

MISSOURI resources

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table of contents

Missouri Department of Natural Resources

Director's Comment

Amazing Graze Rotation Improves Pasture and Herd

by Judy Stinson and Mary Oerly

Cattle producers find financial incentives accompany the environmental benefits of sustainable land management programs

Gateway to Clean Air St. Louis Region Battles Auto Emissions

by Kerry Cordray

Pollutants from small trucks and cars have worsened St. Louis' air quality problems, but a new emissions testing program is starting to win the battle for cleaner air.

Loan Program Lightens Energy Burden Cities, Schools Redirect Savings

by Jim Muench and Lesley Cryderman

Investing in energy-efficient heating and lighting systems bolsters school and municipal budgets and benefits the environment. A worm wrangler outlines the care and feeding of these critters.

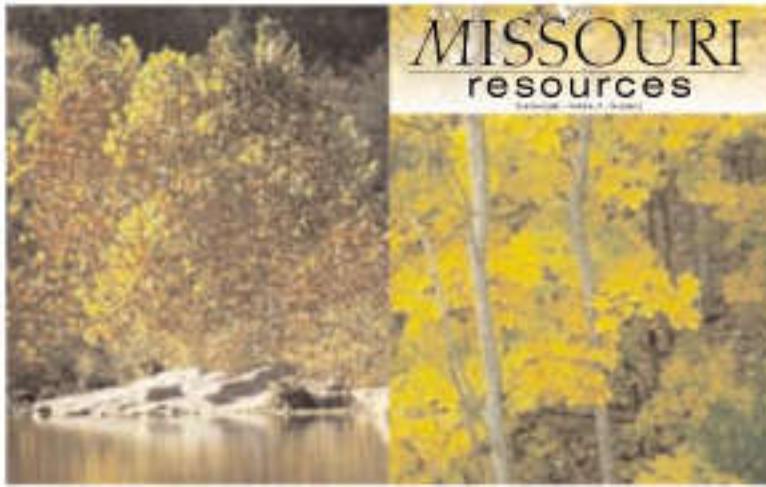
- **News Briefs**
Resource Honor Roll, Letters, E-Notes
- **Resources to Explore**
Montauk State Park

- **Teacher's Notebook**
Home Safe Home?
- **One Last Word**
Old Chain, New Links



Above right: West County-Chesterfield is one of 12 St. Louis-area testing stations where vehicles emissions are measured.

Above: DeKalb County farmers Brenda and Rick Ebersold say rotational grazing has improved their herd and pasture.



Front Cover: A sugar maple tree in Boone County heralds the coming of autumn with a colorful display.

Back Cover: A creek reflects the changing seasons at Sam A. Baker State Park in Patterson.

AMAZING GRAZE

Rotation Improves Pasture and Herd

by Judy Stinson and Marcy Oerly
photographs by Judy Stinson



This herd is moved to a fresh grazing area every two to three days.

Whether a farm is large or small, there always is a need for the landowner to understand how to make their land more productive while still being a responsible steward of that farm's natural resources. To assist in reaching these goals, landowners may turn to certain state and federal agencies for advice and, in some cases, for financial assistance as well.

The Soil and Water Districts Commission, through the Missouri Department of Natural Resources (DNR) Soil and Water Conservation Program, offers a financial incentive to assist landowners more efficiently and responsibly utilize their pasturelands through the use of a planned grazing system. The Natural Resources Conservation Service and University of Missouri Extension provide the technical advice while local county soil and water conservation districts offer the administrative help to implement the plan.

Cattle production is big business in Missouri. According to the 1999 Missouri Farm Facts, the state ranks second in the nation in the number of cattle operations. These 69,000 operations handle 4,353,000 head of cattle. However, there are only 63 head of cattle in the average-size herd. That means there are many herds of cattle on varying sizes of farms.

The DSP-3 (District Special Practice) Planned Grazing System is a state cost-share

practice, offered through local county soil and water conservation districts, that demonstrates the best use of the soil and water resources through the use of rotational grazing. Rather than having one continuously grazed, large pasture, a financial incentive is provided for dividing that pasture into smaller units, or paddocks, to provide more grazing control over the pasture area. The livestock graze in one section while the other sections are given the opportunity to rest. This gives the forages the opportunity to grow back more quickly and vigorously. Although this seems like a simple concept, these smaller paddocks require an increased level of management from livestock producers.

To help improve Missouri's pasture resource, both environmentally and economically, the Soil and Water Districts Commission began to develop the DSP-3 practice in the early 1990s. From its inception, the practice was developed as a total resource management tool for pastureland to help promote and demonstrate sustainable land management. The commission designed the practice to provide an incentive to landowners who had shown an interest in pasture resource management. If landowners demonstrated that they were interested in the total resource and would be committed to a higher level of management, then the practice would be successful.

To learn how to operate with this new mindset, each landowner planning to install a DSP-3 practice is required to attend an approved grazing school. The University Extension, in conjunction with the Natural Resources Conservation Service, holds these schools all over the state to teach about fertility requirements, forage mixtures, fencing technology, stocking rates and other information producers would need to know in advance of putting this new system in place.

The grazing schools also provide the opportunity to see a working system, ask questions and talk to other producers interested in planned grazing systems. This forms a foundation for more profits plus improved farm stewardship.

One farm that is seeing success with this practice is the Bill and Lee Roberts Ranch in Polk County. Alice Roberts, along with her husband, Junior Dickover, manages the ranch of more than 1,000 acres. The ranch is owned by her father and uncle. The operation is primarily cow-calf production, with the calves being sold soon after they are weaned. Even though the planned grazing system is fairly new to Roberts, she remarks that the practice is one she would recommend to others.



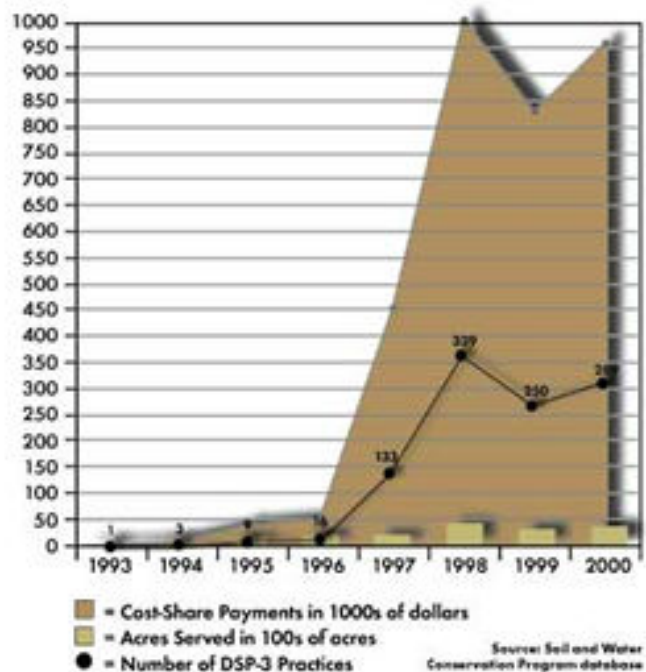
Brenda and Rick Ebersold stand in front of the golf cart that they use to move their cattle into different paddocks.

Since implementing the DSP-3 practice in the fall of 1997, the Roberts have seen a 50-to-75-pound per head increase in the weaning weights of their calves and a dramatic improvement in their grass reserves. They also have been able to double the number of animals each acre can support. Most of the fields consist of fescue interseeded with legumes.

"The DSP-3 is a practice that does require some work," said Roberts. "You must be willing to move your cows in a timely manner to get the most production from your land." The cattle are moved to a fresh grazing area every two to three days and the fences are checked almost daily. "With this practice, you see your cattle on a more regular basis. You know if anything is wrong with one of the herd almost immediately," she added.

Water is an important component of a successful DSP-3 practice. Livestock must have access to fresh water in each paddock. The concern for good water quality on the farm was the beginning of the DSP-3 practice for the Lee Roberts Ranch. Through a cooperative project with the Missouri Department of Conservation, they have renovated and fenced two ponds, installed a well for livestock water purposes and installed five miles of electric fence along a stream to exclude cattle. This not only protects the stream banks from erosion, but also improves wildlife habitat and helps to protect the water from contamination as well.

District Special Practice (DSP) 3 Growth



They also have enrolled this ri-parian area, or land bordering a natural waterway, into the federal Conservation Reserve Program to further protect their water resources. Funds made available through the State Parks and Soils Sales Tax provided cost-share assistance for a spring development, 4,500 feet of pipeline needed for livestock water, tanks and many miles of interior high-tensile electric fence. The fence divides the large field into several 20-acre paddocks where 350 of their 600 head of cattle graze.

Roberts' efforts in grassland management have put her in the spotlight. In 1999, the Missouri Association of Soil and Water Conservation Districts selected Roberts as the Grassland Farmer of the Year. She shares the credit in implementing the program with the help she received through the local soil and water conservation district. Regina

Merrick, soil conservationist with the Natural Resources Conservation Service, assisted in designing the plans for the project and continues to give assistance as the project takes on changes. "Many factors go into the planning process of a project this size," says Merrick. "We look at each farm individually to see what kind of soil is there and what we can do to design the DSP-3 practice to best benefit the landowner." She added that this is a practice that definitely can improve any size farm, large or small.

