MISSOURI
resources
Summer 2000 • Volume 17 • Number 2

table of contents
Missouri Department of Natural Resources

Above right: A fistful of wrigglers offers lessons in waste management.
Above: Wonders of the Outdoor World participants learn to maneuver kayaks on Table Rock Lake.

Cover: The Colosseum Trail at Ha Ha Tonka State Park passes beneath a natural rock bridge before winding its way to the giant sinkhole from which it takes its name. The trail offers views of limestone bluffs where Missouri wildflowers bloom from the cracks and crevices.

MISSOURI resources
Summer 2000 • Volume 17 • Number 2

To Catch A Thief

by Jim Muench
photographs by Nick Decker

A noise startles you out of a deep sleep. In the darkness, you slink stealthily toward the intruder, preparing to attack with the aluminum baseball bat you keep in the closet. Sneaking up behind the thief in your kitchen, you raise the bat and prepare to swing.

Suddenly, from behind, your wife screams, "Don't hit the refrigerator!"

Yes, the noisy thief in your kitchen is your reliable old refrigerator, stealing your hard-earned money by the minute. But there's no need for violence. This thief can be stopped by more civilized means, mainly by considering energy efficiency when purchasing appliances.

Allowing dishes to air dry helps reduce the amount of energy needed to run a dishwasher. For most efficient use, make sure the dishwasher is full, but don't overload it.

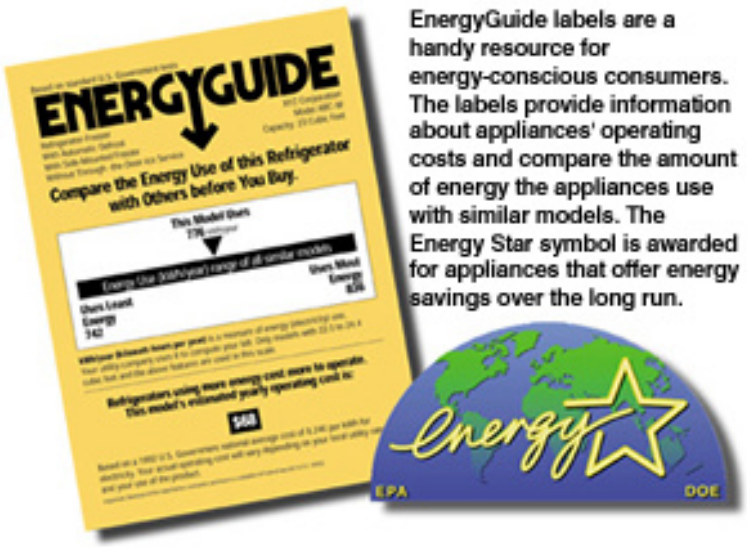
According to the U.S. Department of Energy, Americans spend on average a little more than $1,300 a year in energy to power their homes. About 20 percent of the energy used in the United States is consumed in the home. Heating and cooling account for 46 percent of the energy used in homes. Lighting demands 12 percent. The remaining 42 percent of home energy is consumed by appliances and your water heater, which works in tandem with some of your major appliances. Your refrigerator is your biggest energy-guzzling appliance, consuming nearly as much as your air-conditioning system.

The number of appliances in the home exploded in the second half of the 20th century, partly due to the ready availability of cheap energy between 1945 and the early 1970s. Today's homes sport many more gadgets than previous generations would have thought possible. Luckily, recent gains in technology and newer national efficiency standards mean that almost any new appliance you buy today will be substantially more efficient than those purchased in previous decades. However, it is still wise to think about the energy efficiency of your appliance purchase, both to maximize long-term savings and to help the environment.

So how do you stop that energy thief? For starters, look for appliances that carry the Energy Star label, a certification program sponsored by the U.S. Environmental Protection Agency and the U.S. Department of Energy. You can avoid 30 percent of your home energy waste by purchasing efficient Energy Star appliances, according to the Alliance to Save Energy.

"When you buy an appliance, you pay for a certain amount of energy every time you turn it on," said Anita Randolph, Missouri Department of Natural Resources' (DNR) Energy Center director. "The Energy Star label lets you know that the appliance will save you money over its lifetime. You may pay a little more up front, but the investment is worth it, rather than paying more for electricity over the life of the appliance."

Another important and often overlooked source of information is the EnergyGuide label, required on many major appliances since 1980 by the Federal Trade Commission. The labels do not report which appliance is most efficient, but they tell you the annual energy consumption and operating cost so you can compare models for yourself. The labels also point out the average amount of energy the model uses and how that consumption compares to similar appliances.



EnergyGuide labels are a handy resource for energy-conscious consumers. The labels provide information about appliances' operating costs and compare the amount of energy the appliances use with similar models. The Energy Star symbol is awarded for appliances that offer energy savings over the long run.

Experts suggest that you view the purchase of a new major appliance as you would the purchase of a new car. In some ways, the

purchase price is the down payment, and the cost in energy over 10 or 20 years is the rest of the bill.

In addition to saving money, you help the environment when you purchase an energy-efficient appliance. Every time you turn on an electrical appliance, your local power plant burns fuel, usually coal or natural gas, to generate the electricity to run the device. The burning of such fossil fuels generates emissions that pollute the air and may contribute to climate change. In 1995, the average American home used about 10,000 kilowatt-hours of electricity, thereby sending 77 pounds of sulfur dioxide, 47 pounds of

nitrogen oxides and 13,000 pounds of carbon dioxide into the atmosphere. This quantity of carbon dioxide is roughly equivalent to the amount produced by a mid-sized sedan in a year.

In general, it is always a good idea to begin shopping for a major appliance before it breaks down. That way, you know what features you want. When the appliance eventually does fail, you will not be as pressured to purchase a replacement you may be unhappy with later.

A wise man once said that technology is the science of arranging life so that one need not experience it. If so, energy-efficient technology is a wise investment; it allows us to use our money for experiences we really want, rather than wasting it on energy we don't need.

So take the civilized and prudent course. Invest in energy-efficient appliances. You will sleep better knowing your money is safe from that noisy energy thief.

Jim Muench is a former division information officer for the Department of Natural Resources Energy Center.

MISSOURI
resources
Summer 2000 • Volume 17 • Number 2

Comments from the Director:

You may have heard about a chemical called MTBE or Methyl Tertiary Butyl Ether recently. MTBE has been commonly used as a gasoline additive since 1979, when it was used to replace lead. MTBE reduces engine knocks and helps gasoline burn cleaner, reducing the levels of carbon monoxide and air toxics emissions.

While MTBE can help our air stay cleaner, it's not always beneficial for our water quality. MTBE can enter water through gasoline spills, storage tank leaks or two-cycle engines on motorboats and other watercraft. It travels through groundwater faster than the other components of gasoline and does not readily break down.

There are a total of 17 sites statewide where MTBE has impacted drinking water supplies. Two of Missouri's 2,700 active public water systems were impacted; these are now hooked to new wells. The remaining 15 sites are private wells where alternative sources of water have been identified, new wells have been installed or other solutions have been found.

Missouri is only one state struggling to solve the MTBE issue. In April, Gov. Carnahan issued an Executive Order insisting that Congress and the U.S. Environmental Protection Agency address this problem because they have the responsibility to do so. The governor has taken a strong stand on MTBE in the state of Missouri and has directed that we must push forward in our efforts to ban MTBE and ultimately phase it out altogether over the next few years.

