

Missouri Resources Magazine

Winter 1998-1999

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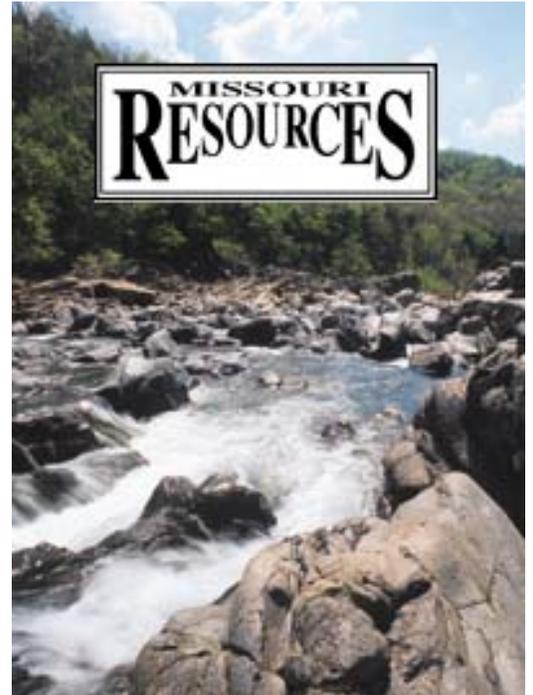


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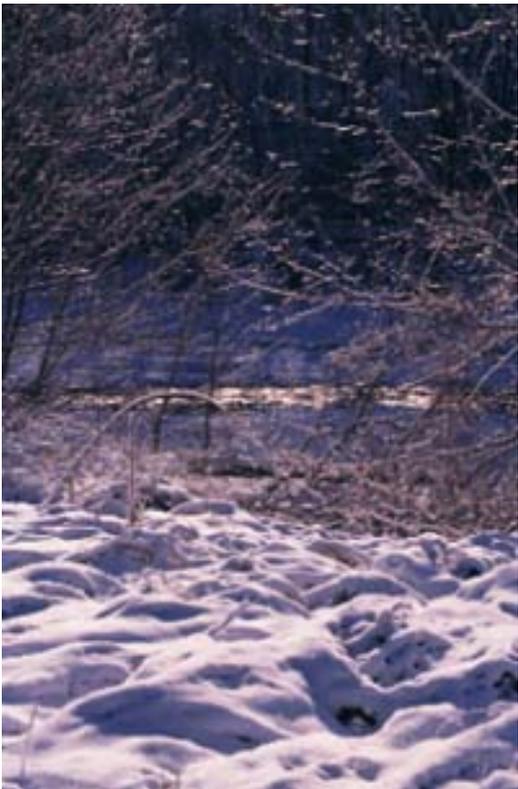
FRONT COVER: Waters of the Black River flow around some of the oldest exposed rocks in the nation at Johnson's Shut-Ins State Park in Reynolds County. The river is an impressive feature of this 8,470-acre park, which also contains more than 900 species of plants and wildflowers. Photo by Nick Decker.

BACK COVER: A fresh blanket of snow at Lake of the Ozarks State Park in Miller County is an added benefit for visitors seeking a wintertime excursion. As the state's largest park, its 17,000 acres feature many areas that are worthy of exploring on a snowy winter's day. Photo by Nick Decker.

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Comments from the Director:



Looking back, I am hard pressed to believe it has only been about 12 months since I became director of the Department of Natural Resources. If I think of it in terms of sheer numbers, I can easily account for all 365 days, and then some. But, when I look at the initiatives we have been able to move forward on, and the goals we have already set, I'm amazed that it didn't take longer than a year for us to get here.

Granted, protecting the state's environment is a big job, and for every one thing we've been able to dedicate our efforts to, there are a million more waiting to be successfully initiated. But that should not stop us from celebrating progress. DNR employees deserve that for their hard work, and the public deserves to know that we listen when they speak.

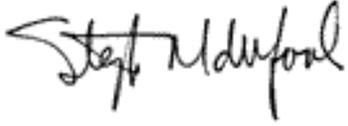
Although we have many other things on our plate, for the next several years we plan to focus our efforts in the areas of water issues, energy issues and efficient government. Our legislative and budget packages for this year are designed to help us in these areas: increased water sampling, monitoring and protection activities, consolidation of state park funds, and promotion of alternative and renewable energy resources.

In addition, we are responding to those things that you told me were important to you as we have met and talked. I've found that you are concerned about having clean, bountiful water for drinking, recreation and swimming. As I mentioned earlier, water issues are one of the three areas that we will immediately focus on, and we've already moved in this direction with our legislative, budget and communication efforts. Cooperative efforts going on at Table Rock Lake (see Fall 1998 Director's Comments) are a prime example of this. Within our legislative and budget proposals, we've outlined stronger, more proactive initiatives to improve the quality of Missouri's water, regardless of whether it is used for water supply, recreation or agricultural purposes.

Although the road to cleaning up the air in St. Louis has been a long one, we have finally sent out the requests for proposals for an enhanced maintenance and inspection program in the metropolitan St. Louis area. As most of you probably already know, this program will help reduce ozone levels in St. Louis and the surrounding counties by requiring a more effective and efficient vehicle emissions inspection test. Coupled with the introduction of reformulated gasoline, this puts St. Louis on the road to clean air. We are excited about this new program and look forward to moving ahead with it. Missouri citizens deserve that.

Finally, you said you wanted to continue to have good times in our first-class park system. In addition, to upgrading facilities, we also are trying to improve the way we do business in state parks by upgrading our campground reservation system. Visitors soon will be able to make reservations anywhere from 48 hours before they plan to arrive up to three months ahead of time. Plus, now you can use credit cards for payment. This should make camping in our state parks more convenient and less of a hassle for you.

So, as my second year begins, I again ask for your suggestions and feedback. Your input, positive and negative, validates our efforts and makes them worthwhile.

A handwritten signature in black ink that reads "Steve Mahfood". The signature is written in a cursive style with a large, sweeping initial "S".

Steve Mahfood
Director, Missouri Department of Natural Resources

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A Tireless Pursuit

by Van Beydler

photographs by Nick Decker



They say a picture is worth a thousand words. Well, unless you are a rat or snake looking for new digs, or a mosquito trying to close on that summer home and breeding ground, only three words are necessary. Ugly. Dirty. Dangerous. Most importantly, tire accumulations are a serious fire hazard for Missouri communities.

For example, more than 13,000 tires had been illegally stockpiled on a lot in Guilford, a small village in northwest Missouri. The threat of fire and mosquitoes had plagued the local citizens for several summers. A May 18, 1998 fire consumed about 200 tires at the site and moved the city to action. About a week later, on Memorial Day, the tires were removed using vehicles and trailers donated by citizens. "Sometimes, cleaning up a site does not take very long," said Dan Fester of the Missouri Department of Natural Resources' Solid Waste Management Program. "It took about two weeks for volunteers to clean up the illegal dump at the Guilford site."

The waste tires were removed from the area, thanks to voluntary cleanup efforts by citizens and the cooperation between the village, the Missouri Department of Natural

Resources (DNR) and the Northwest Missouri Regional Water and Solid Waste Coalition, a non-profit environmental group. DNR will reimburse the coalition for the cost of taking the tires to Alternative Fuel Source Inc., a permitted waste tire processor in Centerview. The tires then were chipped and used for fuel at the Utilicorp United Power Plant in Sibley.

Private Tire Industry

Taking care of the waste tire problem privately has helped us all publicly. Thanks to private industry, the marketplace for waste tires is self-sustaining. There currently are enough people hauling and shredding tires to handle the amount of tires generated in Missouri each year.

The greatest potential for private industry is to find and develop new products made from waste tire materials. There are other environmentally friendly ways to reuse the materials reclaimed from tires, in addition to burning them as fuel. The marketplace has more than enough room for private industry to expand its use of waste tires.

