romesburg of Stream Team 3117 and Dennis Trudeau of Team 3688.



DNR photo by Susan Higgins

Stream Team members prepare to put their chemical kits to work at Bennett Spring State Park. Left to right are Carl Romesburg, Billy Backues, Marvin Silliman, Dennis Trudeau, Lucy Silliman and Carolyn Solomon.

Romesburg and Trudeau met Backues at a VWQM introductory workshop. After becoming acquainted, they quickly discovered that they had similar interests and could assist one another with their monitoring responsibilities. Solomon and the Sillimans knew Backues from their membership in the Lake of the Ozarks Missouri Master Naturalist Chapter.

After receiving a call from the Bennett Spring hatchery asking for volunteers to monitor the water quality above Holland Dam in the state park, Romesburg knew just who to call. This faithful group of monitors rallied around the idea and some of them manage to combine their volunteer activities with pleasure, often bringing their fly rods along so they can do a little fishing after monitoring duties. As monitors, they do macroinvertebrate and chemical monitoring while using the historic gauge in the park for stream discharge measurement.

It is easy to see this group is well organized and dedicated to protecting water quality at Bennett Spring. If you are ever visiting the park and see them working, stop by for a chat. They will gladly show you what they are doing, but be careful, you just might find yourself regularly monitoring with them.



mit modifications for calendar year 2012. The permit modifications list is online at dnr.mo.gov/env/hwp/permits/publications.htm. For more information or a hard copy of the list,

contact the department’s Hazardous Waste Program, Permits Section, at 800-361-4827. Hearing- and speech-impaired individuals may call Relay Missouri at 800-735-2966.

Geologic Maps Published



Four new geologic maps are available for portions of Callaway, Jefferson and St. Louis counties. The department’s Di-

vision of Geology and Land Survey created the maps through the STATEMAP component of the National Cooperative Geologic Mapping Program, which is co-funded by the U.S. Geological Survey.

Bedrock and surficial maps are available for Fulton and Manchester quadrangles. Bedrock geologic maps provide information about the existing layering of bedrock and faulting, folding or deformation, and information about the distribution of rock such as limestone, sandstone, coal and granite. Surficial material maps describe those deposits that occur above the bedrock layer. This includes soil, along with details about deeper unconsolidated material.

Geologic maps benefit landowners, farmers and government agencies by building a regional picture of the distribution of geologic materials that store groundwater or provide recharge to valuable groundwater aquifers. They provide a strong scientific basis for making informed regulatory decisions that ensure protection of public and environmental health, such as siting landfills or cleaning up groundwater contamination. All mineral, energy, water, industrial construction, public works and urban development projects can benefit from a geologic map.

Used in applications including earthquake and other natural hazard evaluation, geologic maps also aid engineers and planners in identifying rock materials for the construction of critical infrastructure such as highway bridges, dams, tunnels and pipelines. Geologic maps help create strategies for resource development and environmental protection. Geologic and topographic maps may be purchased online at missourigeologystore.com or

TIME EXPOSURES



Although officially incorporated in 1853, Kansas City had been a thriving community since the 1830s. The Kansas City neighborhood now known as the River Market was originally called Westport Landing. Land along the Missouri River in the western part of the state often has steep loess hills and bluffs – Kansas City was no exception. In 1833, John Calvin McCoy developed a boat landing carved from a natural rock ledge on the south side of the river. It was used to receive goods via the river destined for the town of Westport, four miles to the south. Those items were then sold to settlers heading west on the Santa Fe Trail. Grand Avenue, along with Main and Delaware streets, were deep ravines that cut through the bluffs. These geologic features were developed as streets that led from the river to the residential and commercial areas of the south. The rugged topography limited development of the area and the land was eventually leveled. This photograph from 1886 shows workers grading the river bluffs at the intersection of Fourth and Grand streets.

Photo from the Missouri Valley Special Collections, Kansas City Public Library, Kansas City, Mo.

Send your photo to "Time Exposures," c/o Missouri Resources, PO Box 176, Jefferson City, MO 65102-0176. Original photos will be returned via insured mail. Pre-1970 environmental and natural resource photos from Missouri will be considered. Please try to include the date and location of the picture, a brief description and any related historic details that might be of interest to our readers.

at the DGLS central office at 111 Fairgrounds Road, Rolla.
Learn more at dnr.mo.gov/geology/statemap/missouri-maps.htm.

Study Grant for Normac Sewer District

The Missouri Department of Natural Resources has awarded \$41,000 to

the Lake of the Ozarks Council of Local Governments to study the possibility of extending the Normac Sewer District near Camdenton.

The sewer line extension feasibility study will help the council understand past precedent and establish a future vision for the land to outline the best plan for extension of the existing collection system. Extending the existing system will add more customers, which will lower the monthly rates being paid by current Normac Sewer District customers. Adding more customers to the district will also benefit the environment as it will reduce the number of permitted outflow points and on-site (septic) wastewater systems in the area.

The feasibility study will be used to develop and to identify the current regional infrastructure and recommend suitable locations for potential long-term investments, and improve water quality in the region.