Facts From the Field

- Since the inception of the Planned Grazing Systems practice in 1992, more than 900 DSP-3 practices have been installed throughout Missouri treating approximately 113,000 acres of pastureland. The Missouri Department of Natural Resources has provided \$3.5 million in cost-share payments.
- The funds for the DSP-3 Planned Grazing Systems practice come from the one-tenth-of-one-percent Parks and Soils Sales Tax.
- To participate in the DSP-3 practice, landowners must attend an approved grazing school and the fields enrolled in the practice must meet minimum fertility requirements.
- Cost-share is limited to 75 percent of the actual or estimated costs up to \$60 per acre. A maximum of \$9,000 in cost-share is allowed per farm and landowner.
- Eligible cost-share components for interior fencing include posts, wire, insulators, fasteners, gates, solar panels and a rapid-impulse fence charger. The fence charger is limited to a maximum cost-share amount of \$225.
- Eligible cost-share components for livestock watering include pipeline, electric pumps, ram pumps, pressure tanks, hydrants, tanks, nose pumps, valves, pond slits or limited stream access. Components necessary for spring development and pond construction also are eligible for cost-share. Pond construction is limited to one pond with a maximum cost-share amount of \$3,500 per farm and landowner.
- Eligible cost-share components for

Brenda and Rick Ebersold would agree. The Ebersolds own a 41-acre farm in DeKalb County and also have implemented a DSP-3 practice. They are extremely happy with the results they have seen since finishing the project in October 1997. "We've seen higher weaning weights for our calves, better grass quantity and more grass species on our fields in just the short time we've been using the practice," Rick Ebersold said. Brenda Ebersold added, "Our cattle have become gentler and since we see them more often, we have the opportunity to observe any problems that might occur and correct them in a timely manner." This is extremely important to the Ebersolds since they both work off the farm. "This practice allows us to keep a better hand on things around the farm without always having to be here," said Rick Ebersold.

Like the Roberts, the Ebersolds rotate their cattle to a fresh paddock every two to three days. They have 34.4 acres in their DSP-3 practice that they divided into 11 paddocks, averaging a little more than three acres per paddock. Water is available in every paddock through the use of frost-proof and galvanized tanks. The design for the DSP-3 practice on the Ebersold farm includes a solar-panel charger for a portion of the electric fence. Like the Roberts, they received a great deal of help with the implementation of the practice from

warm-season grass establishment include seed, seedbed preparation, drilling, broadcast seeding, rolling and chemicals. To qualify for cost-share on the warm-season grass planting, the field must be in poor condition or have a fescue endophyte level of 30 percent or higher.

their local soil and water conservation district, the Natural Resources Conservation Service and University Extension. Cost-share funds for these practices were made available through DNR.

Although there is a difference in the number of acres in each of these farms, the DSP-3 Planned Grazing

Systems practice is working successfully. Both farms demonstrate a productive practice that fits the needs of the landowners and helps meet the goals they set.

For further information concerning the DSP-3 practice, contact your local county soil and water conservation district or USDA Service Center. Check your local telephone directory under the county name or United States Government USDA Service Center. You may also visit DNR's Web site at [] or call our toll free number, 1-800-334-6946.

Judy Stinson is an environmental education specialist and Marcy Oerly is an environmental specialist III with the [Soil and Conservation Program](#) within [DNR's Division of Environmental Quality](#).



Comments from the Director:

I hope many of you had the opportunity to watch the recent Olympic Games. I was impressed to learn that in its bid to host the Olympic Games, Sydney, Australia, committed to producing a "green" Olympics. Global warming, protection of the ozone layer, biodiversity protection, the avoidance of toxic materials and the management of waste, water and energy were all taken into account as the Games were planned. This is just one example of what an important global issue natural resource protection has become.

Closer to home, we've been working on a number of other concerns such as fuel prices and drought. Earlier this summer, the governor formed task forces on each of these issues. We'd like to take credit for the fact that once these groups were formed, fuel prices went down and it started to rain.

First, let's look at fuel prices. Our Energy Center followed the transportation fuels price roller coaster as it monitored and analyzed energy-related information, including Missouri and national prices of gasoline, ethanol, propane, diesel and compressed natural gas. A number of factors have been identified as contributing to the price fluctuations, including pipeline breaks, low inventories of gasoline and high crude oil prices. It was not any one of these factors but some combination of all of them that had Missourians paying more for gasoline this summer than we had in a long while. As I write this, prices still are not stabilized. However, we are taking this opportunity to look at long-range answers to reduce our dependence on petroleum, especially foreign oil, and to promote the use of alternative fuels, the purchase of more fuel-efficient vehicles, carpooling and other means of saving energy.

Now, on to the drought. By mid-July, it became hard for many people to believe we were in the middle of a drought because of all the rain Missouri received in June. In fact, June 2000 was the wettest month on record for two years. It seemed every time we hosted a drought task force meeting, it rained, so we feverishly scheduled as many as possible! Seriously, as of mid-August, we still had some counties in Missouri that needed two to six inches of rain to get back to normal on their rainfall levels. We're seeing some drinking water systems impacted and some of our stream and reservoir levels are low, but there are currently no counties at the emergency level of our drought response plan. This is good news and the worthwhile goal of the task force – to have all the procedures in place to ensure enough water for Missouri citizens in case it got hotter and drier,

like it usually does, as we headed into August. To find out the most current information about Missouri drought conditions, visit our Web site at [\[www.dnr.state.mo.us/droughtupdate.htm\]](http://www.dnr.state.mo.us/droughtupdate.htm) or call our [Division of Environmental Quality](#) at 1-800-361-4827.

I am hopeful that we will be back to normal levels of rain and shine when you receive this fall's *Missouri Resources*. I enjoy hearing from you, so keep your cards and letters coming as you enjoy our natural resources this fall.

Steve Mahfood,
Missouri Department of Natural Resources

Loan Program Lightens Energy Burden

Cities, Schools Redirect Savings

by Jim Muench and Lesley Cryderman



This signal head at 59th and Brookside in Kansas City is one of more than 2,500 to be fitted with 20-year 14-watt LED bulbs. The conventional bulbs only last about one year and use approximately 150 watts. Photo by Dave Buchanan / Kansas City Public Works Department

Ben Franklin once said that if you want to learn the value of money, try to borrow it. Loans from the Missouri Department of Natural Resources (DNR) Energy Center's Revolving Fund have taught schools and local governments in Missouri the value of energy efficiency through investments that will continue to pay off far into the future.

The Energy Revolving Fund provides loans to schools and local governments to finance cost-effective energy-efficiency projects. Established in 1989, the fund allows public schools, city and local

governments, publicly owned hospitals and water and sewer districts to transfer money they might have spent on energy costs to other needs. Energy-efficiency projects reduce utility bills. The loans are repaid from the dollar savings generated by the upgrades, and the local organizations continue to benefit from the investment for years. Over its lifetime, the program has saved \$5.5 million in energy costs.

"These projects produce significant savings that can be used to fund other needs, like textbooks or building repairs," said Anita Randolph, director of the Energy Center. "What school, municipality or taxpayer wouldn't prefer to spend money on visible needs that improve student learning and public services rather than on wasted

energy?"

Just as important are environmental and health benefits. Last year alone, the program cut emissions of carbon dioxide by 41.5 million pounds (equivalent to the amount of CO₂ emitted by more than 4,000 passenger cars in one year), sulfur dioxide by 350,000 pounds and nitrogen oxides by 161,000 pounds.

"Using energy sources more efficiently not only saves money, but it makes our communities and state healthier places to live," Randolph said. "The ... benefits continue long after improvements are made."

Investments funded by the program might include upgrades to wall, ceiling or pipe insulation, lighting, windows, thermostats or heating and cooling systems. Often, the loans help to ease the burden on school districts and local governments by paying for needed capital improvements, such as replacement of inefficient 1950s-era heating systems that remain in service many years beyond their operational life. Sometimes, the projects lead to innovative energy solutions, such as at Pattonville High School in St. Louis County which decided to heat its building using methane gas from a nearby landfill. With a loan from the Energy Center, the school purchased and installed the equipment necessary to convert the methane to heat. The landfill operator, Fred Weber, provides free methane to the school. This saves the school nearly \$40,000 annually in heating costs.

"It's nearly always a wise investment to purchase the most efficient equipment," said Bernard Thompson, director of the Energy Center's Schools and Local Governments Program. "You get rewarded for being kind to the environment, and the rewards last a long time."

Recent demand for the loan funds has surged. The center loaned \$14 million in fiscal years 1999 and 2000 after averaging about \$1 million to \$2 million in previous years. Gratified by the interest in energy efficiency, within a few months the Energy Center will be able to offer more loan dollars. Current loan dollars will be leveraged with bonds issued by DNR's Environmental Improvement and Energy Resources Authority.