Recycled Rubber Resources, in Macon, uses a "tire-eater" to make ground crumb rubber from waste tires. "The procedure separates reinforcing steel belts and polyester fibers from the rubber," said sales associate Shon Coram. "What is left from the treatment is called crumb, a material that can be further divided into various grades depending on particle size. For each pound of rubber salvaged, nearly 99 percent is reduced into crumb. The other remaining components are scrap metal that we recycle into new steel and polyester residue that can be incorporated into new products such as a reinforcing fiber."

Depending on the ingredients needed to make the new product, the crumb can be ground into any size. The larger-particle crumb can be used as a component to improve the wear of a road surface. Also, large-particle crumb can be reprocessed to mold products that are low in strength, but high in weatherproofing value. Even the smaller pieces of crumb are useful. They can contribute to new tires, agricultural hoses, culvert piping and protective mats for pick-up truck beds. Fine crumb is generally worth between 13 and 25 cents a pound.

"The company provided crumb rubber to another manufacturer to make a variety of prototype mats," said Coram. "We're also introducing some new surfaces for walking trails and playground mats." Recycled Rubber Resources also markets forty-pound bags of a product they call "Re-Play." Re-Play is used as a substitute playground surfacing material instead of pea gravel. Not only is the playground covering environmentally friendly, the material is safer than pea gravel. The Macon company also developed a product to spread across soccer and football fields that helps to improve water absorption.

Recycled Rubber Resources helps private- or city-owned parks in Missouri fill out paperwork to apply for grant money, too. "Giving guidance to the people operating these parks helps us have an additional market to sell our products," said Coram.

More waste tire end users are finding new markets in Missouri and other states. Alternative Fuel Source in Centerview currently is supplying tire-derived fuel (TDF) to Utilicorp. Tire Shredders Unlimited in High Ridge is providing tire-derived fuel to AmerenUE, and Tire Energy Corporation in Kansas City is furnishing whole tires to Monarch Cement in Kansas.

Whole tires have been banned from Missouri landfills since the Missouri Solid Waste Management Law was revised in 1990. A 50-cent fee on all retail purchases of new tires helps fund cleanups as well as grants, education

and administrative costs. According to the Missouri Department of Revenue, 3.5 million tires subject to the fee are sold in Missouri annually. About \$1.1 million annually – 65 percent of the tire fee – is used for cleanups. The tire fee will end on Jan. 1, 2001, unless the date is extended. The fund will clean up only about half of the known illegally dumped tires in the state, according to DNR estimates.

In 1995, the emphasis of Missouri's Solid Waste Management Law was amended from market development to cleaning up waste tires. The first priority under this solid waste law was to help innocent-party sites. These are people who got stuck with illegally dumped tires on their property.

Currently, 400,000 tires are being cleaned up at the Wolken site in Laclede County. Another 2,000 tires were removed from an innocent land-owner's property at the Edwards site at Park Hills in St. Francois County in 1998. Thirty-three thousand tires were removed from a responsible-party tire dump at the Wealand site at Raytown in Jackson County during summer 1998.

In Missouri, more than one-half million tires currently are in 20 known innocent-party waste tire dump sites. "Most of these are considered small sites," said Ed Galbraith, enforcement section chief in the Solid Waste Management Program. "The next step is to accelerate cleanups at larger illegal sites. Over 2.5 million tires have been removed from illegal dumping sites, but over 6.5 million illegal tires remain.

"What some people didn't realize is that it is much easier to get the tires than to get rid of them," Galbraith added. "Some individuals who entered the tire disposal business did so without researching the waste-tire market first. Once a worn-out tire is taken off of a car, it is of negative value and becomes a waste tire. It can take hundreds of thousands of dollars to buy and maintain the equipment needed to re-process tires."

Hundreds of waste tire disposal sites exist in the state, but only about five sites have the required permits from the Department of Natural Resources. Responsible parties that own illegal tire sites do not follow state regulations. The people responsible for these sites have little incentive to clean up the site.



The Utilicorp power plant in Sibley burns tire chips for use as a blended fuel at the facility. If the plant continues to burn chipped rubber at its current rate, it would utilize all the waste tires generated in Kansas City. To date, the plant has burned more than a half-million tires this year.

Partnership With Corrections

The Missouri Department of Natural Resources (DNR) is working with other state agencies to solve waste tire problems. These partnership efforts have played a part in helping to reduce waste tires in Missouri.

A cooperative effort currently exists between the Missouri Department of Natural Resources and the Missouri Department of Corrections (MDOC). So far, 14 waste tire sites have been cleaned up using inmate work crews. As a result of this interagency cooperation, the tires are converted to tire derived fuel at a tire recycling plant located at the Central Missouri Correctional Facility in Jefferson City. A tire shredder was purchased for MDOC's Missouri Vocational Enterprises with funds from the Environmental Improvement and Energy Resources Authority's (EIERA) Market Development Program. EIERA operates as a financial arm of DNR.

The University of Missouri-Columbia (UMC) uses the tire-derived fuel, along with coal, to run its power plant. This significantly reduces the amount of coal used to power the university power plant and decreases overall energy costs. "The university saves an estimated \$100,000 each year since we started burning waste tires as fuel," said power plant manager Ken Davis. "The process saves about \$2,000 a week by reusing the fairly cheap waste tires. Add that savings up over a 10-year period, the numbers add up quickly."

An additional air-quality benefit is that sulfur emissions also are reduced at the UMC power plant. This successful and beneficial reuse removes the problems associated with thousands of tires taking up space in storage. It also helps protect air quality and removes the potential for harm to the public and the environment.

As an unexpected bonus, Missouri's Waste Tire to Energy Team won both state and national awards recognizing the innovation of this project. In July, the team received the Missouri Governor's Award for

Quality and Productivity. In December, the team received an America's Best Innovations Award at the annual meeting of the Council of State Government in Charleston, S.C.

The Innovations Award Program recognizes groundbreaking and novel state programs that address significant problems and issues that are regional or national in scope. Winners of the award represent creative and resourceful approaches to solving tough problems.

These people may not have a permit or may ignore the regulations to avoid paying fees associated with permitting. The regulations do not limit the number of tires that can be stored, but do require stacking the tires no higher than 20 feet while maintaining fire lanes between the piles. In addition, these piles must be at least 50 feet away from any wooded areas, due to the potential fire hazard. The regulations also require the owners to set aside funds in the form of financial assurance to guarantee that the site is cleaned up should the owner be unable or unwilling to do so.

Gaining access to illegal dumping sites where there is a responsible owner can be a challenge. The responsible party or owner may try to restrict access to the site in a number of ways. Illegal dump-ers may try to block access to their site because DNR can recoup costs at cleanup sites from responsible parties. DNR must gain access through owner consent or through a court order. Money collected against illegal dumpers goes back into the tire fund to help the department in other illegal site cleanups.

Moving tires from the rim to the recycle bin is increasing and illegal dumping is decreasing. This is due to vigorous inspection and enforcement efforts as well as growth of markets for used tires. Missouri has more than enough capacity to use all the waste tires that currently are generated. Alternative uses often become more apparent as natural resources become scarce or prices for other raw materials increase.

Educating and informing the general public and the tire industry about the multiple uses for waste tires also can make a significant difference. Ask owners or employees of retail tire outlets if they deal with properly permitted tire haulers to dispose of waste tires. Dealers using responsible haulers will help ensure the tires end up at the proper final destination. By doing this, dealers can help discourage tire dumpers from proceeding with illegal hauling and prevent the problems associated with waste tire dumps.

The Department of Natural Resources recognizes the important role that private industry, partnerships and charitable and fraternal organizations contribute to waste tire cleanups. The agency even has a program to pay for disposal costs from tire dump cleanups conducted by charitable, fraternal and other non-profit groups.

DNR enters into agreements with the Missouri Department of Corrections to clean up waste tire sites (see previous page). Private contractors and Corrections have teamed up to clean up innocent-party sites, but the larger waste tire sites will take a lot more effort. The next round of bids for some of the larger sites will begin in spring 1999 and will offer private



In September 1998, this tire fire near Desloge could be seen from a distance of 40 miles.

industry some great financial opportunities.