Another water issue we're working on right now is protecting the quantity of water in the Missouri River. We're protecting this quantity for all water uses in the lower basin. I do not want to see any special interest group sacrifice one use of the river for another.

We have been intensely involved in negotiations with the eight other

states in the Missouri River Basin as well as with several federal agencies and local constituency groups to develop potential changes to the Missouri River Master Manual. This document is used by the U. S. Army Corps of Engineers to manage the mainstream reservoir system. It is very important that I continue to hear from the stakeholders in our state so I can represent our issues. The process for revising the Master Manual must remain open and inclusive. Sound technical decisions must be based on good science. Those of you who know me know that I have worked hard to keep this agency, and our processes, open to public input. This issue is no different. I intend to insist that Missouri's priorities continue to be addressed.

As of April 1, 2000, the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers entered into a formal consultation process to develop a biological opinion to address the needs of the endangered and threatened species in the Missouri River Basin. The Corps is anticipating it will release a draft Environmental Impact Statement this fall that identifies recommended changes to the manual.

We have submitted significant technical information to be considered in the formal consultation. We want to participate openly in the discussions about endangered species and sincerely believe that we can enhance habitat for recovery of these species while not jeopardizing Missouri's interests.

If you would like more information about MTBE or about the Missouri River, please contact the department at 1-800-361-4827 or visit our Web site at [www.dnr.state.mo.us].

MISSOURI resources
Summer 2000 • Volume 17 • Number 2

ENVIRONMENTAL notes

Creature Comforts

Water Gardens Provide Habitat for Frogs and Flowers

If swapping some lawn-mowing and weed-eating chores for lower-maintenance landscaping sounds appealing, consider a water garden. Water gardens can provide an ecologically balanced habitat for plant and animal life, an attractive focal point for the yard and relaxing white noise to quiet urban clamor. Water gardens attract birds, frogs, toads and other animals seeking a drink, a place to cool off or even a warm-weather home.

Proper planning is key to creating a healthy habitat:

- Determine how much room is available. Small yards, decks and patios can accommodate container gardens. Larger yards may lend themselves to excavated ponds constructed with flexible or pre-formed pond liners.
- Choose a location that offers several hours of sunlight, but also provides shade during hot afternoons.

Next, determine what types of plant and animal life are desired to enhance your garden:

- Plants help keep ponds free from algae, supply oxygen and absorb carbon dioxide, offer shade

for fish and serve as landing pads for frogs. Options include submerged varieties of plants such as anacharis, floating water lilies and water's edge vegetation like cattails.

- Goldfish, snails and tadpoles add color and movement beneath the surface.

For complete water garden construction plans, contact your local building or gardening supply store, do-it-yourself center or landscaping company.

Source: Missouri Botanical Garden

MISSOURI resources
Summer 2000 • Volume 17 • Number 2

Letters

As I read in Mr. Mahfood's "Comments" that he and his staff had the media outlets' cooperation to tell the public the five Ws and how of the G. C.A.P. (Gateway Clean Air Program),

I expected to read, "see page ... for details," but was greatly disappointed not to. I was curious as to why *Missouri Resources* chose not to give the details to its readers. I can't believe lack of space was a problem - especially when five pages covered building rehabilitation. Though this is an admirable project, I don't classify buildings as a "natural" resource.

If the G.C.A.P. details require more than one page of space, they are too complex. April 5th (Mr. Utt refers to the official start date for the program in the St. Louis area) is only five days away from my receipt of MR, making the G.C.A.P. details more timely in importance than building rehab.

I feel you missed the boat this time. My eyes and ears are not glued to all the possible media outlets all the time, but I have not seen or heard, as yet, any of the G.C.A.P. details.

Fred M. Utt
Hazelwood

Editor's Note:

As a quarterly publication, MR *cannot always provide the most up-to-date information available on the diverse and often complex issues DNR is involved with. We do, however, strive to offer clear updates on long-range plans, such as the Gateway Clean Air Program. Our Spring 1999 and Spring 2000 issues have included a feature story and news brief update on this program. A feature story also is scheduled for our fall*

issue.

Our agency director serves as the state historic preservation officer, and DNR houses the state's historic preservation program.

We continue to enjoy your magazine, *Missouri Resources*. The Winter 99-00 issue was especially informative. We have lived in St. Charles for 40 years, so it is "home." The article by David Klostermeier on First State Capital was very much appreciated and informative. I attended the big re-opening in 1971.

I have already ordered and received two sets of the GSRAD trading cards (Teacher's Notebook, "Deal of the Century") to give to our 11-year-old granddaughter, a fifth-grader who loves any study on geology, rocks, fossils, etc.

Last, but not least, the article on Bootheel politics by H. Dwight Weaver was just excellent. Even though I was born and raised in the Bootheel, this was something we never studied in school. I made copies and sent to my siblings and other family members. It was amazing how one man had such an impact on what was to become the Bootheel.

Keep up the good work in all you and your department do for our beautiful state of Missouri.

Linda S. Warnhoff
St. Charles

We thoroughly enjoy *Missouri Resources* and read it from cover to cover. I was really impressed with the information on the Gateway Clean Air Program for St. Louis and surrounding counties. Does Springfield have anything like this going for them?

Robert L. Holderby, Sr.
Springfield

Editor's Note:

Springfield air quality currently meets federal clean air standards. These standards are the basics for determining where air quality control measures are required to ensure healthful air for Missourians.

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 daytime phone number. Space may require us to edit your letter. You also can e-mail Missouri*

Resources staff at moresdnr@mail.dnr.state.mo.us

MISSOURI
resources
Summer 2000 • Volume 17 • Number 2

News Briefs

Water Use Report for NE Missouri

The Missouri Department of Natural Resources (DNR) Geological Survey and Resource Assessment Division has released the first volume in phase two of the State Water Plan series of reports. It is titled "Topics in Water Use: Northeastern Missouri."

This 79-page report explores current issues and problems facing the water resources of northeast Missouri in domestic water use, industrial and commercial use, public water supply, agricultural water use, water use in power production and instream flow uses. It also addresses regional water-use opportunities.

"Topics in Water Use: Northeastern Missouri" is available for $5.50 postage paid from DNR's Geological Survey and Resource Assessment Division, P.O. Box 250, Rolla, MO 65402-0250. Orders also can be placed by calling (573) 368-2125.

$52 Million Authorized for Water Projects

The Environmental Improvement and Energy Resources Authority (EIERA) has authorized bond financing through the State Revolving Fund (SRF) to fund drinking water and wastewater facilities projects.

The cities of Boonville, Hallsville, Jackson, Marceline, Perryville and the Camden County Public Water District received $19,640,000 for drinking-

water projects. Wastewater system improvements for Boone County Regional Sewer District, and the cities of Bourbon, Buffalo, Farmington, Kansas City, Kimberling City, Platte City and Rolla received the remaining $33 million.

The SRF is a perpetual loan program operated by DNR with EIERA acting as the bond issuer. The SRF provides subsidized, low-interest loans to construct and improve drinking water and sewer systems.

Air Conservationist of the Year Named

The Conservation Federation of Missouri named John Young, director of DNR's Division of Environmental Quality, the 1999 Air Conservationist of the Year. Young was nominated for personally directing one of the most contentious environmental cleanups in the United States, Times Beach.