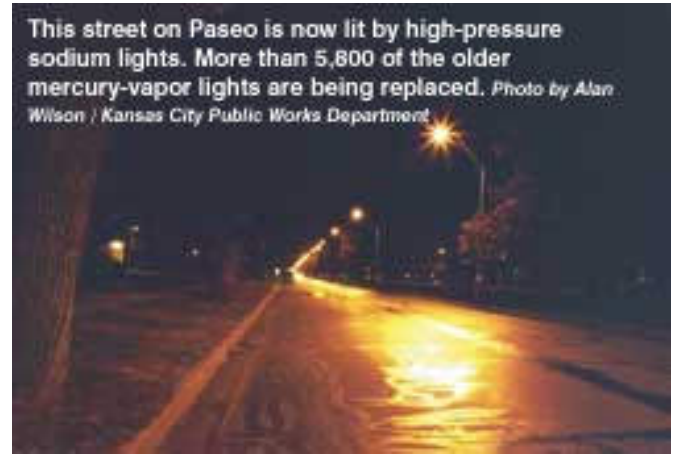
"We want to stretch our loan dollars to help more schools and local governments that are interested in improving energy efficiency," Randolph said. "This will allow more people to do the right thing for the environment and the public."

The program has financed projects across Missouri. Kansas City officials expect to cut utility bills by more than \$220,000 per year with two major lighting projects under way in the metro area.

Lighting projects are critical because each 100 watts of electricity savings equals approximately a 1,500-pound reduction in carbon dioxide emissions per year. As

Kansas City converts more than 5,800 mercury-vapor streetlights into high-pressure sodium streetlights, electric consumption will decline by at least 3 million kilowatt hours per year. These distinctive yellow lamps light the same area as mercury vapor but require less wattage.

Kansas City also is retrofitting 2,518 red signal lights with light-emitting diodes (LED). The 150-watt bulbs, which were used for the red lights, are being replaced with 14-watt LEDs. In addition to the energy savings of the LEDs, maintenance workers will not be hoisted up to replace bulbs nearly as often. These fixtures are designed to last more than 20 years whereas the current 150-watt incandescent bulbs typically last less than one year. The lower maintenance cost alone of replacing the bulbs in traffic lights quickly justifies the purchase.



In the St. Louis Public School District, the benefits of energy savings and classroom energy education complement one another. This district retrofitted 42 school buildings with energy-efficient lighting, computerized controls for heating and cooling and water conservation measures, saving nearly \$450,000 a year, and reducing carbon-dioxide emissions by more than 8 million pounds.

Meanwhile, in the classroom, students are learning about non-renewable and renewable fuel sources and how they are created, how electricity is generated and how energy gets to and is used in their schools. MidAmerica Energy & Resource Partners (MERP) is a St. Louis-based organization devoted to educating students, teachers and managers about the benefits of energy efficiency.

"Through our educational program, MERP teaches the students to understand how energy works in the world around them and then to appreciate the importance of efficiency and renewable fuel sources," said Deborah Chollet, director of MERP. "Using their school building as a real-life laboratory gives the students hands-on experience with measuring energy use and abuse."

The students participate in a number of classroom activities including following the life cycle of coal, doing energy audits of their building and modifying a model home to be more energy efficient.

"MERP and the state Energy Center are not the only entities concerned with teaching our future generations about energy and how to use it," said Chollet. "The Department of



Head custodian Ron Jones of Langston Middle School in St. Louis shows some seventh-graders how the temperature control panel monitors the school's heating and cooling operations.
Photo by Mid-American Energy and Resource Partners

Elementary and Secondary Education's Show-Me Standards (mandated, statewide education standards) have energy components as two of the eight science strands that will be tested through required assessments."

MERP staff members not only teach the students about energy, they also work with building maintenance staff, teachers and administrators to implement energy efficiency in their school buildings.

The Lebanon School District received a loan for a new boiler at its high school, saving nearly \$16,693 and reducing carbon dioxide emissions by 69,242 pounds. The Neosho R-5 School District received two loans to replace aging heating and air-conditioning systems, install thermostats that automatically turn down the heating or cooling when the building is unoccupied and upgrade lighting to T-8 fluorescent lights with electronic ballasts. The district also installed LED exit lights.

"It's important to think in terms of life-cycle costs – the costs and savings of an equipment upgrade over time," Bernard Thompson said. "Schools and local government buildings tend to remain in use for decades, so it's good common sense to consider the long-term potential of the investment."

Daylighting is an energy-efficient design for schools and public buildings. Daylight is less predictable than electric, is more difficult to control and can cause visual discomfort. But, when designed correctly, daylit spaces are more comfortable, pleasant and energy efficient. Electric light can come from many different types of lamps, which vary by color, lifetime and the amount of visible light produced per unit of input power. Daylight is more energy efficient than all lamp types because it provides more light per energy unit than any currently available lamp.

The most obvious way daylighting saves money is in lower electricity bills because electric lights do not have to be turned on. Lighting can account for up to one-quarter of a building's energy costs, and some buildings have saved tens of thousands of dollars per year in energy costs by using daylighting and improving the efficiency of their lighting systems.

A study performed by Innovative Design of Raleigh, N. C., concluded that students

performing in daylit classrooms were healthier (missed fewer school days), exhibited more positive moods and may even have less dental decay because of the additional vitamin D provided by full-spectrum light.

The students who attended the daylit schools also scored 5 to 14 percent higher on tests.

Some energy-saving devices are installed and in use at the DNR Energy Center's new home. Prior to moving into its new building in summer 1999, the center negotiated with the building owner to implement energy-efficiency improvements that the center could model for others. The improvements included a ground-source heat pump, an efficient heating and air-conditioning unit that cuts cooling costs by at least one-third, low-maintenance LED exit lights and 400 efficient fluorescent light fixtures that replaced 700 inefficient ones. In addition, motion sensors automatically turn off lights that are not in use.

"There are all sorts of possibilities for savings once you realize the benefits, study your options and plan how best to take advantage of the opportunities," Thompson said.

When it comes to a loan, it's not the principal of the thing – it's the interest. By generating interest in the principles of energy efficiency, the Energy Revolving Fund saves tax-payers money and benefits our environment. For more information, contact

Energy\$mart Schools

The Missouri Energy\$mart Schools Program is designed to work in conjunction with the Energy Center's Energy Loan Program. The goal of Energy \$mart Schools is to teach both building maintenance people and administrators about how to improve the energy performance of their buildings and to elicit a behavior change in how the building occupants use energy.



A partnership between DNR's Energy Center, the MidAmerica Energy & Resource Partners (MERP) and the U.S. Department of Energy, Energy \$mart Schools provides a packet of information to school administrators addressing the types of efficiency projects to consider, how to finance energy projects, how to implement the projects and tips for energy use.

The Missouri Energy\$mart Schools Program also will expand the classroom activities that MERP already provides in the St. Louis area to additional districts.

For more information contact DNR's Energy Center at (573) 751-3443 or visit our Web site at [www.dnr.state.mo.us/de].

the Missouri Department of Natural Resources [Energy Center](#) at 573-751-3443.

Jim Muench is the former division information officer for [DNR's Energy Center](#). Lesley Cryderman is a public information specialist in the division.

Energy Loan Program

Schools and Local Governments Loan Recipients for FY1999 and FY2000

1. Andrew	\$19,128.00	17. Johnson	\$49,500.00
2. Atchison	\$21,304.00	18. Knox	\$26,352.00
3. Barry	\$353,489.00	19. Laclede	\$58,158.00
4. Bates	\$180,000.00	20. Lafayette	\$52,920.00
5. Benton	\$24,184.00	21. Livingston	\$185,920.00
6. Cape Girardeau	\$410,208.00	22. Macon	\$12,696.00
7. Cass	\$17,752.00	23. Newton	\$518,463.00
8. Christian	\$201,902.00	24. Ozark	\$92,792.00
9. Clay	\$1,604,593.00	25. Pettis	\$49,960.00
10. Clinton	\$366,060.00	26. Phelps	\$1,062,737.00
11. Crawford	\$165,750.00	27. Shelby	\$85,336.00
12. Dade	\$23,861.00	28. St. Francois	\$1,152,233.00
13. Grundy	\$294,680.00	29. St. Louis	\$900,000.00
14. Jackson	\$2,782,169.00	30. St. Louis City	\$2,272,302.00
15. Jasper	\$234,032.00	31. Taney	\$64,936.00
16. Jefferson	\$125,280.00		

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resources

Fall 2000 • Volume 17 • Number 3



Where the Wild Things Grow

Peeking out from a tiny bluebird house, fledglings greet a world ablaze in color. Purple coneflower, yellow compass plants and rosy spikes of blazing star surround the birds' home. Barely visible amid the tumble of flowers, a birdbath, constructed from a recycled skillet and scrap cedar, offers a drink and respite from summer's heat.