The department encourages the development of new markets for waste tires. One of the primary markets is tire-derived fuel (TDF), waste tires that have been processed into small pieces about two and one-half inches in size. These pieces are used for fuel, which helps avoid the use of other, more finite sources.

Waste tires are an excellent alternative for other uses such as playground surfaces. Since 1994, more than \$656,000 in DNR grants were spent for converting waste tires into playground material and running tracks at various parks, churches and schools across Missouri. More than \$1.45 million in grant funds from DNR also have been awarded for tire removal, resource recovery, manufacturing tire-derived products, and to conduct test burns at facilities intending to use TDF.

Rubber-modified asphalt is another use for waste tires. This form of asphalt uses granulated rubber, which gives longer pavement life to the product. Waste tires provide a good springboard for making other products, including rubber mats, adhesives, coatings, footwear, toys, conveyor belts, trash cans, automotive parts, roofing materials, curbing units and more.

Tires collect in dumps and dumps attract attention. Creative solutions have slowed illegal dumping. Bringing together a variety of tire-derived products will create new markets. By tireless pursuit of these goals, we can create a cleaner environment.

Van Beydler is a division information officer for the department's Division of Environmental Quality. A. J. Spruill assisted in the writing of this story.

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Home Cookin'

Recipes for Energy Efficiency

There is nothing like the taste and smell of a hot, home-cooked meal on a frigid winter's day to warm the soul and spirit. By becoming aware of and practicing the following tips, you will be less likely to get burned by energy bills in the kitchen this winter.

- In gas appliances, look for blue flames; yellow flames indicate that gas is burning inefficiently and an adjustment may be needed.
- Use a covered kettle or pan to boil water; it's faster and it uses less energy.
- If you cook with electricity, turn the stove top burners off several minutes before the allotted cooking time. The heating element will stay hot long enough to finish without using more electricity. The same principle applies to oven cooking.
- Use small electric pans or toaster ovens for small meals rather than your large oven or stove. A toaster oven uses one-third to one-half as much energy as a full-sized oven.
- Cover liquids and wrap foods that are stored in the refrigerator. Uncovered foods release moisture and make the compressor work harder.
- Place the faucet on the kitchen sink in the cold position when using small amounts of water. Placing the lever in the hot position uses energy to heat the water even though it may never reach the faucet.
- Use pressure cookers and microwave ovens whenever it is convenient. They can save energy by significantly reducing cooking time.
- If you need to purchase a gas oven or range, look for one with an automatic, electric ignition system. An electric ignition saves gas because a pilot light is not burning continuously.

Source: U.S. Department of Energy

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How Clean Is Your Stream?

by Scott B. Totten and Connie S. Patterson
photographs by Nick Decker

Missouri is a state that celebrates every season nature has to offer with an abundant natural beauty. We are blessed with clean air to breathe. We have soil that produces a livelihood for some and food for many. We have good quality water to drink. Like submerged rocks in a stream, threats to that clean water are always there, but rarely apparent.

A lot of Missourians are talking about water quality these days. Let's take a closer look at one of our most precious natural resources.

Our water is important to us at home. We take it for granted until it doesn't come out of the EAO clean and clear. It is important to us for recreation, as evidenced by the multitude of swimmers and boaters in our state. Our water also is important to Missouri and its people for economic reasons. In fact, our two largest industries, agriculture and tourism, both depend on it.



Johnson's Shut-Ins State Park

Missouri has committed state resources to protecting its water quality since the 1960s. So, just how is water quality determined? Streams that are representative of various areas of Missouri are monitored to determine their water quality. Standards are established that give us the yardstick to see if our waters measure up. These standards also are used to define the necessary conditions in streams and limits for amounts of pollutants allowed. Because a healthy stream is a system that can naturally cleanse itself of certain amounts of pollution, the standards show us a balancing point between pristine and impaired conditions.

We also must balance the impacts individual stream segments have on the water quality in the entire watershed. "Instead of judging individual stream segments on their own merits like we did

in the past, we're analyzing them as part of a watershed system," said John Young, director of the Missouri Department of Natural Resources' Division of Environmental Quality (DEQ). "We're studying each watershed as a whole as we become aware of how everything that happens in that watershed affects it."

Our water quality standards help us protect the pristine streams in our watersheds and point out where we need to take action to protect impaired waters. Facilities or activities that discharge contaminants into Missouri streams must have permits from DEQ's Water Pollution Control Program.

"We review the permit application to compare the discharge proposed to the ability of the stream to absorb that amount and concentration of pollution," said Young. "If issued, the permit specifies how much of each contaminant can be discharged into the stream. Both the permit holder and the department monitor these discharges to ensure that the stream and the public are protected."

Some streams have been identified where additional pollutants cannot be added. The Missouri Department of Natural Resources (DNR) has begun to conduct special studies, called Total Maximum Daily Load (TMDL) analyses. Staff look at the amount of pollution from sources already in the stream plus the additional amount a new source would contribute. DNR then determines the total amount of pollutants the stream can take and still meet the water quality standards. Pollution sources must be reduced to return the stream to a healthy condition.

Every two years, under Section 303(d) of the federal Clean Water Act, Missouri is required to identify waters not meeting state standards. The 1996 Missouri Water Quality Report identified 53 waters that did not meet water quality standards. These waters are ranked for analysis and restoration based on the pollution severity and designated uses of the waters. In 1998, DNR reviewed and updated a list of segments from streams, lakes and rivers that are impaired.

In September 1998, Missouri's Clean Water Commission sent this list to the U.S. Environmental Protection Agency (EPA).

"The 1998 list is larger because we did additional analysis of the Missouri Water Quality Report and sought and received more public input," said Natural Resources Director Steve Mahfood. "The Missouri Water Quality Report, also called the 305(b) Report, is a summary of the state's water quality problems," he added.

The list includes a schedule for conducting TMDL analyses on a number of stream and lake segments. EPA will review and approve the list, or reject the list and provide us a list from its database. DNR will use the approved list to prioritize funding for study and to implement solutions. "We have several resource needs to continue the same level of service and to conduct additional work necessary to return the streams listed for TMDL studies to good health," said Mahfood. "We'll need additional monitoring to better identify stream impairments and pollution sources within a watershed and to reallocate the amount of pollutants the stream segment can tolerate.



"We'll also need additional permit staff to ensure that the environment is being protected while simultaneously revising permits on impaired streams."

The clear waters of Table Rock Lake in Taney County helped make it one of the most popular vacation spots in the state for boating, fishing and swimming. The lake is the focus of an ongoing study by the department that is being used to address the loss of its water clarity due to excessive nitrification.

"To pay for that staff, we're looking into modifying our permit fee structure. Our fees for water permits haven't increased since 1990, although the number of permitted entities has jumped from 2,500 to 12,000," Mahfood added. "We've seen a tremendous increase in general permits over the last decade. General permits cover things like storm water control and smaller animal feeding operations. These permits are \$150 each, which is not enough to cover our costs for administering them."

Having more facilities under permit should mean there will be more pollution being treated that used to be runoff.

"We will be working with the Missouri legislature in the 1999 session to address the increase in permits and the need to ensure these equate to an improving water environment," said Mahfood.

DNR is committed to working with the legislature and the public to protect Missouri's water. The best solutions to water quality problems prove to be those with broad and active local support and involvement. The department supports these efforts through nonpoint source funding and other means.

Citizens all over Missouri are proceeding with watershed enhancement projects. Local citizens and government agencies must join in partnership to sufficiently address Missouri's water quality issues. If you would like to help or to learn more, contact DNR's Water Pollution Control Program at 1-800-361-4827 or visit us at (www.dnr.state.mo.us/deq/wpcp/homewpcp.htm).

Scott B. Totten is a deputy director of the department's Division of Environmental Quality. Connie S. Patterson is an information officer in the division.

What Determines Water Quality?

DNR considers a variety of factors when looking at the quality of water in a water body.

Ecological Health

The Missouri Department of Natural Resources determines whether a lake or stream is healthy by sampling for chemicals, sampling for aquatic life and examining the water habitat as well as the areas along a river's or lake's edge. These areas are called riparian or littoral areas, respectively.