Young became involved in Times Beach in the mid-1980s. His leadership assured that the cleanup moved forward and that disagreements were resolved for the benefit of the environment and the state. He directed DNR staff through the process of collecting and destroying more than 265,000 tons of dioxin-contaminated soil from eastern Missouri. The soil then was incinerated with an overall dioxin destruction efficiency of 99.9999 percent. Dioxin is an environmentally persistent cancer-causing substance, a by-product of chemical manufacturing and incomplete combustion. The incinerator was shut down in 1997, disassembled and removed as promised. The site since has been converted to the Route 66 State Park.

"I am honored to have been nominated and chosen for such a prestigious award," Young said. "The Times Beach cleanup would not have been such a success if not for the dedication of the DNR staff." A trophy was presented to Young in March at the Conservation Federation of Missouri's annual awards banquet at the Lake of the Ozarks.

Open Burning More Dangerous

Burning household trash can produce higher levels of certain toxic chemicals than a well-controlled municipal waste incinerator burning the trash from tens of thousands of homes, according to a U.S. Environmental Protection Agency (EPA) study.

Because of lower combustion temperatures and oxygen-starved conditions, open burning of household trash can produce chemicals such as dioxins and furans, and levels of particulate matter 40 times higher than an incinerator. Inhaling particulate matter can cause difficulty in breathing, damage lungs and aggravate existing respiratory or cardiovascular illness.

DNR restricts open burning in all areas; however, regulations are stricter in the metropolitan portions of St. Louis and Kansas City. Open burning of any waste generated by a business, trade or industry and any demolition is strictly prohibited.

DNR also prohibits open burning of waste oil and tires. Burning tires produces heavy smoke that contributes to the formation of haze. The carbon monoxide produced causes dizziness, light-headedness, headaches, fatigue and weakness. Known carcinogens such as benzene also are released into the air when tires are open burned.

Open burning of trees and other vegetation from land clearing is also limited. It is allowed in out-state areas only if the burning takes place outside the city limits and at least 200 yards from the nearest inhabited dwelling.

Your local Solid Waste Management District can work with you to develop a cleaner alternative, such as waste reduction, recycling or composting. For more information on alternatives to open burning, call DNR's Solid Waste Management Program at

1-800-361-4827 or (573) 751-5401. For more information on open burning restrictions, call DNR's Air Pollution Control Program at 1-800-361-4827 or (573) 751-4817.

Gasoline Prices to Decline (a little)

The U.S. Department of Energy forecasts the national average price for unleaded gasoline will decline steadily to $1.39 by September, but the

average price this summer is expected to be 25 percent higher than last year.

"We've probably seen the last of the abnormally low gas prices we saw in the spring of 1999," said Anita Randolph, director of the Missouri Department of Natural Resources' Energy Center. "Although prices may moderate from today's levels, consumers should expect gas prices that are higher than those of last spring. In the long run, with rapidly growing economies in developing countries, demand for fuel around the world is unlikely to decline."

The Energy Center suggests diversifying energy choices through greater use of alternative and domestic fuels, which help the environment, reduce our dependence on foreign oil and may stabilize demand.

Workable alternatives include such fuels as electricity, propane, compressed natural gas, ethanol, methanol, liquefied petroleum gas, soy diesel and gas-electric hybrid vehicles. Within a few years, fuel-cell cars that will vastly reduce or eliminate emissions and increase fuel efficiency should be available.

$50,000 Awarded to St. Louis Firm

Organic Resource Management, Inc. (ORMI), a St. Louis company, has received $50,000 from the Missouri Market Development Program to purchase a soil pulverizer. The soil pulverizer will allow ORMI to expand its composting and organic product operation and produce premium soil mixes. ORMI also is involved in a cooperative effort with St. Louis County to develop a state-of-the-art materials recycling center.

The Market Development Program, which operates under the Environmental Improvement and Energy Resources Authority (EIERA), provides technical and financial assistance on a statewide basis to promote recycling markets and recycled-content products.

Trek Celebrates Tallgrass Prairie

You have the opportunity this summer to participate in a 565-mile march, called the Lek Trek, across what is left of Missouri's tallgrass prairie. A lek is an assembly area where prairie chickens engage in courtship rituals. Along the way, participants will visit some of the

state's best prairies and explore three of Missouri's state parks.

Sponsored by the Missouri Prairie Foundation, Lek Trek will begin July 21 at the Iowa state line near Hatfield in Harrison County. On Sept. 22, a second group will begin its march at the Arkansas state line near Southwest City. Each group will travel through 16 communities and encounter educational and fun-filled activities along the way. The finale will be Oct. 14 for the annual Prairie Jubilee at Prairie State Park near Liberal in Barton County.

Part of the route will include portions of Katy Trail State Park from just east of Windsor to Green Ridge, and then again from Calhoun to Clinton, as naturalists share their knowledge of prairie species and ecology. On Sept. 2, Knob Noster State Park near Knob Noster will offer prairie field tours, pioneer storytelling and presentations on prairie wildlife and wildflowers.

On Oct. 14, walkers from the north and south will meet at the southeast corner of Prairie State Park and walk the last five miles of the Lek Trek across Missouri's largest remaining tallgrass prairie to the park's visitor center. Here, Prairie Jubilee will end the trek with festivities including 1850s dancers, crafts, pioneer storytellers and hands-on activities.

For more information, visit the Web site at [www.lektrek.org].

State Watersheds Conference Slated

The Missouri Department of Natural Resources' Division of Environmental Quality has scheduled a conference to showcase watershed management and water-quality issues in Missouri. The conference will be held Sept. 8 and 9 at Marriott's Tan-Tar-A Resort at the Lake of the Ozarks. Exibitors looking for information about the display portion of the conference may call 1-800-361-4827 or (573) 536-6627. For information about attending the conference, call 1-800-361-4827 or (573) 751-6721.

Annual Earth Hero Award Winner

This year, Springfield's Dickerson Park Zoo recognized Barbara Lucks as its first annual "Earth Hero." The award honors individuals and organizations that strive to preserve our natural heritage. Lucks was the driving force behind Springfield's Earth Day events this past April. The

events, which were attended by approximately 2,300 people, focused residents' attention on protecting and preserving our natural resources. Lucks also organized the Springfield chapter of Choose Environmental Excellence, a statewide program helping businesses learn how to start environmental programs and providing recognition for those who do. Lucks also volunteers with Ozark Greenways, the Missouri Environmental Education Association and the Missouri State Parks Association.

Observation Well Network Expanded

For nearly half a century, the department's Geological Survey and Resource Assessment Division (GSRAD) has operated and maintained a network of groundwater-level observation wells statewide. The wells are equipped with recorders that measure the distance from land surface to the water level in the wells. Water levels in wells and groundwater aquifers change in response to various natural conditions, such as drought and rainfall, and respond to pumping by both private and municipal water supply wells.

The observation well network is the state's most effective tool for monitoring the quantity of water available from the state's major aquifers. Initially, the network consisted of 20 wells, but by the early 1990s had grown to about 50.

In 1999, the Missouri Legislature approved an expansion of the network resulting in the purchase of new equipment to replace the system's aging recorders and funding for the drilling of at least 15 new wells.

The new recorders use a float mechanism that translates the data into a computer-compatible format. Instead of this information just being stored internally in the recorder, it also is transmitted back to the office via satellite. Technicians no longer must visit each well to gather groundwater-level information. This data will soon be available on the GSRAD's Web site.

Water Resources Program employees are drilling the new observation wells and installing new recorders. They expect to complete the expansion program by the end of the year.