This haven for birds, butterflies and bees did not exist two years ago. When Missouri Department of Natural Resources Environmental Engineer Curtis Ogg and his colleagues moved into the Jefferson City Regional Office, the triangle of land at the entrance was little more than rocks and construction debris buried in tightly packed clay. Ogg began spending his evenings and weekends removing rocks, wire and old soda cans. He loosened the soil with nearly six tons of sand and nourished it with organic matter. He then transplanted seeds and plants from his garden at home.

While a well-established wildflower garden demands relatively little maintenance, Ogg said they are not universally appreciated. "A lot of people don't understand wildflower gardens. They think they are weeds," he said. Cultivating a continuous bloom of color will appease those who eye your burgeoning garden with doubt. Creating color from March through first frost demands planning and careful species selection.

- Early bloomers include false indigo, purple beardtongue,



fire pink, coreopsis and butterfly weed.

- Reaching their peak during mid-summer are several varieties of coneflower, including purple, orange, Missouri and grey headed; purple prairie clover and blazing star.
- Plants that flower during fall include aster, cardinal flower, goldenrod and rosinweed.

Ogg recommends mulching with cypress chips until plants become established. This not only creates a neater appearance, the mulch offers the added benefits of reducing watering demands and helping prevent plants from heaving during winter.

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Gateway to Clean Air

St. Louis Region Battles Auto Emissions

by Kerry Cordray



10:03 a.m.:

Debbie Zengel of Maplewood was a little nervous.

"I don't know what to expect," she worried aloud. "I take pretty good care of my car, but it's pretty old, and it's in the shop a lot of the time. I hope it won't fail. I don't know much about the new tests, but I've heard they may be a little tougher than the old ones. They're making sure you can't just 'buy a sticker' somewhere. If all this makes cleaner air, I guess it's worth it, though."

Zengel and a few other recent arrivals were waiting to move forward into the test lanes at 10 a.m. one June morning at the West County-Chesterfield station, one of the 12 new test stations of the

Gateway Clean Air Program, the new vehicle emissions testing program for the St. Louis area. This morning there was almost no waiting at the two lanes of the station, and in a few moments a technician motioned Zengel past the stop sign outside the doors and into the first test lane.

Big Opening Day Crowd

On April 5, 2000, the Gateway Clean Air Program's 12 new state-of-the-art emission testing stations opened their doors, ready to begin the newest job in the fight for cleaner air quality in the St. Louis metropolitan area. Missouri Department of Natural

Resources (DNR) staff and federal officials looked on, and television camera crews lined up for live reports as 1,399 vehicles were tested on the opening day. Thousands more motorists were already receiving mailed notices that their very clean-running vehicles had already passed an unobtrusive roadside test (see RapidScreen, sidebar below).

Opening day had been a long time coming. In 1994, acting on concern for unhealthy air quality in the St. Louis area, state lawmakers passed a measure providing for the replacement of the old emissions testing program that began in 1984. The new "centralized" emissions testing program would replace a decentralized program that relied on older emissions testing technology that was quickly becoming outdated.

Along with more stringent emission controls on industrial sources, an improved vehicle emission inspection and maintenance (I/M) program was crucial to the DNR plan to bring the area into compliance with the air quality health standards of the Clean Air Act, in time for an approaching 1996 federal deadline. That deadline passed and was eventually extended, as the new program overcame five years of funding, legal and contractual challenges.

Finally, after five years of groundwork, in February 1999 a contract was signed with Environmental Systems Products (ESP), the nation's largest vehicle emissions testing contractor, to build and operate the test stations under DNR's oversight. "Each year ESP tests the emissions of about 15 million cars in North America," said Laura Baker, ESP vice-president of corporate communications. "We operate similar test programs in 11 other states and the province of British Columbia. The ESP-Missouri program in St. Louis is the newest and most technologically advanced program of its kind in the nation."

Missouri's contract with ESP calls for most of the 1.2 million vehicles of the St. Louis area to receive an emissions test every two years. "Motorists still go to their local garage for their safety inspection," said Chuck Dachroeden, emissions unit chief of DNR's St. Louis Regional Office. "But in the enhanced test area of the city of St. Louis and the counties of St. Louis, St. Charles and Jefferson, separate emissions tests are now done every other year, based on the model year of the vehicle. Even-year vehicles are being tested in even-numbered years, odd-year vehicles will be tested in odd-numbered years." An exception to this "odds and evens" rule is in Franklin County, where an annual basic idle test is required.

RapidScreen

One Second is All it Takes



RapidScreen is another convenience option under the Gateway Clean Air Program that allows motorists to pass the new emissions test without visiting an emissions-testing station. Special infrared and ultraviolet light technology is used to take an unobtrusive "snapshot" of exhaust emissions while vehicles are driven on streets and highways. This new technology has proven to be particularly effective for on-road identification of very clean vehicles. According to the U.S. Environmental Protection Agency, the St. Louis program is the first program in the country to employ "remote sensing" to screen such a large number of vehicles. As a result of Missouri's initial success with RapidScreen, other states are beginning to look more seriously at using this kind of technology to make their own test programs more convenient.

Motorists who receive two successive clean records within 12 months before their registration month are notified by mail. They can then call or send in their test fee and avoid the necessity of a visit to the test station. "We were able to design the whole program so that about 40 percent of vehicles won't even have to go to a test station," said Karl Fett, inspection/maintenance unit chief for DNR's Air Pollution Control Program. "The RapidScreen program rewards those people who maintain their vehicles extremely well, allowing them to skip a trip to the test station."

By November 1999, the project was officially christened the Gateway Clean Air Program (becoming known at DNR as "G-Cap"), and a major public information campaign was launched. Extensive work was done to acquaint media outlets and the general public with the features of the program. That public information effort continues. "A new program of this magnitude requires a massive information push to try to provide the public with the details they need to know. Reporters and editors must be briefed, Web sites designed and public meetings conducted," said DNR Director Steve Mahfood. "A toll-free information line, direct mail literature, paid

advertising – you name it. Staff at DNR and at ESP-Missouri have made communication with the vehicle owner in the St. Louis area a top priority."

10:08 a.m.:

Zengel showed the lane inspector her safety inspection and registration papers, got out of her car and was shown to the glassed-in waiting area. She watched the technician as he tested the gas cap for air leaks, then drove the car further up the lane into a second spot in the lane, settling the front wheels of the Chevy Beretta onto a set of rollers installed in the lane floor.

A large rubber cone was fitted over the tailpipe of the vehicle, and a fan was positioned to blow cool air toward the radiator. The dynamometer, an automotive treadmill making it possible to drive the car in place, hummed loudly as the inspector drove the car for four minutes, following pre-programmed speeds displayed graphically on a computer monitor.

Finally, the vehicle's emissions were gathered and analyzed by a bank of waiting computers.

(VOC + NOx) + Sun = Trouble

The St. Louis air quality problem can be summed up in one word: ozone. It takes a few more words to explain how unhealthy concentrations of this pollutant are formed down where people live and breathe.

"Ground-level ozone doesn't come out of anyone's smokestack or tailpipe," explains Jay Turner, Ph.D., assistant professor of chemical engineering and civil engineering at Washington University. "It takes a hot, calm and sunny summer day and enough of two other common air pollutants to cook up a high-ozone day." These two pollutants are Volatile Organic Compounds (VOCs, commonly known as hydrocarbons) and oxides of nitrogen (NOx). "Along with industrial and area sources, gasoline-powered vehicles are one of the largest sources of VOC pollutants in most urban areas, including St. Louis. Almost anything that burns produces quantities of NOx. Automobiles, coal-fired power plants and diesel vehicles such as heavy-duty trucks, are significant sources of nitrogen oxides. Power plants currently are being subjected to significant controls, while additional controls on diesel vehicles are forthcoming," said Turner. Because so many heavy-duty diesel vehicles are involved in interstate transport, their emissions can be more effectively monitored and regulated by federal controls on diesel engine emissions and the quality of diesel fuel. In May 2000, the U.S. Environmental Protection Agency (EPA) proposed to implement a regulation for stricter new diesel engine and fuel rules intended to cut diesel emissions by more than 95 percent.

"One of our typical St. Louis summer days combined with over 52 million miles driven each day by area motorists is a potent recipe for lung health problems in our region," agreed Susannah Fuchs, director of the Air Quality Program for the American Lung

Association of Eastern Missouri (ALAEM). "High concentrations of ground-level ozone can cause shortness of breath, coughing, wheezing, headaches, nausea and eye and throat irritation. Studies É show that even healthy adults can experience decreased lung function when exposed to ozone."

Fuchs also explains that people who suffer from lung diseases like emphysema, bronchitis, pneumonia, asthma and even the common cold have even more trouble breathing when the air is polluted. These effects can be worse in children, the elderly, exercising adults and those who spend extended periods of time outdoors like police or construction workers.

Getting control of the St. Louis ozone problem involves cutting down the emissions of many major and minor sources of harmful NOx and VOCs. These regulations are applied to industrial facilities, on-road and off-road mobile sources and even smaller area sources such as auto painting shops and dry cleaners.

The Gateway Clean Air Program's testing technology is the best available to test most gasoline-powered vehicles. Diesels are not tested because they are exempt. "It is true that diesel vehicles pollute, and those emissions are a real problem in many of the nation's urban areas," said Eric Giroir, a toxicologist with DNR's Air Pollution Control Program.