Fish, invertebrates and other aquatic life are best supported where their habitat has been least disturbed. Stream conditions supporting aquatic life vary widely across Missouri. A good example of healthy aquatic life would be an Ozark stream undisturbed by gravel mining. A poor example would be a channelized stream with no vegetation along the bank.

Fish

We use the contaminant levels in fish to directly determine whether fish from certain waters meet health standards for consumption. With the exception of some fish in the Big River and sturgeon in general, fish in Missouri waters are suitable for consumption. The Missouri Department of Health recommends limiting consumption of fatty fish

such as catfish, carp, buffalo, drum, suckers and paddlefish from waters outside of the Ozarks to no more than one pound per week.

Drinking Water

All drinking water systems in Missouri monitor the finished-water supply. Finished water is water that has been treated to remove contaminants so it is safe for you to drink; it is the water that comes out of your EAO. Surface water in Missouri usually does not contain any water contaminants that are dangerous on a short-term basis, with the exception of possible pathogens, such as bacteria or viruses. Any water that is taken directly from the environment should be disinfected, and preferably filtered, before you drink it.

Almost all public drinking water systems in Missouri provide high-quality water. Some must provide significant and expensive treatment of raw water to reach that quality. Private well water is generally adequate; owners may want to periodically test their water quality because no government agency oversees private wells. No surface water or spring water should be consumed without proper treatment.

Swimming

Waters are determined safe for swimming by measuring the amount of fecal coliform bacteria in the water. High levels of fecal coliform bacteria can come from a variety of sources, including human waste, geese and duck droppings and other animal waste. Many agencies and some volunteers monitor for bacteria.

All Missouri waters that are managed for swimming are safe most of the time, excepting times of higher flow following rains. Swimming is not recommended during those times due to increased bacteria in water. Bacterial contamination is episodic in nature, and it is best to ask the specific lake or stream manager for current water conditions if you have doubts about the water's safety.



Swimmers take a dip in the clean, clear water of the Black River at Johnson's Shut-Ins State Park. DNR estimates there are 5,411 miles of rivers and streams used and protected for swimming in Missouri. Of those, 5,364 miles are considered safe for swimming.

Livestock Watering

In general, livestock are not as sensitive to contaminants as humans. Most water sources in Missouri provide adequate quality water for livestock. As with the use of any water supply, rain washing contaminants into the water or other sources of upstream contamination may render a particular source unsuitable at times. Bacterial contamination of livestock water supplies is possible where cattle access surface waters during rainfall or waters that may be contaminated. Livestock also may congregate in small pools and render the streams unfit.

Staff from the Water Pollution Control Program contributed to this sidebar.

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RESOURCES TO EXPLORE

Knob Noster State Park

by Theresa Ramsey



Hiking trails allow visitors to conveniently explore Knob Noster State Park's varied landscapes, including the Clearfork Savanna. Knob Noster, in Johnson County, is an example of how mined, timbered and overused land can be reclaimed for outdoor recreation (photo by Nick Decker).

In the 1930s, the federal government created the Montserrat National Recreation Demonstration Area to show how over-used, timbered and mined land could be reclaimed into useful recreation areas. Today, Knob Noster State Park shows how successful this project truly was. Located between Kansas City and Sedalia, this 3,567-acre state park offers visitors many opportunities for recreation, relaxation and enjoying natural and cultural features. With a campground, picnic area, hiking trails and lakes for fishing, Knob Noster State Park is a good spot for an afternoon or a week-long vacation.

To look at the park today, you may not realize the past misuse and abuse of its natural resources. Upon closer observation, you will notice remnant areas where the grass just doesn't seem to want to grow. These areas lack the topsoil to support vegetation. Look closely at the forest and you will notice stands of trees that are pretty

much the same age (second growth after timber harvesting). You may even notice a few old homesteads scattered throughout the wooded areas. These areas serve as reminders that how we use land can affect future generations. But today, Knob Noster State Park showcases how land can recover and become productive and useful again.

Savanna restoration areas, prairie demonstration areas, hiking and equestrian trails and fishing lakes are all things you can explore when you visit this park. To find out more about these features, make the visitor center your first stop. While at the visitor center, view the exhibits and displays upstairs and learn about the natural history of the park through hands-on activities downstairs. There are even live animals downstairs for your viewing pleasure. As you leave the visitor center, be sure to have a map in hand. This will aid you in finding the park's trails, camping and picnicking sites and fishing lakes.

Probably one of the most interesting areas within Knob Noster is the savanna restoration area. A savanna landscape is an area where prairie meets the forest. Within a savanna, you should expect to see trees scattered throughout a landscape with prairie plants carpeting the ground. There are two major restoration areas within the park that fit this description: Clearfork Savanna and Opossum Hollow Savanna. Wildflowers such as shooting stars, violets, milkweeds, blazing star, wild petunia and goldenrod carpet the ground in the spring, summer and fall. You can view the savanna from the Clearfork Savanna, Hawk Nest or Opossum Hollow trails. Some of wildlife in the savanna include woodpeckers, deer, turkeys, opossum, burrowing wolf spiders and ringneck snakes.

Within the prairie restoration areas, you can walk out among the tall grasses and imagine how it must have been for early settlers as they passed through the area. Keep your eyes open for interesting birds in the grassy areas, such as bluebirds and field sparrows. You can view the prairie areas from the Northloop Trail or by driving to the kiosk along the road to Clearfork Lake. Both of the park's savanna and prairie areas are burned periodically to enhance the growth of savanna and prairie species and to try to control some more invasive plants like honey locust and multiflora rose.

Buteo, Discovery and McAdoo trails will take you to different areas within the park to explore. Buteo Trail is one mile long and goes along the shoreline of Buteo Lake. Recent activity by beavers has caused Buteo Lake to extend into a marsh-like area that goes all the way to the roadway. This has caused the trail to no longer be connected as a loop unless you walk a little way onto the paved roadside. The Discovery Trail will take you by No Name Creek into the woods and bring you to the visitor center from the campground. The Discovery Trail forms a two-thirds mile loop and is a good trail to start out on because of its variety of habitats. Many people like to take this trail because of its variety of wildflowers and animal life. Jack-in-the-pulpit, spring beauty, wild garlic and several other wildflowers are abundant along the trail as well as skinks, tanagers and woodpeckers.



There are three open picnic shelters like this one that provide park visitors with a comfortable and accessible setting for outdoor gatherings (photo by Nick Decker).

The McAdoo Equestrian Trail is approximately seven miles long and can be used by hikers, non-motorized bicycles and horses. The trail takes you through bottomland forests with several creek crossings and upland stands of forest. Riders or hikers will travel through Christopher Woods, an area of forest that is probably the oldest stand within the park. These woods were not as heavily logged as the more accessible areas of the park.

While journeying along the trails, you may come across several ponds, a few wet-weather creeks, some old stone work or an old iron bridge that was from past land uses. The waterways serve as great breeding areas for salamanders, frogs and toads. Insect larvae like the dobsonfly and mayfly are abundant in these ponds.



There is one main creek within the park known as Clearfork Creek. Fish such as bluegill and catfish are common in the creek along with many different types of minnows. Other common creekside residents include beaver, muskrat, belted kingfishers and even great blue herons. A heron rookery is located along one remote section of the creek.

Lake Buteo and Clearfork Lake are popular areas for campers and community residents who visit the park to fish. Bass, bluegill, carp, sunfish and catfish are found in the lakes.

There are no boat ramps, so most anglers fish from the shore while others opt to carry non-gas powered watercraft to float to different lake areas.

The last area a visitor should make sure to see is the Pin Oak Slough Natural Area. This four-acre forested oxbow slough is recognized for its natural quality and has been designated a Missouri Natural Area. Dominant trees in this natural area include pin oak, silver maple, swamp white oak, bur oak, pawpaw and redbud. The Pin Oak slough area can be seen from the road to the primitive youth camp area or from the North Loop Trail in winter after the trees have dropped their leaves.