MISSOURI resources
Summer 2000 • Volume 17 • Number 2

One Last Word

Passport to Discovery

by Sue Holst

Passport – The word itself inspires thoughts of adventure, fun and discovery. This summer – and for the next five years – you can have all kinds of fun and adventure right here in Missouri by participating in the State Park Millennium Passport Program.

The Missouri Department of Natural Resources (DNR) began the passport program in 1995 as a way to invite new visitors to Missouri state parks and historic sites and to encourage repeat visitors to explore different or lesser-known parks and sites. The program has proven successful beyond original expectations, with thousands of participants.

This spring, a new passport program was unveiled that has several major variations from previous programs. The new souvenir passport booklet features color photographs of state parks and historic sites and includes an area for visitors to record trips. Combined with a full-color souvenir booklet that can be purchased, the passport serves as a journal of their experiences.

The passport booklet can be used by families or individuals for five years, and, continuing a theme from previous programs, a full-color commemorative

With the new passport program, visitors to Missouri state parks can document their travels and collect full-color souvenir stickers like these.

patch can be earned each year. Each year, the program will have a different theme: Family Fun (2000); Missourians You Should Know (2001); Geologic Wonders (2002); Missouri's Great Lakes (2003); and the Lewis and Clark Trail (2004 – in commemoration of the 200th anniversary of the Lewis and Clark Expedition). By visiting the 10 state parks and historic sites featured in the theme category for that year, you can earn the commemorative patch. Full-color souvenir stickers of the same parks and sites can be purchased each year.

Some people visit the same park or parks every year, never realizing that the park they pass on the way home also has some great resources to discover. As in past years, to earn a patch, you will need to visit some traditional favorites. In the millennium program, you also will be asked to visit some lesser-known parks. For example, many people visit Johnson's Shut-Ins State Park, but may not realize that nearby is Taum Sauk Mountain State Park – the highest point in Missouri and the state's highest wet-season waterfall. Exploring new parks and sites is one of the most rewarding aspects of the passport program.

Since it's inception in 1995, 1,720 people have completed the program, while tens of thousands have participated in it. Many have discovered new parks and sites or new aspects of familiar facilities. The program has also proven effective in enticing people to visit during the shoulder seasons of spring and fall when attendance is not as high. Many people find they enjoy visiting the parks and sites when fewer people are around.

Regardless of the season you visit, there is always something new to see and enjoy in Missouri state parks and historic sites. Passports can be purchased at any state park or historic site or by calling DNR toll free at 1-800-334-6946 (voice) or 1-800-379-2419 (Telecommunications Device for the Deaf).

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

MISSOURI resources
Summer 2000 • Volume 17 • Number 2

Resource Honor Roll


Ralph Manley

People should do more than appreciate what they have, they should make it better for future generations, according to Ralph Manley of Springfield. For Manley, real estate development is not just about building houses - it is about developing what he calls "happy places to live." During 54 years as the owner of a residential real estate development firm, Manley has earned a reputation for attending to the needs of the environment while contributing to the economic well-being of the community.

Manley has constructed more than 2,000 homes, 1,200 of them within 17 subdivisions he has developed. In all of the subdivisions, he voluntarily provided land for green spaces, parks and even schools. He also is proactive in addressing potential water quality concerns that may surface as a result of the proposed developments. He is known for providing plans to minimize the environmental impact of his developments, even before city officials raise such questions.

Manley preaches what he practices. He served on both the Springfield and Green County planning and zoning boards for a number of years. These days, he shares his conservation convictions through his membership in the Home Builders Association, his work on the Springfield City Council and as a member of the James River Basin Partnership, a grassroots group formed to halt the decline of the James River Watershed, which feeds Table Rock Lake.

As the director of the Air Quality Program for the American Lung Association of Eastern Missouri (ALAEM), Susannah Fuchs plays a critical role in supporting and promoting local and regional efforts to improve air quality in the St. Louis area. She and ALAEM are at the center of activity for the St. Louis Regional Clean Air Partnership (SLRCAP), a coalition of

industry, government and media groups formed to increase awareness of regional air quality issues and to encourage the voluntary reduction of air emissions.

In the summer, Fuchs and ALAEM coordinate SLRCAP's distribution of daily air quality forecasts and warnings for ground-level ozone (urban smog) and respond to hundreds of requests for information each week from citizens and the media. Her agency also serves as a clearinghouse for indoor air quality information. Recently, Fuchs has been involved in numerous public presentations, media interviews and educational exhibits to inform St. Louis area citizens about the Department of Natural Resources' Gateway Clean Air Program, the region's new vehicle emission testing program. Fuchs' untiring efforts have earned her wide respect from SLRCAP partners and among colleagues in the environmental community.

Susan Fuchs

MISSOURI
resources
Summer 2000 • Volume 17 • Number 2

Resources to Explore

Boone's Lick State Historic Site

by Michael Dickey

Silt and leaves clog the spring associated with the original salt works at Boone's Lick, reducing its flow from that of the early 1800s. *DNR photo by Greg Leech*

Boone's Lick, the site of an early 19th-century salt manufacturing industry, lies in the valley of Salt Creek in southwestern Howard County. At this location, several saline springs seep to the surface. Animals such as deer, elk and bison would gather at the springs and literally lick the ground in these spring areas to obtain the salt. In 1804, explorers Lewis and Clark reported the presence of many salt springs in the area that now comprises Howard, Saline and Cooper counties.

In pioneer times, salt was indispensable for preserving meat and tanning animal hides. The countryside around this salt lick was ideal for settlement and by 1810 had acquired the name "Boone's Lick Country." In addition to sources of much-needed salt, there was timber, wild game, fertile river bottoms for farming and the Missouri River to serve as a water highway for commerce. For many years, the "Boone's Lick Country" was the primary destination of settlers moving west.

Famed frontiersman Daniel Boone is often credited with discovering the salt lick as evidenced by a red granite monument the Daughters of the American Revolution placed at the site in 1913. However, Nathan Boone made it clear in an 1851 interview that he and his brother, Daniel Morgan Boone, not their father, were associated with the salt lick. Nathan found the lick late in 1804 while returning from a hunting trip out west.

His account corresponds closely with an article that appeared in the Aug. 27, 1819, edition of the Franklin Missouri Intelligencer newspaper: "It is not true that the person who draws on him so much attention of these editors, ever lived in the tract of country vulgarly called 'Boon's Lick', or gave his name to it. About the year 1809, Col. Daniel Boone, junior, and Maj. Nathan Boone, sons of the old Col. B. made salt at some springs now occupied by Messrs. Becknell & Morrison, and from them these springs were called Boon's Lick: and from these springs, people as ignorant as those wise editors, have called by the name of Boon's Lick, the whole tract of country ... extending on both sides of the Missouri from the mouth of the Osage (River) to the western Indian boundary. ..."

The question of who first discovered the lick is moot. Evidence collected at the site shows that American Indians were hunting animals there at least 5,000 years ago. In 1797, the Spanish government in St. Louis granted James Mackay 400 arpents (330 acres) of land surrounding what would soon become known as Boone's Lick as a reward for mapping the Missouri River valley and allying Indian tribes to Spain. Mackay surveyed his land grant in December of 1804, although the U.S. government denied the claim for many years.