Large trucks and buses emit large quantities of pollutants, but they are not included in the program for two reasons. They emit relatively low amounts of the pollutants that form into ground-level ozone, or urban smog, which is the air quality problem of most concern in St. Louis. Also, many of these vehicles are transient in nature and impossible to regulate by a state. The federal government is setting new standards for new manufactured and rebuilt diesel engines and new standards to make diesel fuel burn cleaner.

10:19 a.m.:

In another nearby lane, Zengel could see a station technician talking with the owner of a vehicle that had not run as cleanly as required. The tech explained computer readouts showing where test standards had been exceeded and provided brochures explaining the next steps to take. The car needed emission-related repairs before it qualified for a free retest.

Fairness

The goal is cleaning up the air. Obviously, testing a vehicle does not reduce emissions. "Repairing the ones that pollute excessively is where the difference is made," said Karl Fett, inspection/maintenance unit chief for the department's Air Pollution Control Program. "Most motorists who

do a good job maintaining their vehicles have little to worry about. But we can still anticipate about a 10 to 15 percent failure rate. For auto emissions to be reduced and the air to be cleaned up, we have to depend on repair technicians and shops to be ready to help customers solve their emission problems."

Although motorists can still repair their own vehicles or have repairs done where they choose, special training was developed for repair technicians throughout the region. Those who complete the training are "recognized repair technicians" listed in a booklet provided to motorists whose vehicles fail a test. The shop's labor charges may be counted toward the spending requirements for a waiver. The waiver is issued only if the vehicle fails a retest and valid emission repairs and expenditures have been made.



Along with the monitor that charts and tracks the treadmill emissions test, a powerful fan provides the air needed to keep the engine cool.

"A vehicle that fails its emissions test is not working properly. Repairing it ensures that the vehicle will last longer, perform better, pollute less and get better gas mileage," said Ron Reiling, executive director of Missouri's branch of the Association of Automotive Service Providers (AASP). "Most motorists who fail the initial test are (bringing) their vehicle up to a passing standard."

10:27 a.m.:

A few moments and it was over. The inspector moved the car along to the third position in the lane as others moved up to take its place. A printer dispensed a report form as the inspector called Zengel's name from the exit door of the waiting booth. Even before she made it to the door, through the glass Zengel could see the technician placing a blue sticker on the inside of her windshield. "It passed!"

The emission testing of the Gateway Clean Air Program has been designed to double the emission reductions of the old program while providing the greatest possible convenience to the public. Each month the program has performed about 50,000 station-based tests and mailed approximately 60,000 RapidScreen notices.

The road to improve the St. Louis metropolitan area's air quality has been a long and complicated one. "Since its recent deployment, the Gateway Clean Air Program has been working through the inevitable growing pains, but is still improving every day," said DNR Director Steve Mahfood, a St. Louis native himself.

In late May, long lines developed at a few stations. Although several factors

contributed to this, May was the first month when emission inspections were not deferred. The end-of-the-month rush and low RapidScreen participation in April and May multiplied this effect. The program quickly alleviated this by requiring additional inspectors and bolstering the public information campaign about the RapidScreen option.

While RapidScreen is a phone and mail-in system, DNR has added capabilities at the stations to process motorists who have passed RapidScreen. This, along with other improvements in efficiency, has made long waits very rare, even at the end of the month.

DNR had received complaints that the toll-free information line was busy so it stepped up oversight of the system. Since then, additional lines and operators have been added to improve customer service. DNR will continue to provide oversight and pay close attention to customer service at the stations and with the phone information services. "Citizen convenience is one facet of this program that we have insisted on since the outset, and it was one of the important criteria stressed during the bid process," said Mahfood. "We're working very hard to ensure that the people of St. Louis are able to breathe cleaner air with as little disruption as possible in their daily lives."

For more information about the Gateway Clean Air Program, visit the program's Web site at [www.gatewaycleanair.com]. St. Louis area motorists also may call toll free 1-888-748-1AIR (1247).

Kerry Cordray is an information specialist in [DNR's Air Pollution Control Program](#) within the [Division of Environmental Quality](#).



MISSOURI

resources

Fall 2000 • Volume 17 • Number 3

Letters

I recently came across your publication in a hospital waiting room. I was very impressed. How can I subscribe? (The [subscription cards](#) were removed.)

Allan Davis
St. Peters

You've heard of know-it-alls? Well, just when I thought I had such a handle on energy conservation, along comes your article, "[To Catch a Thief](#)" (Summer 2000) by Jim Muench. Well done! Thanks for bringing me down a notch.

Jeannette Lee
Springfield

A few weeks ago, I had my first chance to visit Route 66 State Park. My daughter and I took a shortcut through what we thought to be a mown path. As we got deeper into it, the path became less and less mown. But, we saw 19 deer. We were thrilled until our bubbles burst while picking all the ticks off us! Having read [Missouri Resources spring issue](#), I wondered whether the prairie chickens could be introduced in this area. I wonder if this is a place they could thrive and help both the deer and people by eating ticks. Do they eat ticks?

Marsha Anderson
Maryland Heights

Editor's Note:

Although birds of this feather, such as quail and even chickens, will eat

lice and other small insects, whether they would prefer ticks is unknown. In summer months, up to 90 percent of prairie chickens' (more closely related to grouse than chickens) diet may consist of grasshoppers. When foraging, fowl will sometimes make brief, vertical, flying "jumps" to retrieve seeds from bushes just out of their reach. Even so, most of the ticks they might be able to reach in this manner would probably not be the ones that end up down our shirt collars. Jim D. Wilson, the Missouri Department of Conservation's ornithologist, advised us that although sufficient food to support re-establishing a species is an important consideration, many other factors go into deciding what is appropriate for them. One critical factor is the availability of expanses of managed prairie. Wilson added that even if prairie chickens had a fancy for ticks they would be unable to reduce their numbers enough to increase our comfort.

I would like to receive the free publication, [Missouri Resources](#). Thank you for making this magazine available. I am particularly interested in reading about ["energy thieves"](#) in the [Summer 2000, Volume 7, Number 2 issue](#).

Carol Vaughn
St. Louis

How can I get a [subscription](#) to this magazine? I read it at a friend's house and would like to receive it myself. There are some great articles I can use in my classroom.

Mary Taylor
Perryville



MISSOURI

resources

Fall 2000 • Volume 17 • Number 3

News Briefs

Heating Fuels in Short Supply

Although the price of gasoline had the nation reeling this past summer, behind the scenes, the high cost of heating fuels has concerned analysts and state and federal officials.

While the peak heating season does not start until after November, many suppliers begin stockpiling fuel in the fall. Heating oil stocks have been low as refineries concentrated on producing as much gasoline as possible. Because stockpiles are down, costs will remain higher. At the same time, the price of natural gas, which heats about half the nation's homes and is the primary heating fuel in the Midwest, doubled in the last year. Many new electric generating plants are using natural gas to fuel generators, increasing demand. Also, during peak summer cooling times, many plants use natural gas to supplement the coal they burn.

Heating oil is a distillate produced during the crude oil refining process as gasoline is produced. Natural gas is mainly a methane gas found in conjunction with crude oil.

EIERA Supports Research Project

The Environmental Improvement and Energy Resources Authority (EIERA) has provided extensive research data to the National Recycling Coalition (NRC) to help quantify state-specific efforts in recycling and reuse of waste.

The EIERA, through its Missouri Market Development Program, contracted with Missouri Enterprise in Rolla to conduct an eight-month study to evaluate various recycling categories, such as number of employees or workers involved in recycling, wages earned, goods and

services provided from recycling activities and the number of businesses operating in recycling or recycling-related activities.

The NRC, with assistance from R.W. Beck Consultants, will correlate Missouri's data with similar information compiled from other states to develop an economic picture of how recycling supports economic development and enhances local economies. The NRC plans to release a preliminary report on the findings in September.

Dursban, Lorsban Phase-out Begins



The U.S. Environmental Protection Agency (EPA) recently announced the phase-out and elimination of certain uses of chlorpyrifos, also called Dursban or Lorsban. This chemical is an organophosphate insecticide found in many home and agricultural products and some termite treatments. EPA's revised risk assessment determined chlorpyrifos threatens the health of children.

To check if a pesticide contains chlorpyrifos, read the section of the container label called "active ingredients." If you have had pesticides applied by professionals, they should be able to tell you if chlorpyrifos was used.

Consumers may continue to use products they have now or purchase up to the phase-out deadlines. As always, read the entire product label and follow all instructions. It is advisable to consider the new risk assessment if you use chlorpyrifos in or around your home, especially where children are present.

If you choose to dispose of your chlorpyrifos products, it is important to do so in a manner safe for you and the environment. It is particularly important to not dump pesticides outdoors or down the drain. If you have any questions about disposal, call the Department of Natural Resources Environmental Assistance Office at 1-800-361-4827. EPA's Web site, [www.epa.gov/pesticides/op/chlorpyrifos/consumerqs.htm] provides more information about the chlorpyrifos risk assessment.