To help you take advantage of all the natural features, the park offers a campground with 73 shady campsites. The campground features both basic and electrical sites, along with modern restrooms, hot showers, laundry facilities and a dumping station. The campground is being renovated to make it accessible to people with disabilities. These improvements include making campsites accessible and building a new, accessible shower house.

To accommodate equestrian users, a special area has been designated for these campers. In addition to the regular amenities at campsites, these sites also offer hitching posts and a corral for horses. This area provides easy access to McAdoo Trail, which offers equestrian use.

Knob Noster also offers two organized group camps that may be used by non-profit organizations and youth groups. Camp Shawnee has accommodations for 150 campers and Camp Bobwhite has accommodations for approximately 165 campers. Facilities include sleeping cabins, a mess hall, modern restrooms, a swimming pool and courts for basketball and volleyball. Advance reservations are required for these group camps.

A primitive youth camp area also is available and features centrally located water and a pit latrine, along with a picnic table and fire grill at each site.

For visitors coming for a picnic, the park offers 75 sites. In addition, three open picnic shelters are provided. An accessible restroom and picnic sites are being added to the picnic area.

Knob Noster State Park, one of 80 state parks and historic sites operated by the Missouri Department of Natural Resources, truly is a natural treasure for visitors to enjoy. To enhance your visit even more, participate in naturalist-led hikes, or just relax in the evening by going to an outdoor nature program. At the park's amphitheater,



The majority of Knob Noster's 3,567 acres is covered by thick, second-growth forest (photo by Sheila Laird).

you can learn about plants, animals or the history of the park. Junior Naturalist hours are scheduled throughout the summer months for both children and adults to learn more about the park's resources. You can even receive a patch for completing the program. Naturalists are available to answer your natural history questions and to help you enjoy the park even more by providing these programs. Programs are offered on a regular basis from April through September and by special request during other months of the year. For teachers planning field trips to the park, programs are offered that tie into science topics, such as edible and useful plants, Missouri mammals, soils, insects and geology.

Special events are offered in the park, including an Easter Egg Hunt, spring wildflower events, "Mammal Mania," "It's a Bird's Life" and "Trees are Terrific."

To find out about the programs offered or to schedule a special program, contact the Knob Noster State Park naturalist at (660) 563-2463. For information on any state park or historic site, call the Department of Natural Resources at 1-800-334-6946. Persons with hearing impairments may call 1-800-379-2419 with a Telecommunications Device for the Deaf (TDD).

Theresa Ramsey is the naturalist at Knob Noster State Park, within DNR's Division of State Parks.

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LETTERS

The summer 1998 issue of Missouri Resources featured "A Look at the Lake" which included information on the Adopt-the-Shoreline program sponsored by AmerenUE at the Lake of the Ozarks. The Adopt-the-Shoreline program received numerous inquiries from Missouri residents concerned about maintaining a clean shoreline.

As a result of this article and an inquiry by the City of Warsaw, we have expanded the Adopt-the-Shoreline program past the 60 mile marker all the way to the Truman Dam. The City of Warsaw has agreed to adopt the shoreline below Truman Dam and another 20 miles of adopted shoreline has been added between the 61 mile marker and the 85 mile marker.

In early October 1998 approximately 450 miles of shoreline at the Lake of the Ozarks had been adopted by 67 organizations who twice a year commit over 500 volunteers to clean their adopted shoreline.

Thank you to Missouri Resources magazine for sharing the Adopt-the-Shoreline story with the residents of Missouri. Additional information about the Adopt-the-Shoreline program is available by calling 573-365-9310.

Colleen M. Jarvis
Coordinator
Adopt-the-Shoreline
Lake of the Ozarks

Thanks for your continued excellent choice of informative articles.

In the current issue (Fall 1998), I believe you have an error of fact. In the topographic article ("Missouri's All-Purpose Map") on page 13, top right hand paragraph, the scale references should be one inch to 65,000 inches (not feet) and one inch to 24,000 inches (not feet) respectively.

Thus the figures later in the paragraph (eighteen and one-half inches and twenty-two and one-half inches) really do correspond to seven miles and eight miles respectively, and 1:24,000 (page 15) means what it says – one unit on the map represents 24,000 units on the ground.

Granville White
Town and Country

Editor's note:

Our thanks go to Mr. White and several others who wrote or e-mailed us regarding the error.

Letters intended for publication should be addressed to "Letters," *Missouri Resources*, P.O. Box 176, Jefferson City, MO 65102-0176 or faxed to (573) 751-7749, attention: "Letters." Please include your name, address and a daytime telephone number. Space may require us to edit your letter. You can e-mail *Missouri Resources* staff at moresdnr@mail.dnr.state.mo.us

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NEWS BRIEFS

SRF expands loan offerings

The U.S. Environmental Protection Agency (EPA) has approved a Department of Natural Resources proposal to modify its State Revolving Fund (SRF) programs. Missouri now is the fourth state in the nation to benefit from this financial opportunity.

In Oct. 1998, Missouri's Clean Water Commission approved cross-collateralization of the Clean Water State Revolving Fund with the Drinking Water State Revolving Fund. The Safe Drinking Water Commission also approved the new concept.

Cross-collateralization means DNR can use drinking water revolving funds as security for bonds issued to finance wastewater projects. The clean water revolving funds also can be used as security for bonds issued to finance drinking water projects.

Initially, DNR will use clean water revolving fund repayments to secure drinking water revolving fund loans. This is expected to secure an AAA bond rating on the first drinking water revolving fund financing that is scheduled for Dec. 1998. This flexibility is expected to achieve and maintain low-interest rates on both revolving fund loans. These low rates benefit the users of water and wastewater systems.

For more information, contact DNR's water pollution or public drinking water programs at 1-800-361-4827.

Partners open park academy

The first session of the Joseph Jaeger Academy of State Parks recently was held at University Forest facility in Popular Bluff. The academy is an effort between the department and the University of Missouri's Department of Parks, Recreation and Tourism. It is designed to improve training and educational opportunities for employees within DNR's Division of State Parks.

Thirty-seven individuals attended the first week of the session and a second session is scheduled for March 1999. Each session is taught by division and University of Missouri staff. Three hours of graduate or undergraduate credit is available to participants upon completion of a special project following the program.

The academy is named for Joseph (Joe) Jaeger, the longest-tenured state park system director. Jaeger was instrumental in the evolution of the state park system.

Schools lower energy costs

The DNR Division of Energy recently awarded the North Kansas City School District a \$1.6 million loan for energy-saving improvements and upgrades in eight buildings.

The loans will be repaid over eight years at two percent interest and will save the district nearly \$200,000 in energy costs. "The money saved by this can be used for education needs such as books, equipment or supplies," said Anita Randolph, director of the Division of Energy.

An independent energy service company will perform the work at Oak Park High School, Maple Park and New Haven middle schools, and Chapel Hill, Chouteau, Clardy, Linden West and Topping elementary schools.

1973 energy crisis revisited

The winter of 1998 brings the opportunity to reflect on the 25th anniversary of the Arab Oil Embargo, an event that forever changed how Americans perceive energy issues.

The 1973 embargo by the Organization of Petroleum Exporting Countries (OPEC) was precipitated by the month-long Yom Kippur War that began Oct. 6, 1973. Syrian and Egyptian jets attacked Israeli positions in the Golan Heights, along the Suez Canal and in the Sinai desert. On Oct. 17, OPEC announced an embargo against the United States and the Netherlands because those countries supported Israel.

The cartel targeted the United States with successive monthly five percent supply reductions. By the time OPEC lifted the embargo on March 18, 1974, Americans had endured extreme price fluctuations, frequent shortages and rationed gasoline.

"Those of us who remember the event have vivid memories of prices skyrocketing and motorists waiting in long lines to purchase gasoline," said Anita Randolph, director of DNR's Division of Energy. "It was unnerving because Americans had never had to worry about their energy supply before."