Contributing partners in this collaborative wastewater study include the Camden County Health Department, Camden County Assessor, Camden County Waste Water Department, Camden County Sewer Board, Missouri Spatial Data Information Services, Missouri Association of Council of Governments and Missouri Department of Natural Resources.

The U.S. Environmental Protection Agency, Region 7, has provided partial funding for this project under Section 319 of the Clean Water Act. The Department of Natural Resources' Water Protection Program will administer the grant funds. The department is committed to working closely with communities and businesses to assist with funding efforts that improve water quality in Missouri.

For news releases on the Web, visit dnr.mo.gov/newsrel/.

For a complete listing of the department's upcoming meetings, hearings and events, visit the department's online calendar at dnr.mo.gov/calendar/search.do.

Looking for a job in natural resources? Go to dnr.mo.gov/hr/.

Resource Honor Roll **Dave Murphy**

Dave Murphy, who recently retired as the Executive Director for the Conservation Federation of Missouri, grew up with an enthusiasm for spending time outdoors through hunting, fishing and trapping. Along the way, he also developed a true passion for natural history. Murphy soon became a dedicated and respected conservationist and environmentalist.

Murphy grew up on his family's farms in Lewis and Clark counties in northeast Missouri. He earned his Bachelor of Science degree in Forestry, Fisheries and Wildlife in 1976 and attained his Master of Science in Wildlife Biology in 1983.

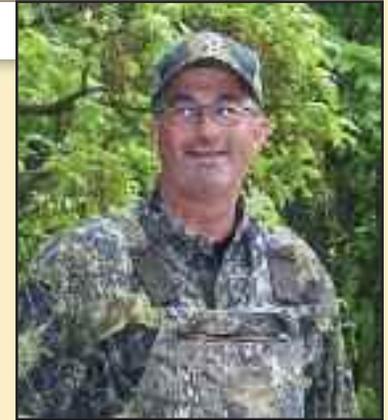
Murphy spent the beginning of his career working on wildlife research for the Missouri Department of Conservation. He eventually began looking for opportunities to fulfill his quest to become an engaged and dedicated conservationist.

Murphy augmented his efforts by becoming an active volunteer for several private conservation organizations including Trout Unlimited, Quail Unlimited, the Ruffed Grouse Society and especially, the National Wildlife Turkey Federation.

"I believe absolutely in the value of ordinary folks working together to accomplish extraordinary feats," said Murphy.

His positive, collaborative attitude led Murphy to a career as the

Regional Field Supervisor and Regional Director for the National Wildlife Turkey Federation. Under his direction, the federation grew from 11 local chapters to more than 200 with over 600 members that generated in excess of \$2 million net each year for conservation projects. Murphy's 10 years of service with the Conservation Federation of Missouri also brought similar results while enhancing and maintaining the relevance of the outdoors to every living and future Missourian.



Dave Murphy

Conservation Federation of Missouri photo

His dedication as a conservationist and environmentalist has been recognized by many organizations, such as *Outdoor Life's* 25 Most Influential People on the Future of Hunting and Fishing, and Bass Pro Shops' 2012 Conservation Partners of the Year, awarded to Murphy and Sara Parker Pauley.

Murphy and his wife, Gunilla, will continue to run their family's tree farm in Fairmont and will most certainly remain active in working to protect our precious natural resources.

Rock Matters



Glacial erratic

Taking their names from the Latin word *errare*, erratics are rocks that differ from size and type of rock native to their surroundings. During the ice age, glaciers carried rocks and soil into Missouri from South Dakota, Iowa, Minnesota, Wisconsin, Michigan and Canada.

(Left) Glacial erratic in Sullivan County. DNR photo by Jerry Vineyard. (Bottom) Most erratics in Missouri are composed of Quartzite (left) or gneiss (right). DNR photos by Mark Gordon.

When the glaciers melted, the rocks and soil remained in deposits of till that is sometimes more than 300 feet thick. The rocks are usually composed of igneous and metamorphic rock types most resistant to weathering. While the erratics were trapped within glacial ice, they were rubbed against each other, as well as the bedrock they moved over during their journey south. Erratics may be found with flattened sides and grooves etched into them as a result of this abrasion.

Quartzite and gneiss (rhymes with nice) are the most common glacial erratics in Missouri. Much of the quartzite found in Missouri is believed to have originated in South Dakota and is known as Sioux Quartzite. It is commonly red to purple and is metamorphosed sandstone, composed primarily of the mineral quartz. It is generally grey or pink, has a banded appearance, and is made up of granular mineral grains, typically containing abundant quartz or feldspar minerals. Erratics composed of anorthosite, andesite, basalt, diorite,

gabbro, granite, granodiorite, greenstone, schist, slate and syenite may also be found.

The size of erratics can range in size to that of pebble-size particles to boulders the size of cars. Occasionally very interesting pieces are discovered, such as native copper from Michigan or banded iron formations from Minnesota. One glacial erratic composed of granite and located in Sullivan County, is estimated to weigh more than 750,000 pounds!