New Teaching Materials Available

ReSource Your Waste, a teachers' guide for solid waste



education at the middle school level, and the "Travelin' Trash Kits," a collection of recycling information and recycled products, are now available for use by Missouri teachers.

Nearly 1,000 copies of ReSource Your Waste have been distributed statewide, including one to each of the 524 public school districts. Larger districts and non-public schools may also request copies to meet their recycling education needs. There is no charge for the teachers' guide, but as with other resources, the more they can be shared and reused with others, the better.

The "Travelin' Trash Kits" have been developed for teachers to check out for a few days or weeks. Each of the 20 solid waste districts, some state parks and most DNR programs or regional offices should have a kit to check out or will help you find one that is available.

DNR's Environmental Assistance Office (EAO) manages a publications distribution service that includes a variety of materials for teachers. For more information or to order the kit and the curriculum, call 1-800-361-4827 or visit the EAO Web site at [/oac/env_assistance.htm].

Dam Safety Gets Gator, Beaver



The Department of Natural Resources' Dam and Reservoir Safety Program now has a John Deere Gator and a 16-foot gooseneck trailer. The vehicles will transport specialized dam safety inspection equipment.

In 1999, Dam Safety purchased a remote-control miniature steerable truck system that allows employees to inspect pipes in dams with remote camera gear. "The gear, with all of its accessories, weighs about 800 pounds," said Ralph Hess, a Dam Safety technician. "We needed something suitable to transport the expensive equipment to inspection sites. Besides the Saturn II track-mounted camera and its control box, there are 500 feet of electrical cable and TV-monitoring equipment. We built a console unit on the Gator to hold the equipment."

The new equipment has already been used on five inspection sites. At one site, the remote camera detected a split in a pipe deep inside the dam structure. "If water had collected behind the dam and the pipe had filled with water under pressure conditions, it could have caused the

dam to fail as the leaking water eroded the dam fill," said James Alexander, director of the Dam Safety Program. "On this one site alone, the new equipment paid for itself."

Dam Safety purchased the new trailer and Gator with funds provided by the Federal Emergency Management Agency through the National Association of State Dam Safety Officials (NASDSO), which led to the program acquiring a new mascot.

"Beavers are the best dam builders in the world," said Hess. "NASDSO made it possible for us to get the transportation equipment. We have since adopted a mischievous-looking beaver as a mascot and put its image on the trailer."

Katy Trail Legacy Earns Recognition



Katy Trail State Park was officially dedicated as Missouri's Millennium Legacy Trail in a ceremony June 1. "Millennium Trails" is a national initiative of the White House Council in partnership with the U.S. Department of Transportation and the Rails-to-Trails Conservancy. The mission is to recognize, promote and support trails and preserve open spaces, interpret history and culture, and enhance recreation and tourism. Katy Trail is the only trail in Missouri to receive the designation and one of 53 in the nation.

To celebrate, DNR has launched a Katy Trail State Park Millennium Legacy Passport Program. This special passport program, which runs through Oct. 31, will encourage participants to collect stamps from the towns participating in the program along Katy Trail this summer and fall. Participants completing the program will receive a commemorative Millennium Legacy Trail T-shirt and patch. Passports are free of charge and can be found at participating businesses or by contacting DNR.

[Katy Trail State Park](#) is the nation's longest developed rails-to-trail project covering 225 miles from St. Charles to Clinton.

Digital Geologic Mapping Begins

The Department of Natural Resources Geological Survey and Resource Assessment Division (GSRAD) now has bedrock and surficial material geologic maps available in digital format and hard copies for some of the

7.5-minute quadrangles in Barry, Butler, Carter, Cass, Christian, Phelps, Ripley, Stoddard, Stone, Taney, and Wayne counties.

Similar maps also are available for the 30-minute-by-60-minute Table Rock Lake quadrangle.

"Geologic mapping has been a fundamental activity of Missouri geologists since the 1800s, but despite a century and a half of such work, there is still a great deal we need to learn about the basic bedrock and surficial material geology of Missouri," said Mark Middendorf, a department geologist. "One of the challenges for us today is to fill in the missing information and to make that information available in a format compatible with current technological needs and demands."

Such maps help solve groundwater and surface water problems, Middendorf said. "The structure of bedrock units and sediments affect groundwater movement. The more we know about what we are sitting on, the easier it is for us to protect our groundwater resources."

The work being done at GSRAD is part of the National Cooperative Geologic Mapping Program supported by the U.S. Geological Survey. It goes by the name of STATEMAP. The program is nationwide and began in 1993.

"We have completed more than 50 such maps for Missouri and they now are available from our maps and publications service," said Middendorf.

For information or to obtain a list of the available maps call (573) 368-2125.

State Park Sees Improvements



Visitors using the boat-launch facilities at Lake of the Ozarks State Park will have an easier time this fall, thanks to the completion of a \$1.5 million construction project. The project, which took place at the Grand Glaize Beach area of the park near Osage Beach, included expanding the current boat launching and redesigning it for more efficient traffic flow. The redesigned area expanded the number of parking spaces from 125 to 232. In addition to expanding the current boat launch area, the project included construction of a new boat-launch area in a nearby cove known as Pa He Tsi. The new area included a three-lane boat ramp and a 135-space parking area along with an overflow parking area for 80

vehicles.

Improvements also have been made at the marina. These include new boat docks (38 covered slips and 12 uncovered slips), a breakwater, fueling dock, courtesy dock, and a marine sewage pump-out station.

The improvements were made in response to input from the general public and groups that use the area for fishing tournaments.

EIERA Staffer to Lead MORA

Kristin Allan, manager of the Market Development Program, through the Environmental Improvement and Energy Resources Authority, was recently elected the Missouri Recycling Association (MORA) president for a one-year term.

MORA has a nine-member board of directors and 160 members statewide. The organization supports recycling and waste reduction activities by providing information, educational opportunities and technical assistance in partnership with regional, state and national organizations. MORA sponsors an annual conference in the spring. Based in Jefferson City, MORA's Web site is [www.mora.org] and the telephone number is (888) 325-6672.

MISSOURI resources

Fall 2000 • Volume 17 • Number 3

One Last Word

Old Chain, New Links

by Tracey Berry

Dozens of cyclists in matching bright yellow and black jerseys milled about the gravel parking lot, laughing, chatting and guzzling water. Some stretched out on benches enjoying the mild spring afternoon. Others remained astride their bikes, eager to get back on the trail.

The cyclists, ages 7 to 71, represented a partnership between the Rails-to-Trails Conservancy and World T.E.

A.M. (The Exceptional Athlete Matters) Sports, a group that promotes physical diversity. One man, lacking the use of his legs, turned a crank with his hand to propel his bicycle. A blind man helped power a tandem with his sighted partner. They had left Boston 22 days earlier bound for the Gateway Arch. This stop in north St. Louis County preceded the final leg of their journey. Behind them, the Old Chain of Rocks Bridge rose from the banks of the Mississippi.



World T.E.A.M. Sports cyclists relax after crossing the Old Chain of Rocks Bridge.

"This is going to be the Mississippi crossing of the coast-to-coast trail," said David Burwell of Washington, D.C. Burwell is president of the Rails-to-Trails Conservancy, which hopes to one day see the bridge connected to Missouri's Katy Trail State Park.

"They all want to come across this bridge, and they all want to use the Katy," he added.

The Old Chain of Rocks Bridge is not only a potential link in a future coast-to-coast trail, it is a key component of the Confluence Greenway, a 40-mile linear park under development on both sides of the Mississippi River. Plans for the area where the Mississippi, Missouri and Illinois rivers meet include a series of multi-use trails linked by the bridge. Eventually, the bridge also may become part of a larger trail system that uses Katy Trail State Park to span Missouri from Illinois to Kansas.

The continuous-truss structure is among the world's longest pedestrian and bicycle bridges. It is named for a nearby limestone ledge that cuts across the Mississippi, churning up rapids. The U.S. Army of Corps of Engineers augmented the naturally occurring shoals to discourage navigation attempts. Vessels have been routed through a canal to the east since 1952, yet the rapids beckon kayakers, anglers and wintering eagles.

Constructed in 1929 as a toll bridge, the Old Chain of Rocks Bridge became part of the now-historic Route 66 in 1936. The City of Madison, Ill., purchased it in 1939. The opening of a free Interstate 270 bridge 1,800 feet to the north led to a decline in revenue and ultimately the bridge's closure in 1968. Demolition was planned in 1975; however, a steep drop in the value of scrap steel rendered it unprofitable to tear it down, so the bridge was left idle, becoming an attraction for vandals.

In 1989, a newly formed land trust dedicated to the development of linear parks, Trailnet Inc., envisioned a new use for the bridge – as a bicycle and pedestrian crossing. The \$4 million restoration project began in 1997. Trailnet signed a 20-year lease with the City of Madison to operate the bridge. The Missouri Department of Natural Resources supplied a \$45,000 grant from the federal Recreational Trails Program fund for repairs. The names of other renovation project donors are affixed to the rails along with messages such as, "Enjoy the View," and "Live Your Dream." Parking and portable toilets are available on both sides of the river and picnic tables, made from recycled materials, permit a scenic lunchtime break on the bridge itself.