Early in 1805, Nathan and two Frenchmen tested the salinity of the water. They soon went into full-scale salt production with six to eight men tending one furnace and 40 kettles. On Dec. 10, 1805, James Wilkinson, governor of the Louisiana Territory, wrote to the secretary of war, "... and I have been info(rmed) that the salt works of a son of old Dan(iel) Boone, about one hundred and fifty miles up the Missouri have been broken up ... and I have also been informed that a party of bad men, have killed or carried away the cattle and destroyed the salt works of Boon." This was the first of a series of mishaps that would eventually lead the Boones to quit the operation.

Shortly thereafter, the Boones' partners, James and Jesse Morrison of St. Charles, entered actively into its day-to-day operation. The Morrison name would be associated with the Boone's Lick salt industry longer than any other would. They leased the spring from James Mackay and expanded the operation to two furnaces capable of handling 60 kettles each and employed 16 to 20 men in the operation.

Salt production was a labor-intensive project. Brine water was poured into kettles that held 30 or more gallons and heated on a stone furnace. As the water

A kettle used in the evaporation of salt brine is located on the walking trail that leads to the spring. *DNR photo by Greg Leech*

evaporated, salt crystallized in the bottom of the kettle. Approximately 250 to 300 gallons of brine water was required to obtain one bushel of salt. Approximately 25 to 30 bushels of salt per day were produced and shipped downriver to St. Louis where they sold for $2.50 per bushel.

In 1810, Daniel Morgan Boone sold his shares to Jesse Morrison. The threat of war with Great Britain and her Indian allies loomed in 1812. Nathan Boone was appointed a captain in the rangers and he disposed of his interests in the salt works. The Sauk, Fox and Ioway tribes viewed the Boone's Lick settlers as trespassers and the salt works was abandoned. When peace was made with the tribes in the summer of 1815, the Morrisons returned and found the salt operation had been destroyed.

Other noted Missourians were associated with the Boone's Lick salt works. William Becknell was a manager at the works and led the first successful trading expedition to Santa Fe, N.M., in 1821, earning him the designation, "Father of the Santa Fe Trail." Members of the Cooper family, the first white settlers in Howard County, helped manage the salt works. They were also known for bringing back the first mules, jacks and jennets from Santa Fe, helping lay the foundation of Missouri's renowned mule-breeding industry.

James and Jesse Morrison dissolved their partnership in 1827, leaving James in possession of "all the salt kettles and tools of every description at the Boon's Lick Salt works." Morrison advertised the salt works for sale in August of 1831. It is not clear when the property actually sold, but one more tragedy had yet to be played out. In 1833, Morrison's 16-year-old son, Joseph, fell into one of the boiling salt kettles and was horribly scalded. He died several days later and was buried on the hill above the spring. Then in November of 1833, the U.S. government confirmed the 1804 claim of James Mackay to his heirs. Morrison departed for St. Charles and commercial salt manufacturing ceased.

Intermittent manufacturing of salt may have continued for local use. In 1869, there was a short-lived attempt to revive the commercial manufacture of salt. The so-called "Oyster Plan" of 1900 sought to dam the spring branch and raise oysters and saltwater fish. The plan quickly collapsed because there was no fresh water in which the mollusks could spawn. The Boone's Lick site was then largely neglected. Silt from Salt Creek and the nearby hillside covered archaeological features and the wet, salt-and sulfur-laden soil helped preserve wooden artifacts associated with the early salt works.

In 1960, Mr. and Mrs. J.R.

In 1990, students and staff members from the University of Missouri-Columbia Field School of Archaeology excavated artifacts from the original salt operations at Boone's Lick. *DNR file photo*

Clinkscales and Horace Munday donated 17 acres of land including the springs to the Missouri State Park Board, which administered the state park system before the creation of the Missouri Department of Natural Resources. An archaeological survey identified the remains of salt furnaces and other structures. The site was added to the National Register of Historic Places in 1965 and subsequent excavations in 1986 and 1990 brought the total number of furnaces to 10. Also discovered were the remains of a complex water delivery system, most notably a 10-foot long octagonal hand-hewn drive shaft of a tread wheel. These items have been preserved and some are on display at the Arrow Rock State Historic Site visitor center, which administers Boone's Lick as a state historic site.

Boone's Lick State Historic Site today comprises 52 acres in a wooded, hilly setting. Picnic facilities are available and a short, steep trail winds its way to the spring site. Signs along the trail describe archaeological features as well as the unique fauna of the saltwater environment. Boone's Lick is home to the rare saltwater mosquito and plains killifish. Wood remnants of the salt works are visible around the bubbling springs and one of the original boiling kettles still resides at the site.

Funds from the parks-and-soils sales tax have been used to make the site more accessible to persons with disabilities and create a new, outdoor interpretive exhibit explaining the history of the site.

Boone's Lick State Historic Site is located on State Road 187, two miles west of Boonesboro in Howard County. The site is open daily during daylight hours, offering visitors a chance to view this center of early frontier industry.

Michael Dickey is the historic site administrator at Arrow Rock State Historic Site within DNR's Division of State Parks.

MISSOURI resources
Summer 2000 • Volume 17 • Number 2

Teacher's Notebook

Linked to the Land – Connected to the Country

by Joe Pitts

Aldo Leopold, in *A Sand County Almanac* said, "Land is the place where corn, gullies and mortgages grow, country is the personality of the land ... poor land may be rich country and vice versa." This quote from the father of modern wildlife management relates to the doctrine that all wealth stems from the land. Appropriate management of natural resources is the product of compromise between the critical need for good land and the spiritual desire for rich country.

Missouri is a rural, urban, agricultural and industrial state. The diverse nature of these activities makes it difficult to manage the need for good land while fulfilling the desire for rich country. It is hoped, citizens of the 21st century will begin to appreciate this concept as they make decisions about management of natural resources. A challenge in this century is to find effective means of helping people create a personal sense of connection to the land and an appreciation of country.

Whether eating toast for breakfast or doing homework on their computer, everything a student needs or uses can be traced directly or indirectly to a natural resource from the environment. Actions and decisions students make about resource use have

measurable impacts on the environment. Teachers can facilitate awareness of this relationship and help students understand the links between land and country.

The activity outlined below will help students understand the links they share with each other and the land. Try serving a piece of toast or other grain-based snack to each student to begin the activity.

THE ACTIVITY

"One Piece of Toast"

Begin the activity by asking how many students had a piece of toast or some other bread or grain item for breakfast. Ask if anyone knows the steps involved in producing their piece of toast.

Now, become the facilitator as the class develops a list of the steps involved in producing that one piece of toast. (It is best if the students develop this list with limited guidance from the teacher.) Place the list on the chalkboard. Review the list and ask students to describe the benefits to humans and the natural resources consumed during each step. Ask if anyone has an item that should be deleted or added.

Work with students to develop a description of the possible environmental effects of using soil, petroleum, natural gas and coal. Ask them to think of positive and negative effects. Some negative effects include the depletion of soil nutrients, possible loss of topsoil through erosion and acidic runoff from abandoned or neglected strip mines. Students also may point out, depletion of the limited supply of fossil fuel reserves, damage to marine life from oil spills, air pollution, acid rain, tundra degradation by oil pipelines and so on. Positive effects could be more food for human consumption, better nutrition, healthier people, fewer insect and plant pests and a robust economy.