Although a similar supply crisis appears unlikely in the future, many of the ingredients of the 1973 event still linger. The United States imports more oil today than at any time in its history, mostly from the politically volatile Persian Gulf region. Imports are expected to rise to 62 percent of U.S. consumption in the next 20 years. In addition, while OPEC's share of the world market initially dropped from a high of 55 percent in 1973, its share has steadily increased from a low of 30 percent in 1986 to 43 percent today.

The Division of Energy promotes the use of domestically produced fuels, carpooling programs and the installation of efficient home appliances. These measures can help consumers maximize their energy dollars and reduce dependence on foreign energy sources.

Call ahead for reservations

Beginning in 1999, it will be easier and more convenient to reserve campsites in Missouri state parks. Instead of having to reserve a campsite in January for anytime during the year, you can now make a reservation up to three months in advance of the planned date of arrival.

Also, you can now use credit cards for payment, so reservations can be made as late as 48 hours prior to your arrival.

The following 12 state park campgrounds accept reservations: Sam A. Baker State Park, Patterson; Bennett Spring State Park, Lebanon; Hawn State Park, Ste. Genevieve; Johnson's Shut-Ins State Park, Lesterville; Lake of the Ozarks State Park, Kaiser; Meramec State Park, Sullivan; Montauk State Park, Salem; Roaring River State Park,

Cassville; Harry S Truman State Park, Warsaw; Mark Twain State Park, Stoutsville; Washington State Park, DeSoto; and Watkins Mill State Park, Lawson.

Watch for more news about the improving campground reservation system in the future.

For information on state parks and historic sites, call the Missouri Department of Natural Resources toll free at 1-800-334-6946 or 1-800-379-2419 with a Telecommunications Device for the Deaf (TDD).

New inn and conference center opens

The new Roaring River Inn and Conference Center at Roaring River State Park near Cassville recently was dedicated. The new inn, which will be open year-round, features dining and lodging facilities as well as beautiful accommodations for conferences.



The new Roaring River Inn and Conference Center at Roaring River State Park near Cassville features modern dining, lodging and conference facilities, including this open lobby.

The inn, built of rustic wood and natural stone, includes 26 guest rooms, with eight of them featuring balconies overlooking the valley. There are two dining facilities: the Tree Top Grill is a full-service restaurant, while the Fishin' Hole Coffee Shop offers breakfasts, sandwiches and snacks. The inn's gift shop offers everything from crafts by local artists to an array of brand-name outdoor clothing and accessories.

The conference facility is made up of five separate meeting rooms. A complete line of services will be available to groups, including activity planning, technical equipment and a dance floor with sound system. A catering service also will be available to handle receptions, banquets and reunions.

GSRAD publishes water report

A new technical document is available for those who want basic information on Missouri groundwater. The well-illustrated, 210-page book is titled "Groundwater Resources of Missouri." It is volume II of a seven-volume series of technical reports being published by the department's Water Resources Program and is part of a comprehensive Missouri State Water Plan. It focuses on Missouri's seven groundwater provinces.

The document is available for \$14 postage paid from DNR's Geological Survey and Resource Assessment Division, P.O. Box 250, Rolla, MO 6540-0250. Orders also can be placed by calling (573) 368-2125.

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ONE LAST WORD

DNR Expands Regional Accessibility

by Connie S. Patterson

The rich diversity of Missouri's people is almost as broad as its varied landscape. Nearly every Missourian has different perspectives and needs related to protecting our environment. To help residents address local environmental concerns, the Missouri Department of Natural Resources (DNR) Division of Environmental Quality (DEQ) has six regional and seven satellite offices. Staff work daily with local natural resource issues and emergencies. The regional offices have been a part of the department since it was reorganized in 1974.

Satellite Offices

The satellite offices were established over the past several years to better serve citizens in Franklin, Jefferson, Lewis, Lincoln, Miller, Stone and Taney counties and in the Neosho and Joplin area. Most of the satellite offices are housed in a DNR state park or district office.

Regional and satellite office staff work to protect the quality of your air, land and water. They also seek to improve communications between citizens, policy makers and environmental professionals. Staff with different areas of expertise allow immediate access to many department services locally. They explain how local issues impact the environment. And, staff often translate Missouri's environmental laws and regulations into plain English for people. Then they provide technical assistance to the residents and businesses so they can begin to adapt to these laws and regulations.



In addition, staff inspect facilities and respond to calls and letters from citizens who are concerned about specific environmental incidents near their homes or businesses. Local DNR employees, who generally live in the same region they work in, can provide a good local perspective on regional issues in developing long-term solutions to environmental problems. Our goal is to help you help us protect your air, land and water.

District Offices

The department's Division of State Parks also reaches out with district offices in Festus, Brookfield, Lebanon and Boonville. These

Darryl McCullough, of DNR's Northeast Regional Office, responds to a citizen's complaint by taking a water sample from a road culvert (photo by Daniel Rethemeyer).

offices provide support for the state parks and historic sites and limited outreach and information to the general public.

To contact any Missouri state park or historic site, call 1-800-334-6946. To reach a DEQ regional or satellite office, call 1-800-361-4827. Readers also may call 1-800-379-2419 with a Telecommunications Device for the Deaf (TDD).

Connie S. Patterson serves as an information officer in the department's Division of Environmental Quality.

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Park Volunteers ... VIPs Only

by Sue Holst

photographs by Nick Decker

"They are the whipped cream on my strawberry shortcake, the chopped walnuts on my hot fudge sundae."

Earl Schuessler is not referring to his dessert, but his campground hosts. As superintendent at Lake of the Ozarks State Park, Schuessler is one of many staff members with the Missouri Department of Natural Resources (DNR) that uses and praises the volunteers that assist in state parks and historic sites.

Collectively known as participants in the Volunteers in Parks (VIP) program, these volunteers provide a wide range of services to the public and to the facilities themselves. Volunteers work as campground hosts, interpreters, park or site aides, and trail workers, as well as taking on a variety of other duties. Depending upon a volunteer's experience and preferences, duties can range from counting butterflies and handing out lemonade, to burning cedar trees and leading wild cave tours. The length of service can range from one or two hours a week to a full season.

In 1997, almost 680 volunteers worked more than 97,000 hours in state parks and historic sites. In addition, more than 1,250 members of scout, youth and civic groups, along with almost 2,400 people earning Junior Naturalist badges, contributed almost 19,500 hours of volunteer service. These totals continue a steady rise in the number of volunteers over the last several years.

But the statistics do not show the true impact of the volunteer program. That impact can best be illustrated by the grateful look on a camper's face when a campground host assists in setting up a new tent, or when a child begins to see the life of a Civil War soldier through the eyes of a volunteer interpreter.

"Volunteers help us provide a better service to the public. Although we have a talented and dedicated staff, volunteers give us that added 'extra' that help make the state park system a more enjoyable place to visit," said Douglas Eiken, director of DNR's Division of State Parks. "The bottom line is that volunteers have helped us make the Missouri state park system one of the best in the nation."

Although volunteers do a variety of different things, one of the largest and most visible



Participating in the Volunteers in Parks Program at Harry S Truman State Park provides Charlie and Louise Curry with an opportunity to help others that share their interest in camping and bird watching. The couple has spent eight summers as campground hosts at Truman State Park in Benton County.

retirement, they sold their home, purchased a recreational vehicle and told everyone to "catch us if you can." One place you can always "catch" them is at Sam A. Baker State Park, where they have returned for the last five summers because "we like it the best of all of the parks," according to Norman Owens.

In addition to the scenic setting, the Owenses like Sam A. Baker State Park because of the staff. "Campers are people wherever you go, but we get a lot of support from the park staff here," Owens says.

Owens describes a typical day as one where he and his wife pick up trash (as they walk each morning for exercise), check the campground, collect fees, check the bathroom, talk to campers, answer questions, and even help put up tents. But whatever the routine, campground hosts usually focus on people. "The people you meet here become friends that last a lifetime," Owens says.