Ginny Zschau of Spanish Lake said the bridge provides a great path to walk her dog. "The river is beautiful to look at and there's usually a nice breeze," she said.

The view looking south is a confluence of past and present. In the distance, the modern St. Louis skyline rises as a backdrop to three water intake towers whose turn-of-the-century architectural style mimics that of gothic castles.

On a recent weekend, Allen Minks of Florissant brought his 11-year-old son to cycle across the bridge. Minks marveled that the once-doomed structure has found a new life as a recreational attraction. He recalled trips across the 24-foot-wide bridge as a passenger in his father's car. "Now I'm an engineer and I look at it and think, holy cow."

The Old Chain of Rocks Bridge trail is open from 9 a.m. to 5 p.m. on weekends through Nov. 26.

MISSOURI

resources

Fall 2000 • Volume 17 • Number 3

Resource Honor Roll



David J. Lyons

As energy planning manager for automobile manufacturer DaimlerChrysler, David J. Lyons performs a balancing act.

"As a strategic plan, we're looking for projects that not only impact the environment positively, but also have benefit to our stockholders," he said. To address those priorities, Lyons has led the automaker's efforts to utilize landfill gas (methane is a natural landfill by-product) to power its Fenton assembly plants.

Superior Services' 125-acre Oak Ridge Landfill will supply the landfill gas, which will be shipped via an underground pipeline to DaimlerChrysler's Fenton complex. There, the gas will power two old coal-burning boilers that have been retrofitted to heat and cool the plants as well as supply the energy required for some manufacturing processes. The agreement between automaker and landfill operator offers the environmental benefits of reusing waste gas that would otherwise be burned off as well as a 25 to 35 percent reduction in the amount the automaker would have spent to purchase natural gas for the Fenton facilities.

Using information supplied by the U.S. Environmental Protection Agency's Methane Outreach Program, Lyons examined the constituents of municipal landfills to gauge whether landfill gas would damage the company's boilers, thus reducing thermal efficiency. Comfortable with the results, Lyons brought the plan to fruition. "The economics are great on paper, but we have to make sure the equipment has (a sufficient) life expectancy. It doesn't help if we have to shut down boilers and stop making cars," he explained.

The company plans to begin powering its Fenton complex using landfill gas later this year.



Marc Ramsey

While researching the feasibility of using gas from waste, Lyons examined a number of existing projects, including the agreement between Pattonville High School and its Maryland Heights neighbor, the Fred Weber Inc. Landfill. Lyons said Pattonville's success gave him hope that his project would be accepted.

Pattonville High School officials have heated their building using landfill gas since 1997. However, the idea that led to the partnership with Fred Weber was born three years earlier during a dinner-table discussion at Marc Ramsey's home. Ramsey, a civil engineer, is Fred Weber's vice president of landfill operations. He said his daughter, a high school student at the time, asked if it would be possible to pipe landfill gas to her school. Fred Weber was already utilizing landfill gas in its asphalt and concrete operations as well as to heat a commercial greenhouse, but the landfill produced far more gas than the company could use. As a result the landfill was flaring, essentially wasting, the excess. Ramsey began talks with school administrators to interest them in the possibility of a partnership and he initiated the feasibility study that brought about the project.

Fred Weber spent \$250,000 to build a pipeline to the school's property line. The company also upgraded its blower system and installed additional wells and piping to transport gas to the school. The partnership saves the district up to \$40,000 per year in heating expenses.



MISSOURI

resources

Fall 2000 • Volume 17 • Number 3

Resources to Explore

Montauk State Park

by Jamin Bray

Ask anyone, "What does Montauk mean to you?" and you are likely to get a wide variety of answers. Montauk State Park means many things to many different people. More than 400,000 visitors enjoy this scenic area every year, each with their own point of view. But they all agree that Montauk is a special place.

If you ask an angler, Montauk means trout, and lots of them. Montauk is one of three parks in the Missouri state park system that supports a trout hatchery, and trout fishing is its best-known attraction. The Missouri Department of Natural Resources (DNR) operates the park while the Missouri Department of Conservation runs a modern trout hatchery within the park. The hatchery raises more than 300,000 fish each year to stock at several locations. Fish are stocked nightly in the park from March 1 through Oct. 31, and monthly during the winter "no creel" season. Visitors enjoy different fishing styles, so the park is sectioned to offer opportunities for bait and artificial lure, catch and release and fly-only fishing.



Montauk State Park lures anglers to its trout-stocked waters for fly fishing and the catch-and-release program. DNR photo by Marian Goodding

But Montauk State Park is more than just a trout park; it is an interesting blend of natural, cultural and recreational resources for visitors to explore.

If you ask a nature enthusiast, Montauk means diverse habitats and abundant plants and wildlife. Montauk State Park is located in the Ozarks of Southeast Missouri. The park includes 1,356 acres of river valley cutting through steep ridges of upland forest. The headwaters of the Current River, one of the premier canoeing destinations in the Midwest, are located within the park. Montauk is well known for the abundance and quality of its water. Two large springs and several smaller spring outlets combine to provide an average flow of 53 million gallons of springwater per day - the 11th largest spring system in the state. Bluff Spring, which alone produces 9 million gallons of water per day, provides water to two sets of hatchery rearing pools and the hatchery building. The main Montauk Springs complex supplies water to 12 separate trout-rearing pools. The springs at Montauk are generally gravel and sand boils, emanating from shallow groundwater sources. The presence of abundant amounts of springwater has helped shape the valley and the natural communities that have developed

here.

Historically, the Montauk valley was home to a small milling town surrounded by upland forests. Water was harnessed for grist and saw mills, crops and pasture grasses were planted, and virgin timber was cleared from surrounding hillsides. Existing natural communities reflect these activities and are in various stages of restoration following these disturbances. Montauk still contains some remnants of pre-European settlement landscapes, such as glades and upland forests.

A mix of flood-tolerant woody species, flowering plants and grasses live in the floodplains of Pigeon Creek and the Current River. Flooding continues to be the dominant force in the valley, reshaping the stream channels, scouring silt, sediment and gravel, depositing sand and debris, and inundating broad expanses with water.

An abandoned hatchery located in the floodplain has been maintained as a spring-fed wetland area now known as Montauk Lake. Willow is the dominant tree species, and other typical wetland plants also are present. A large slough runs between the Current River channel and the hatchery building. This slough actually is a remnant of the old river channel and still serves as such during high water. Most of the time, however, the slough is cut off from springwater supplies, and temperatures rise to levels that support a different natural community than the spring-fed areas.

Moist forests are common at Montauk, and occur on northern and eastern slopes and in drainages between ridges. Habitats within this community type vary from moist ravines and wooded slopes to dolomite bluffs with the vegetation reflecting this variation. Ridge tops are numerous throughout the park and are characterized by higher elevations, gentle slopes and dry conditions. These communities contain most of Montauk's large, native shortleaf pine stands.

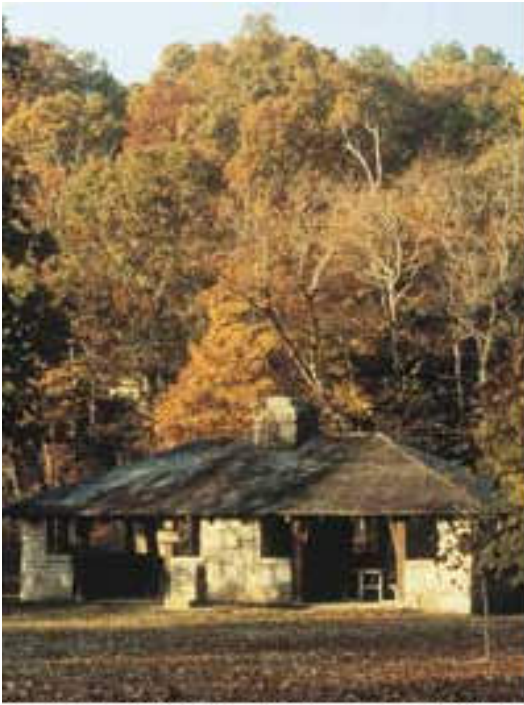
Glade habitats are found on the slopes of steep, south and southwest-facing hillsides. These communities receive direct sunlight most of the day and tend to be much warmer and drier than surrounding habitats. The soil is thin in the Montauk valley and there are many rocky outcrops. Glade vegetation is tolerant of these conditions and many unique glade species have been documented in the area.

Periodic fires prior to European settlement helped shape the plant communities on these hillsides by controlling the growth of woody species and creating conditions conducive to the growth of grasses and forbs, which are herbs other than grasses. As a result of fire suppression during this century, glades have become very rare at Montauk. There are two remnant glades in the park: one in the 40-acre Montauk Upland Forest Natural Area, and another along a ridge above the campground.