One Piece of Toast

Students should be able to describe many of the steps listed below:

Some Steps Involved: Providing Benefits to Humans – A loaf of bread	Resources Consumed
1. Cultivation of land for growing cereal grains.	Petroleum, top soil
2. Increasing yields using chemical fertilizers and pesticides.	Petroleum
3. Harvesting cereal grains.	Petroleum
4. Transporting, storing and processing grain.	Petroleum, coal
5. Baking and packaging bread commercially.	Petroleum, coal, natural gas
6. Transporting and shelving bread in stores.	Petroleum, coal
7. Transporting bread to the home.	Petroleum
8. Toasting the bread.	Petroleum, coal

Discuss the use of renewable and nonrenewable resources. Ask students to describe the effects of human use on these resources. Discuss the idea of sustainable resource use.

Have students develop a cost-benefit statement for the use of soil, petroleum, natural gas and coal. Use a simple cost-benefit example on the board as a model for the students. Ask them to describe environmental and economic costs.

Now, throw the piece of toast in the waste can. Ask students to repeat the activity. Focus the new activity on the resources used and the environmental effects of solid-waste disposal. Ask students to consider whether they can really ever throw something away.

The above are only suggested steps; individual students may be much more creative in developing their connections. Ask students if the resources consumed are renewable or non-renewable. Encourage them to discuss other resource connections to their piece of toast (e.g. water for irrigation, concrete and steel for construction).

Now, what about the toaster, their home, the car, the school? How are these items related to the land and country concept? The potential is limited only by student creativity.

The time required for this activity varies with student age. The activity could be conducted in one class session or over several sessions. It is recommended that students be allowed time for independent or group research.

The activity above was adapted with permission from Investigating and Evaluating Environmental Issues and Actions: Skill Development Program, 1996, by Harold R Hungerford, Ralph A. Litherland, R. Ben Peyton, John M. Ramsey and Trudi L. Volk.

Joe Pitts is an environmental education specialist with the Division of Environmental

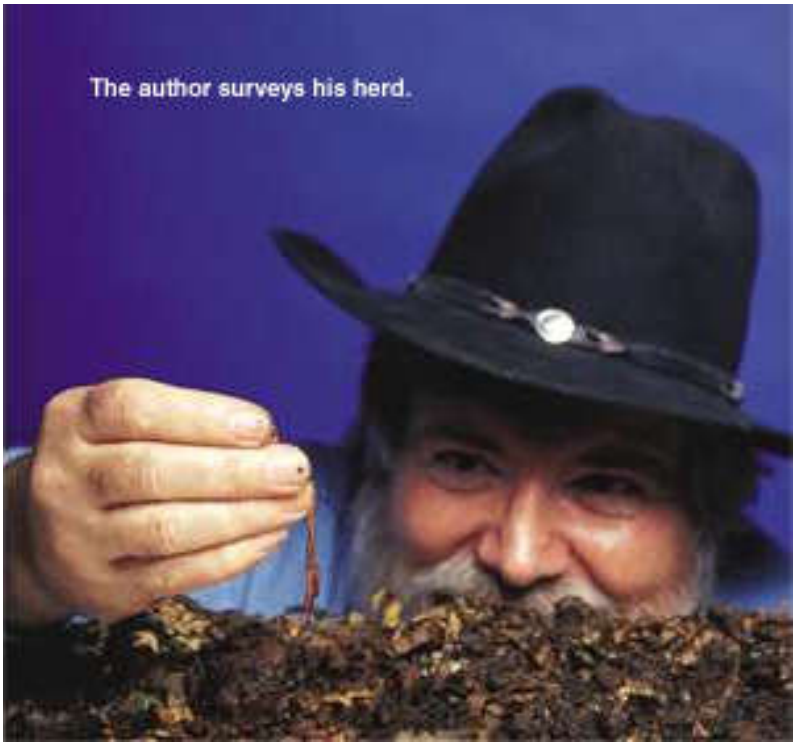
Quality's Technical Assistance Program.

MISSOURI
resources
Summer 2000 • Volume 17 • Number 2

Wriggler Roundup

Worm Wrangler Lassos Waste

by Philip Tremblay
photographs by Nick Decker


The author surveys his herd.

Sunset was casting long shadows down the valley. I had been beating the brush for strays most of the day. Sitting on a log near the creek bank, I thought, "There's got to be a better way to do this. Not much money in raising beef cows on my hardscrabble acres. Land washed away years ago. Prices don't cover costs either."

I looked down between my feet. A ray from the fading sun highlighted a single golden leaf. I turned it over with the toe of my boot. Right there before my eyes was the answer! I saw a small, red worm moving around in the rotted leaves and debris. I figured I could raise plenty of those little critters in my stock tanks to sell to tourists heading for the lake.

That's sort of how I became the official Missouri Department of Natural Resources (DNR) worm wrangler. I left the ranch before I started raising bait. It was less of a

jump from feeding cows and calves to feeding worms than I thought it would be. Both types of critters are eating machines. The more you feed them, the better they do. Each will respect a fence or worm bin containment as long as they are happy, which demands comfortable temperatures, shelter from extreme weather conditions and good food.

The idea of using worms to reduce the amount of food waste going into landfills has become popular in many Missouri classrooms. Children may not really be thrilled by waste reduction, but they apparently are excited about the fascinating stars of vermicomposting - the humble Red Wriggler worms.

Now, sit down a spell. Spend some time with this Missouri worm wrangler. Learn what a herd of hungry worms can do to reduce trips to the trash can. What worms produce naturally can improve lawns and gardens. Experience a feeding frenzy in the worm bin. Find out how to round up those migrating mavericks. Yes, even you can become a worm wrangler!

Welcome to the Show-Me State. This is where most roads to the west got their start. The Oregon Trail, the Santa Fe Trail, Route 66 - most of them still pass through here, although today they look more like interstate highways.

As the guardians of the Gateway to the West, we Missouri folks have had a chance to open doors, suggest the best routes and sell folks what they will need to get to where they're going. We've had a history of showing people how to do things better and also of needing to be convinced that our way isn't already the best. Go ahead. Show me!

Over the past several hundred years, the muddy Missouri River has carried a lot of the western landscape through here on its way to the Gulf of Mexico. Show me a mud flat near Jefferson City, and I'll show you a chunk of Montana or Wyoming. Worms can help replace these losses with their ability to turn waste to soil.

Missouri has seen a lot of garbage over the last couple centuries. Wagon trains lightened up before heading out across the plains. Riverboats dumped trash as well as passengers. The early settlers could probably move and build a new cabin more easily than hauling away the trash from the backyard. Even today, there are still places where an old, deserted home sits surrounded by junk and trash. Just a few yards away is a newer home with a new pile already building up around it. It has been less than 25 years since our communities stopped throwing trash into swamps or piling it up along streams. Burning or burying trash doesn't make it go away.

We're doing well. As a nation, as a state, as a population and as a group of neighbors - we are in fine shape and prospering. We have a healthy economy. There are jobs, food and shelter for people.

The trouble with prosperity is, the more we buy, the more we throw away. One of the faster growing piles of garbage our prosperous society is throwing away is leftover

food. In Missouri, the food we throw away is too often buried in a landfill. Once it is buried, it doesn't disappear. The food breaks down and produces moisture and gases. While modern landfills are designed like a giant underground "baggie" to contain moisture (leachate) and gases (methane and odors), they are not guaranteed to remain sealed forever. So, if leachate and methane start creeping into the environment, people, plants and animals may be harmed.

The trouble with prosperity is, the more we buy, the more we throw away.