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Helping people is one reason Jim Bell and his wife, Diana, decided to become campground hosts at Hawn State Park. "Being a campground host is the most rewarding job you can have. It feels good

groups is the campground hosts. In return for a free campsite, these campers become the live-in "hosts" for the campground, performing duties that range from collecting fees to assisting campers and answering questions. Although they have assigned duties, park superintendents report that most hosts go way beyond expected requirements.

A four-week consecutive stay is required; some campground hosts stay the entire season at one park while others move around from park to park. Some campground hosts volunteer full-time, moving from park to park and state to state throughout the year.

Such is the life of Norman and Nancy Owens, who have served as campground hosts in Georgia, North Carolina, Virginia, Kentucky and Pennsylvania. After

helping people," Bell says.

Having a disability has made Bell sensitive to the needs of other people. Although the park campground has been renovated to make it accessible to people with disabilities, some people still have difficulty making it to the amphitheater, which is located on a hill. Bell makes a point of offering transportation with his golf cart so others can attend amphitheater programs.

Like the Bells, one of the reasons Charlie and Louise Curry decided to become campground hosts was because of the pleasure they derive from helping others. They have spent eight summers at Harry S Truman State Park because they like the park and the people.

"We enjoy the trees and wildlife, we make new friends, we help people and we see all the new types of RVs," Louise Curry says. Their campsite also is a great place for her seven hummingbird feeders.

She admits that sometimes campers can be difficult to deal with. "My solution is this pin that I wear. It says, 'Don't yell at me – I'm just a volunteer.' When people see that, they usually laugh, and that always makes things easier," Curry says.

"Some campers make you feel good; some don't. Ninety-five percent of them are just wonderful," says volunteer Maureen Sailer. "There have been many occasions that campers have renewed my faith in mankind."

Sailer and her husband, Jim, have volunteered at Johnson's Shut-Ins State Park for approximately five years. But Sailer is an example of how a simple volunteer assignment can expand. The couple began volunteering as campground hosts, but for the past several years, she has volunteered for a variety of duties. This included helping with naturalist programs and prescribed burns, assisting with rescuing injured visitors, and working in the park office where she takes camping reservations, does paperwork and greets visitors.

Although campground hosts are the largest group of volunteers, people give of their time and talents in many different ways. For Penny Holtzmann of St. Louis, a fun weekend is one spent stacking and burning brush on a glade at Meramec State Park. Holtzmann and her friends from the St. Louis Chapter of the Sierra Club have been helping clear and restore glades and savannas in state parks for 11 years. The work may be hard, but the results are dramatic. After cedar and other brush are removed, native grasses and wildflowers can once again flourish on the rocky glades.

"Fires are fun; it's a great bunch of people to work with, and I've always loved wildflowers and natural history. It



Having a disability has not stopped Jim Bell from helping others at Hawn State Park in Ste. Genevieve County. He helps make the park even more accessible for people with disabilities by driving them in his golf cart to an amphitheater in a hilly area of the park.

just all comes together for me," Holtzmann says.

Holtzmann says it is incredible to see what a group of 15 people can do in two days when they have a goal. "This is something that would take park staff many hours to do, and they are already stretched thin," she says.

For Bob Eckhoff of Lexington, the appeal of volunteering is the chance to show school children what it would have been like to be a soldier during the Civil War. Authentically dressed as a Missouri State Guardsman, Eckhoff demonstrates the weapons and other equipment that would have been used during the war for school groups at Battle of Lexington State Historic Site. "I've even had kids ask if I was in the war," Eckhoff recounts.

This summer, Eckhoff built a coffin that was used in a special event at the site interpreting "the day after" the Battle of Lexington in 1861. A 12-year-old neighbor helped him, and now he has caught the reenactment fever.

Eckhoff says he and his wife, Sherri, first became interested in Civil War reenacting and volunteering as a way to do something together. Sherri is now a volunteer for tours at the site's Anderson House, which served as a hospital during the Civil War battle. "I enjoy doing this. It makes me feel good about me, and it has been good for us," Eckhoff says.

Many volunteers work together as a couple or see it as a family project. For the Walk household in Columbia, volunteering at Rock Bridge Memorial State Park is truly a family affair. Rick Walk volunteers as a leader of wild cave tours through Devil's Icebox, helps with scientific exploration and mapping trips through the cave and assists with special events. His wife, Diane, assists with naturalist programs, monitors trails, plants wildflower seeds, organized a reference library and helps with special events. This year, their son, Mike, did an Eagle Scout project by installing four benches along park trails.

Diane Walk recently took on the responsibility of setting up and coordinating a butterfly count for the park. She began the project because she was interested in the subject and she knew the park did not have enough staff to do it. Walk and her volunteers count butterflies four times a year and keep track of their findings for the park.

"Help is definitely needed out there, and we were looking for something to do outside as a family," Walk explains about their reason for volunteering.

Ken Jones of Rocky Mount also realized there was more to be done at St. Joe State Park than park staff could adequately do. So he and his friends formed the Friends of St. Joe and Finger Lakes State Parks. Jones and his co-members, including Gary and Diane Horn and Larry Hendricks of St. Louis, have taken responsibility for maintaining St. Joe's off-road vehicle trails.

Several years ago, the group applied for and received a federal grant from the National Recreation Trail Fund to buy equipment to maintain the trails. This summer, the group received another National Recreation Trail Fund grant for use on the trails.

Jones says he began the volunteer effort because he loves to ride the off-road-vehicle trails and he knew that the park did not have all the resources needed for proper maintenance. "We use the trails; we know how they need to be maintained and we know what has to be done," Jones says. The next logical step for the group was to help maintain the trails. With chain saws, shovels and rakes, the group spends several weekends a year clearing and maintaining the trails.

St. Joe State Park is not the only park to benefit from volunteer trail work. At Crowder State Park, the Green Hills Trail Association has helped maintain and develop a trail system, while other efforts have helped at Thousand Hills and Castlewood state parks.

One of the largest trail volunteer efforts has helped develop the Ozark Trail. When completed, the Ozark Trail will follow the most scenic route from the St. Louis metropolitan area through the Ozarks of southern Missouri to the Arkansas border where it will eventually connect with the Ozark Highland Trail. Today, approximately 300 miles have been completed, with several sections located in state parks. The trail is a reality because of the efforts of the Ozark Trail Council, which is made up of state and federal agencies, landowners, land managers and trail users. Much of the work for building and maintaining the trail came from volunteers.



Volunteering at Rock Bridge Memorial State Park in Boone County has become a rewarding activity for Diane Walk and her family. Diane coordinates the park's butterfly count, husband Rick leads cave tours and her son Mike helped improve park trails by installing benches.

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This summer, the volunteer effort received a substantial boost from a \$50,000 grant from the National Recreational Trail Fund to the Conservation Federation of Missouri. The grant will be used to establish Ozark Trail Teams and a coordinator of volunteers, Nicki Aberle, has been hired. According to Aberle, the goal of the Ozark Trail Team effort will be to organize volunteers to help maintain trail sections.

Another trail that has benefitted from volunteerism is Katy Trail State Park. This 185-mile long hiking and bicycling trail follows the former corridor of the Missouri-Kansas-Texas Railroad from St. Charles to Sedalia and eventually to Clinton. Although volunteers have helped for several years, an organized effort was launched this year, says Wallace Keck, district naturalist for DNR's Missouri River District, which oversees the trail.

Since March, more than 150 people have expressed an interest in being a volunteer for the trail. Sixty of these volunteers have finished training as park aides, and 35 have completed more advanced training as members of the Trail Watch program.

Trail volunteers have provided various services this season, including greeting visitors at trail heads, answering questions, providing water and lemonade to trail users, monitoring the condition of the trail, helping produce a volunteer newsletter, assisting with special events and even painting a maintenance building.

Trail Watch program participants monitor the trail itself, helping to provide safety and security to users. This program also showcases another type of volunteer service to the state park system – numerous businesses along the trail have become involved by agreeing to keep and check out cellular phones and identifying vests to volunteers who need them. The cell phones and vests used by the Trail Watch participants were donated by United States Cellular Wireless Communications in an agreement with the Department of Natural Resources. The businesses along the trail also have provided other services such as training on bicycle maintenance and repair.