Wildlife viewing is excellent along the one-and-one-half-mile Pine Ridge Trail, the three-fourths-mile Montauk Lake Trail and the numerous fishing trails and access roads. Birders often visit Montauk to seek out the more than 150 species of birds found in the valley. The park is home for 27 plant and animal species currently listed in Missouri as rare or endangered. Species range from rare plants such as the Cherokee sedge (found in bottomland forests) to birds such as the bald eagle (found along the stream in winter) and mammals such as the gray bat (found in Montauk Mill).



DNR Naturalist Jamin Bray explains the State Parks Junior Naturalist Program to visitors before taking the group on a stream walk. During stream walks, Bray points out a variety of life forms, such as crawfish and water bugs, and explains various food chains found in the creeks at Montauk State Park. DNR photo by Rachel Penn



The Civilian Conservation Corps constructed many of the structures found in state parks across the country, including this stone and wood picnic shelter built at Montauk State Park during the 1930s. The shelter is listed on the National Register of Historic Places. DNR photo by Marian Godding

If you ask a history buff, Montauk means a rich and diverse human history. Indians of the Osage tribe, who used the rich valley as a seasonal hunting ground, first inhabited the area. European settlers from New York state first came to the area in the early 1800s and gave the valley the name Montauk, an Algonquin Indian word meaning "hill" or "fort" country. Settlers soon took advantage of the constant supply of water power from the Current River and built grist and saw mills to support their communities. Montauk Mill, constructed in 1896, was the last gristmill built in the valley and is open to the public for tours. The town of Montauk was a thriving community for many years, until new milling technology brought about the decline of the old-style gristmills.

Civil War enthusiasts might enjoy exploring the valley as the site of a Civil War skirmish in 1862. One thousand Union soldiers were sent from nearby Fort Davidson to find a band of 200 Confederate guerrillas known to be in the valley. A battle ensued, but Union troops fled after growing short on ammunition. Another cultural feature of the park

is the work completed by the Civilian Conservation Corps. Company number 770 was stationed at Montauk as part of President Franklin Roosevelt's program to support families during the Depression. These men built the original hatchery (evident at Montauk Lake), as well as trail and camping facilities.

If you ask a hungry or sleepy traveler, Montauk means comfortable camping and lodging facilities. Many of the 156 campsites are on the banks of the Current River. The campground offers electric or basic sites, showers and laundry facilities. The Dorman L. Steelman Lodge has a full-menu dining room, snack bar and store, as well as motel rooms and rental cabins. Some cabins remain open during the winter.

Ask a child what Montauk State Park means to them and the words fun, learning and adventure no doubt will be mentioned. School groups flock to Montauk to take nature walks, mill tours and participate in activities to learn about nature and history. Kids and families visiting the park may experience the wonders of the night during a guided night walk or take a step back in time during a living history demonstration. Interpretive programs, including nature walks, hands-on demonstrations, slide shows, nature games and crafts are presented from March through October.

So, what does Montauk mean to you? Why not visit and find your own favorite resource to explore at Montauk State Park?



Montauk State Park is located near Salem and Licking on state Highway 119 in Dent County. For more information, contact the park office at (573) 548-2201, or call the Department of Natural Resources toll-free at 1-800-334-6946 (voice) or 1-800-379-2419 (Telecommunications Device for the Deaf).

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Teacher's Notebook

Home Safe Home?

Keeping Children Safe from Household Hazards

by James D. Lubbers

"Keep Out of Reach of Children" is a familiar phrase found on the labels of hundreds of potentially hazardous household products. It dates back at least to 1962 when the U.S. Department of Agriculture required that it appear on pesticide labels. Today, it appears on many types of products. Consumers need to pay attention to the information on these labels to reduce risks to humans, minimize waste and prevent harm to other species and the environment.



Household hazards take many shapes. Improperly disposed motor oil can be toxic to fish and birds. Antifreeze contains ethylene glycol, a poison, and a sweet smell that can attract pets. Pesticides use a number of chemicals. Oil-based paints use organic solvents that can irritate skin and eyes and damage the kidney, liver and brain. Wet-cell batteries rely on lead and sulfuric acid and can produce explosive gases.

The "Keep Out of Reach" statement is just one of several bits of information required on the labels of household products that may be hazardous if used, stored, or disposed of improperly. Household products are considered hazardous if they are: toxic, ignitable, corrosive or reactive. Signal words represent just how dangerous the product is. With the words DANGER or POISON, contents are highly toxic, ignitable, corrosive or reactive, followed by WARNING, which indicates moderately toxic contents, and CAUTION, which is used for slightly toxic products.

In many products, it is these very properties that make them desirable to do the jobs for which they are intended. Pesticides, for example, are designed to kill insects and animals, and drain cleaners are made to be chemically reactive. Because many products are inherently dangerous, the U.S. Department of Agriculture requires product labels listing the hazards of

improper use and disposal. Reading the labels thoroughly allows consumers to make informed decisions.

Another requirement on product labels is a "statement of practical treatment" in case of accidental ingestion, inhalation or contact with skin or eyes. Directions for use, storage and disposal usually are provided as well and should be followed carefully to help minimize health risks.

Is Your Home Safe?

With all kinds of potentially hazardous products on the market, it is the responsibility of the consumer to weigh the benefits and risks of using such products. Many product labels advertise benefits in big bold type and precautionary information in print too small to read. Nevertheless, reading the label first can save time, trouble, money and avert possible safety risks.

Parents and teachers must decide at what age children are able to understand specific dangers and risks associated with hazardous household products. Guide children through the following exercise to provide a framework for responsible habits.

Activity: Home Inventory of Household Products

Direct students to walk through their homes making lists of household products whose labels include signal words indicating possible risks. Young children will need guidance and supervision from parents or older siblings. Older students can complete the exercise on their own.

Review the lists in class. Discuss the following questions with the students.

- How many items did they find? Which are still useable and which are not?
- Were they able to read and understand, storage and disposal directions?
- Is each stored properly (sealed, identifiable, out of the reach of children)?
- Are flammable products kept away from heat or sparks? Are containers leaking?
- Are these products really needed? Are there less hazardous alternatives?

EPA, CLI and RtLF

In 1996, the Environmental Protection Agency (EPA) began working with individual consumers and manufacturers in a voluntary cooperative program, the Consumer Labeling Initiative (CLI), to improve labels on pesticides and hard-surface cleaners. The CLI partnerships and subsequent recommendations have lead to easier-to-read product labels and the "Read the Label First!" (RtLF!) campaign.

The RtLF! campaign was kicked off March 6, 2000. The RtLF! "reading person" symbol does not imply an endorsement of products. The RtLF! campaign is to improve public health, safety and the environment by encouraging people to read label information and follow directions regarding selection, precautions, storage and disposal.

Special concern for child safety is only one part of preventing problems that can accompany the use of hazardous household products. Complacency or ignorance when using hazardous products can lead to a variety of health problems and death. Hazardous substances that end up in the environment can harm or kill humans and animals or contaminate food and water resources. Hazardous products are designed to solve a wide array of problems, but consumers must be careful not to create new problems through improper use and disposal.

Missouri continues to play a leading role in educating people about ways to reduce risks and minimize wastes through the Household Hazardous Waste Project (HHWP), which for more than a decade, has produced and distributed educational materials and has developed an Internet course entitled: From Awareness To Ac-tion.

To contact the HHWP, go to [outreach.missouri.edu/owm] or call the University of Missouri Extension, Office of Waste Management at (417) 889-5000.

Homework: Read the Label First! (and do what it says)!

The best option for managing household hazardous waste is to not make it in the first place. If you buy hazardous products, make sure you follow directions for use, storage and disposal. If you have or know about materials needing disposal or have questions about safer alternatives, contact the Missouri Department of Natural Resources at 1-800-361-4827 or visit our department home page at [www.dnr.state.mo.us].

The EPA has an informative Web site at [www.epa.gov] for additional information about hazardous household products.

James D. Lubbers is an environmental education specialist with [DNR's Technical Assistance Program](#) within the [Division of Environmental Quality](#).

Product Name
DIRECTIONS FOR USE
It is a violation of federal law to use this product in a manner inconsistent with its labeling. _____

PRECAUTIONARY STATEMENTS HAZARD TO HUMANS (DOMESTIC ANIMALS) DANGER

ENVIRONMENTAL HAZARDS

PHYSICAL OR CHEMICAL HAZARDS

KEEP OUT OF THE REACH OF CHILDREN DANGER

FIRST AID
(Statement of Practical Treatment)
If Swallowed _____
If Inhaled _____
If in Eyes _____
If on Skin _____

THIS PRODUCT CONTAINS
XX LBS. OF XXXX PER GALLON

STORAGE AND DISPOSAL
Storage _____
Disposal _____

Active Ingredients _____ %
Other (Inert) Ingredients _____ %
TOTAL: _____ 100%

Manufacturer's Address _____
Net WT. / NET content statement: _____
EPA Registration No. / EPA Reg. No: _____
EPA Establishment No. / EPA Est. No: _____

Warranty Statement _____

The "Read the Label First" campaign encourages consumers to acquaint themselves with the hazards that some household products pose and to promote their safe use and disposal.