One of the critters that doesn't mind having some garbage around is the humble earthworm. The worm has been around for many centuries. Some students of worm history suspect that worms have digested most of the earth's soil at least once and probably many more times over the past thousands of years. Worms don't get a lot of credit for their efforts, even if they do get invited to go fishing once in awhile.

Worms don't speak up or give directions, but there are a few people who study them to learn how to better handle food wastes and rebuild our vanishing soil cover. Some of these people are teachers and students in Missouri schools. Small worm bins in hundreds of classrooms have become popular as a means of showing how even the smallest creatures can help us handle a very large problem. When we throw out our leftovers, there is still a lot of material there that can be useful to worms and plants.

The volume of food scraps Missourians throw away amounts to nearly 20 percent of all wastes discarded from our homes, businesses and industries. Worms have a role in the future of Missouri's waste reduction efforts.

During the past several years, DNR has been studying ways to make it easier for worms to get to the food wastes discarded by restaurants, food markets, hospitals, nursing homes, schools and prisons. This isn't an easy job; in fact, it is a job for real worm wranglers. An answer may be to move the worm bin or bins to various locations in a climate-controlled trailer. One person could service several traveling worm-powered waste processors in a day.

DNR has seen how successful small worm bins have been in cutting down the amount of food wastes thrown out at homes that use them. Students who have seen how fast a herd of worms can wipe out a leftover salad can hardly wait to see what they do to those veggies Mom wants them to eat. A worm bin under the kitchen sink, home to about 2,000 worms, (two pounds) will eat up most of the food scraps that a family of

four will produce in a week (about seven pounds).

Worms are not fast eaters. Meats, dairy products and too much pasta are not recommended as grazing for a worm herd. However, those items are not what hungry people usually toss into the waste can anyway. Vegetables, salads, fruits, breads, coffee grounds, even coffee maker filter paper are among the many digestible items that are good-to-excellent worm fodder.

Of course, other household pets may demand equal time in begging for leftovers. Cats and dogs can handle the boneless meats and fish. Worms just want a steady diet, not necessarily a consistent one.

Since leaving behind the cattle and all their requirements, I've found that worms have similar needs. Both have a strong urge to wander. They need enough food to keep them busy and encourage them to reproduce. Worms that don't feel there is enough food available won't lay eggs and produce more worms.

Hungry worms will make every effort to leave their worm bin and find something to eat. They also need enough moisture to keep from drying out. If their bin is too wet or too dry, the worms will become restless. You don't even want to think about dealing with a herd of stampeding worms.

Cattle and worms also don't like weather extremes. If it is too cold, neither species wants to eat. They just want to stay warm. While cattle get out of the wind, worms will get out of their bin - if they can. Usually the worms will gather in a clump or wriggling mass to retain warmth. Worms work within a temperature range of 40 F to 90 F degrees. Like people, they prefer a constant temperature around 70 F degrees. When the goal is waste reduction, you need to keep the worms happy so they eat quickly and reproduce.

The worm bin I am working with now is larger than those used in many classrooms. Worms are not particular about where they live as long as they have food, air and water. Worm bins can be made from plastic pails, storage bins and even old picnic coolers. The bin should have holes in the bottom for ventilation and so excess moisture can

Missouri Department of Natural Resources (DNR) Worm Wrangler Philip Tremblay uses a hand tool, similar to a three-pronged cultivator, to pull back the layer of newsprint used to cover the worms and give them a sense of being underground. Once the worms are temporarily exposed, he can make a visual assessment of the herd's health while also taking the temperature inside the worm bin to make sure it remains between 40 F and 90 F degrees.

escape. A piece of tight screen placed in the bottom will discourage the mavericks from leaving through these holes.

Earthworms work in the dark and live in soil-like conditions. To simulate their world, a layer of moist, shredded newspaper can be placed on top of the bottom screen. The worms - Red Wrigglers - can be purchased from one of several Missouri "Worm Wranches." A list of these, as well as plans for building a worm bin, can be obtained from the DNR Internet Web site at [www.dnr.state.mo.us/deq/swmp/wormlist.htm] or by calling (573) 751-5401.

The new worm herd should be introduced to its bedding and allowed to get comfortable. A bit of soil can be mixed with the newspaper, but it isn't necessary. After a day or so, add enough food so each worm can have between its own weight to twice its weight to eat. For example, two pounds of worms could be fed between two and four pounds of food. It is important not to overfeed the herd because the excess food might create an acid or caustic environment that could be harmful. Weigh the food with the help of a scale to make sure the worms are getting the right amount of feed.

As you feed the herd, cover the food with another layer of wet, shredded newspaper. This will help control odor and give the worms that protected feeling of being underground. Keep a lid on the worm bin to further reduce odors and help keep the mavericks in place.

Within a month or two, you may notice that there are more worms in the bin than you started with. That's reproduction! If the herd gets too big, the worms may show signs of wanting to wander. This is natural, too. It means the adult worms want to get away and let the new worms have a chance to grow and reproduce. This is the time to start a new worm bin to give to friends or neighbors or to take a few of the adult worms on a fishing trip.

DNR's demonstration worm bin is one developed in Oregon to handle up to 20 to 25

pounds of food waste per day. It is designed for easy removal of the worm manure, or castings. It contains between 40,000 to 60,000 worms. At feeding time, you can hear the critters moving up to sample fresh food. In a matter of hours they will be turning waste into castings. The worm castings are good plant food, and should be removed from the worm bin on a regular basis. Just like a cow herd hates to live in a manure-filled shed, worms don't feel comfortable in too many castings.

To remove castings from a small bin, move the feeding area to one end of the bin. The worms will leave the castings to go to the food. Remove the castings and add wet, shredded newspaper to the cleaned-out end of the bin. As the worms finish eating their food supply, add the food layers to the new bedding area. The herd will graze its way back and you can clean the end of the bin they just vacated.

You can also dump the whole bin on a tarp placed in the shade and make small mounds of the castings. The worms will move to the bottom so the tops of the mounds can be removed until all that is left is the worms. Once their bin is set up with bedding again, the worms will be ready to go back to work.

To find out more about the worms and their interesting lifestyle, visit the DNR Web site at [www.dnr.state.mo.us/deq/swmp/wormlist.htm] for a report on the DNR demonstration project and answers to questions that Earth Day 1999 participants had for a "spokesworm." Sure beats calving on a cold spring day or roundup on a hot and dusty autumn afternoon.

If you have a question these Web sites cannot answer, give the old worm wrangler a call at (573) 522-3342. Adios.

Phil Tremblay is an information specialist with DNR's Division of Environmental Quality.

MISSOURI resources
Summer 2000 • Volume 17 • Number 2

Reading, Writing ... and Rappelling

WOW Yourself at Outdoors School

by Jennifer Sieg
photographs by Sonya Estes

Margie Stude of Warrenton learns the proper techniques for cleaning fish.

Just as Columbus had set out to explore new lands and opportunities, approximately 350 people embarked on a mission last Columbus Day weekend to explore and discover the great outdoors. Their destination: the third annual Wonders of the Outdoor World (WOW) National Recreation and Conservation School at Roaring River State Park near Cassville. As Columbus Day weekend in October again approaches, WOW coordinators hope to arouse the curiosity and adventure of new partakers willing to accept the challenge to discover new and exciting outdoor opportunities at this year's event.