"These volunteers greatly increase our visibility on the trail, and this helps users feel safe," Keck says. With four rangers responsible for covering 185 miles, staff cannot be in all places at all times.

The volunteers also have helped complete special projects. This summer, volunteers completed a survey of trail users as part of a larger study being completed in state parks and historic sites throughout the state. "This was a very time-consuming project, and it would not have been possible for us to complete without volunteer assistance," Keck says.

Whether it is handing out information, helping visitors find a campsite, or cutting brush to clear a trail, volunteers can fill a need that already exists or create a role that fits their interest and experience.

The benefits from the volunteers are obvious for the state park system, but many volunteers say the experience is a "win-win situation," benefiting them as well. "Volunteering is a way of giving back something when you have the means to do it," summarized Sailer about her volunteer experience at Johnson's Shut-Ins State Park.

For more information on volunteering in the state park system, contact the state park or historic site you are interested in working with, or call the department toll free at 1-800-334-6946, or 1-800-379-2419 with a Telecommunications Device for the Deaf (TDD).

Sue Holst is the division information officer for DNR's Division of State Parks.

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RESOURCE HONOR ROLL

Students from John Burroughs School in Ladue were chosen as one of 12 finalist teams in the highly competitive 1998 National Science Teachers Association/ Toshiba ExploraVision Awards Program. The team's hypothetical project was selected from more than 5,000 entries that represented 17,000 students in the United States and Canada. Asked to envision what a form of technology would look like 20 years into the future, eighth graders Anita V. Devineni, Eric W. Hirsch, Jonathan S. Pollock and Catherine A. Whyte presented, "Quack – The Duckweed Paper." Organizers said that the student competition serves as a platform for science and technology projects that could improve our lives in the future.



ExploraVision finalists from Ladue's John Burrough's High School

The students hypothesized how to remove a cellulose gene from a cotton plant and insert it into the common duckweed plant. This would create a new subspecies that easily would grow in ponds and lakes in temperate regions. The plant would mature fast and could be harvested every two to three weeks. Its roots should yield enough cellulose to produce high-quality paper. Thus, duckweed could be used as an alternative to harvesting trees for paper products. The students' research also discovered that the plant could double as an excellent fertilizer. Each participant won a \$5,000 U.S. Savings Bond and was honored at an awards ceremony in Washington, D.C.

A team of young adults has pulled tons of trash from the Mississippi River during a major cleanup of the nation's largest and most historic waterway. Project organizer Chad Pregracke, 23, of East Moline, Ill., has gained nationwide recognition for his team's efforts to remove garbage and debris from the river. His crew is composed of two women and four men from the Quad Cities region of Illinois and Iowa. Even though others see him as an environmentalist, Pregracke prefers to call himself a "garbage man with a boat." In the spring of 1998, during a 300-mile journey from Grafton, Ill. to Hannibal, the group collected 60 tons of trash. The project is supported by corporate funds, mainly a \$20,000 grant from Alcoa Aluminum Co. In 1999, he plans to clean up the Illinois River and launch an Adopt-a-Waterway program that is similar to the popular, national Adopt-a-Highway program.



Chad Pregracke
(standing on refrigerator)

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REUSABLES

Design plans ready to fly

Design plans are now available for one of the most popular promotional items ever distributed by the department at its annual Earth Day celebration in Jefferson City.

Last April, during Earth Day '98 at the state capitol, birdhouses made from recyclable materials were given to more than 60 elementary schools that pre-registered for the event with the Department of Natural Resources. More than 600 people also registered to win one of the birdhouses (designed by DNR employee Bob Hentges) as a door prize at Earth Day.



Missouri School for the Deaf student Trudie McNece helped classmates decorate one of the birdhouses. (Photo by David Kelly)

Since then, Earth Day organizers have received many requests from parents and teachers for recycled birdhouse blueprints. Most people will be able to build these nesting facilities easily using materials that can be found around the house.

To receive a copy of step-by-step written instructions complete with diagrams, please write to "Reusables," Missouri Resources, P.O. Box 176, Jefferson City, MO 65102-0176.



This birdhouse for bluebirds can easily be built using recycled lumber.

Missouri Resources Magazine

Winter 1998-1999

TEACHER'S NOTEBOOK

Dawn of the Envirothon

story and photos by Van Beydler

In April 1998, the first Missouri Envirothon was held at Shaw Arboretum at Gray Summit near St. Louis. Ten Missouri high school teams participated in the six-hour event. The event challenges students to solve problems related to soil, water, wildlife, forestry and conservation.

The program began nearly 20 years ago in Pennsylvania. Each Envirothon team is made up of students from classrooms, school organizations and after school clubs. "The goal of the Envirothon is to help teach high school students about the environmental conditions and how those conditions have an effect on each other," said Peggy Lemons, executive secretary of the Missouri Association of Soil and Water Conservation Districts. "The Envirothon increases the environmental literacy of the students."



An Envirothon team closely examines some of the aquatic life and insects found living in a pond. This experiment is an example of how the event sharpens the observational skills of students.

The high school students, through the use of several outdoor stations, experienced five different ecosystems and closely observed how the ecosystems interact with one another. During the Envirothon, students visited a pond to observe the diverse insect and aquatic life it supports, examined soil to determine its mineral content and observed a savanna to identify the varied plant life.

Students answered questions relating to the environment by using their observational skills, and making scientific and mathematical estimations. One eco-station had a microscope to magnify bugs. Other stations required students to think creatively, using tools like a protractor to make a homemade clinometer to measure tree angles and slopes.

Prior to the competition, the local soil and water district can be contacted to help the participating school with any assistance or guidance it might need. "The soil and water district also can request additional assistance from the Missouri Department of Natural Resources (DNR) or other agencies," said Lemons. "In fact, the district may need help to solve a problem they are facing locally. The team can address that problem and offer a solution as practice

for their project."



These students made a homemade clinometer using a protractor, drinking straw, tape and metal wire. Working together as a team, one student sights a tree through the straw while the other determines its angle of growth.

hard, along with a chance to have a fun day. "Our science club is a volunteer organization that meets after school hours," said Twillman. "In the past, the club formed a stream team, participated in the Science Olympiad and worked with elementary students. We've only been back to school for four days and the kids have already started working on plans for the next Envirothon." Science teacher Becky Teague, who chaperoned the team at last year's national competition, added, "The kids need to prepare physically as well as mentally. There is a lot of walking involved in the national event."

A guidebook, application form and video are being sent to every high school in the state to invite them to compete in the next Envirothon. "The first few years there will only be a statewide competition," said Lemons, "but a regional competition is planned for the future when more teams start to participate." The next statewide competition will be held April 21 and 22, 1999, near Columbia.

Sponsors for the pilot Envirothon included the Missouri Association of Soil and Water Conservation Districts, Missouri Botanical Garden, the Department of Natural Resources, Missouri Department of Conservation, Missouri Environmental Education Association and University of Missouri – School of Natural Resources. DNR employees from the Soil and Water Conservation Program serve on the steering committee to give guidance and provide workers to help coordinate the event.

Teachers, students or parents wanting more information about the Envirothon may call Peggy Lemons at (573) 761-3105.

Van Beydler is a division information officer representing the department's Division of Environmental Quality.

Part of the statewide competition includes an oral presentation about a current topic. "All teams address the same topic during competition," said Lemons. "Each team can use items such as posters for its presentation to the panel of judges." The team has 10 minutes to present its solution to the problem statement. The panel has five minutes to question the team on aspects of its presentation. The team is judged on the quality of its presentation and its overall understanding of the various environmental, scientific, social and economic issues involved.

The team from St. Charles West High School, with members Nicole Durfee, Jeff Cook, Angela Powers and Van Hoang, earned the right to advance to the national competition in East Lansing, Mich. The students had an opportunity to win up to \$2,500 each in scholarships at the national level. The Missouri team placed 33rd out of 44 teams.

St. Charles West team advisor and science teacher Joan Twillman thinks the Envirothon gives students an opportunity to get rewards for working