Wonders of the Outdoor World is designed to teach participants how to enjoy a wide range of outdoor recreation activities while practicing personal safety and outdoor responsibility. Each WOW course includes an outdoor skill, conservation, safety and ethics component. Outdoor skills courses are designed for either the beginner seeking adventure, or the seasoned professional looking to brush up on specific skills. Bass Pro Shops, Missouri Department of Natural Resources (DNR), Missouri Department of Conservation (MDC), Johnny Morris Foundation, University of Missouri Outreach and Extension and U. S. Forest Service sponsor this fun-filled, action-packed, educational weekend.

Last year, participants could choose from more than 60 courses ranging from outdoor cooking to rappelling. Courses were offered in a variety of areas of outdoor skills and sports to grab the different interests of everyone in the family. Several levels and varieties of archery, shooting sports, boating, fishing, camping, hunting and outdoor cooking courses were presented as well as courses catering to the outdoor adventurer,

such as backpacking, orienteering and the high ropes challenge.

Those interested in natural history and nature had options ranging from cave exploring to bird watching and spider sniffing. Arts and crafts enthusiasts could make nature arrangements, campfire pottery or birdhouses or learn the basics of wood carving or nature journaling.

Other courses focused on outdoor photography and primitive skills. Favorites among participants included the high-adventure activities such as rappelling and kayaking, cooking and the natural history instruction including star gazing and stream ecology.

A youth camp, presented by 4-H, offered lots of exciting outdoor educational activities for 4- to 8-year-olds to help inspire each child's natural curiosity about nature and the great outdoors. Each day was packed with fun-filled activities including outings to a cave, fishing hole or the woods for a nature walk, nature crafts and games. Nancy Burmaster, Raytown, found the youth camp to be "structured and organized" and said her kids really enjoyed it.

Victor and Laura Skulavik of Independence learn that a little rain is part of the adventure as they paddle a canoe.

Jennifer Gross, Roach, doesn't classify her family as being real outdoors people, so they appreciated the fact that the courses were taught "at a level that they could enjoy and not feel intimidated." Gross, her husband, Barry, and their children have attended WOW the last two years and enjoyed seeing familiar faces on their return visit. They look forward to attending this year's program as well.

"It was wonderful!" exclaimed Mary Reuter from Berryville, Ark. Last fall was a return visit for her and husband, Frank. They plan to attend WOW again this year.

John Higdon, Holts Summit, ended up at WOW after failing to find a fly-fishing course that was not for women only. He describes WOW as a "neat program that teaches people to use the parks to their full potential." Higdon referred to the instructors as very professional and helpful and found the class sizes to be appropriate. Employees of the sponsoring agencies and other outdoor experts provided the instruction.

Marilyn and Jerry Dickerson, Auxvasse, said the instructors were well-versed in their topics. Dickerson was excited last fall when she successfully field-dressed a deer that she had killed during deer season applying some of the skills she learned at WOW. She also put to use some of the skills she obtained during a Dutch oven cooking class at WOW on a recent camping trip. "We had a very good time, learned a lot and met wonderful people with similar interests," said Dickerson, whose enthusiasm for the program is abundant.

Being a single mother, Barbara Albritton of Tulsa, Okla., was looking for a program she and her son, Stewart, could attend together. Albritton said she didn't "grow up doing these things" but wanted her son to experience the outdoors. They have participated in WOW all three years, taking some courses together and others on their own. The program has given them a common interest to talk about and experiences to share.

Richard Martin, Nixa, accompanied his twin boys, Taylor and Barrett, to WOW the last two years. The boys are active in their local Scouting group but wanted to do some of the fun activities that they would not have an opportunity to do in Scouts until they were older. Wonders of the Outdoor World gave them the chance to participate in courses in canoeing, kayaking, animal tracking, orienteering and archery. According to Martin, the skills learned at WOW will give them a head start as they graduate from Cub Scouts into Boy Scouts later this year and are faced with more challenging goals.

Merle Rogers, park naturalist at Roaring River State Park, says that the participants of WOW feel that it is the "greatest thing they ever went to" and usually return to do it again. Not only do they return for WOW, some are attracted back to visit the park because they enjoy the setting of Roaring River State Park with its rugged terrain and the Roaring River Spring.

According to Sonya Estes, WOW coordinator for Bass Pro Shops, leadership training was offered to representatives from 28 states just prior to the 1999 school year to educate them on how to start up similar programs in their areas. Normally, the WOW program at Roaring River State Park draws attendance from eight or nine different states and courses fill to capacity.

How did WOW get its start? Glen Weaver, while working as the state extension tourism specialist at the University of Missouri-Columbia, came up with the original idea for WOW. He wanted to give kids and families the opportunity to learn how to enjoy the outdoors. Weaver took his idea to Bass Pro Shops and as a result,

Children develop an appreciation for nature while learning practical skills at WOW. Lauren Carnahan of Poplar Bluff assembles a bird feeder.

the first WOW, sponsored by Bass Pro Shops, the Department of Conservation, U. S. Forest Service and the University of Missouri Outreach and Extension, was held at Drury College in Springfield in 1997.

Through a survey of participants that first year, the desire for a more natural setting became apparent. The Department of Natural Resources' Division of State Parks became involved when Roaring River State Park in Cassville was selected for the location of the next WOW. The Department of Natural Resources agreed to become a co-sponsor of the program because of the commitment by the sponsors to expand the program into urban areas. This fulfills a long-term desire by the department to provide expanded outdoor education and recreation opportunities for urban families.

According to Douglas Eiken, director of DNR's Division of State Parks, offering the WOW program in the future in closer proximity to Kansas City and St. Louis would, in addition to teaching outdoor skills, raise awareness about DNR and the programs the department offers. Due to a lack of sizeable pristine natural resources in our urban areas, most state parks are located on the outskirts of urban areas or in rural settings, yet 63 percent of state park visitors from Missouri are city dwellers. Offering the WOW Urban Workshop Program in these areas would teach skills and encourage outdoor activities that are within easy driving distance of participants' homes. Families living in urban and suburban neighborhoods would receive hands-on training in activities such as fishing, hiking, outdoor cooking, caving, canoeing, orienteering and shooting sports.

Watkins Mill State Park, near Lawson, has been tentatively selected to host a 2001 WOW Urban Workshop Program in the Kansas City area. The first of these day-and-one-half workshops is planned for next spring. Workshops would include topics such as archery, boating, camping, fishing, hunting, outdoor cooking, nature arts and crafts, natural history, shooting sports and more. Experienced instructors from DNR and organizations such as MDC and Bass Pro Shops will teach the workshops. Although specific dates have not been set, the workshops are planned as condensed versions of the program being offered at Roaring River State Park. The location for the WOW Urban Workshop Program in the St. Louis area has not yet been determined, although Dr. Edmund A. Babler Memorial and Meramec state parks are being assessed for their potential as sites.

"The department is excited about this opportunity to offer urban residents skills that will encourage and promote outdoor activities in our state parks. The skills they learn will enable them to use our facilities and areas properly and to their fullest potential," Eiken said.

The fourth annual Wonders of the Outdoor World National Recreation and Conservation School at Roaring River State Park will be held Oct. 6-9, 2000. Information on this year's program can be obtained by calling (417) 873-5026 or by e-mailing your request for WOW information to sestes@bassprocom. To learn more about this national recreation and conservation school, visit the WOW web site at [http://www.basspro.com/wow].

Jennifer Sieg is a public information specialist for DNR's Division of State Parks.