

## **Water Quality**

# Water Quality Division is Guardian of State Waters



*Lily pads floating on an Oklahoma pond provide cover for fish.*

The Water Quality Division (WQD) of the Oklahoma Department of Environmental Quality (DEQ) protects the state's ground and surface waters and ensures the safety of public drinking water supplies. The division is responsible for assuring that wastewater discharges from municipal and industrial treatment plants do not have a negative effect on the formally designated "beneficial uses" established in the state's Water Quality Standards. The combination of several strategies — licensing, permitting, enforcement and techni-

cal assistance — helps to accomplish the mission.

WQD is organized into ten sections, each with a particular purpose: Public Water Supply (PWS) Enforcement; Compliance Tracking and PWS Administration; Drinking Water State Revolving Fund and Construction Permitting; Operator Certification and Complaint/Permit Tracking; Municipal Permitting; Industrial Permitting; Municipal Wastewater Enforcement; Industrial Wastewater Enforcement; Watershed Planning and Stormwater Permitting; and

Program Management. The following are examples of how WQD roles and responsibilities are organized:

- *Public Water Supply Enforcement.* Engineers conduct compliance assistance visits and sanitary surveys, during which they help system operators keep drinking water systems in compliance with federal regulations.
  - *Operator Certification Section.* Staff conduct training sessions and certification examinations for operators of water and wastewater systems and laboratories. Training and certification ensure that only qualified personnel are treating Oklahoma's drinking water and wastewater.
  - *Watershed Planning and Stormwater Permitting Section.* To help keep pollutants at or below acceptable levels, this section develops Total Maximum Daily Load (TMDL) calculations for rivers, streams and lakes and manages storm water permitting.
  - *Program Management Section.* Program Management centralizes division functions that support the technical work of the sections. Program Management delivers administrative support (e.g., reception, accounting, grant tracking, permitting tracking, monitoring and enforcement activities) and technical support (e.g., Information Technology, Geographic Information Systems, Global Positioning Systems).
- WQD continues to streamline permit issuance and compliance assurance responsibilities. The state is moving toward more general permits and a holistic approach to watershed restoration and protection. One of the objectives is to prioritize areas for attention in accord with their needs, which in turn ensures that more serious violations are addressed first and that water protection activities are systematic and as cost-effective as possible. ■

# Fifth Graders Learn at H<sub>2</sub>Oklahoma

After attending this year's H<sub>2</sub>Oklahoma Festival at Foss State Park in Western Oklahoma, 250 fifth graders from the Upper Washita River Watershed went away with a new appreciation for Oklahoma's clean, plentiful water – and for what it takes to assure that the resource is saved for future generations. A fifth grade teacher praised the event: "Our students learned more in one day than we could have tried to teach them in nine weeks." Students, teachers and festival presenters braved temperatures above 100 degrees on September 17 to participate in the 2004 festival.

DEQ chaired this year's effort. For the eighth year, department employees helped organize and present it. In all, 22 employees from all divisions shared their expertise, enthusiasm and time. They hosted eight activity stations on topics as diverse as the water cycle and water history, environmental law, conservation and protection. Students ended the day with a deeper

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*Students learn how water recycles.*



*Elena Jigoulina,  
Water Quality  
Division, shows  
students the effects  
of water pollution.*

understanding of the water cycle and the resource's multiple uses that sustain and enhance life. Other state and federal agencies covered additional topics at 16 other activity stations.

Contributing to the success of the event, DEQ employees joined with others from the Office of the Secretary of Environment and the Oklahoma Environmental Education Coordinating Committee. The Coordinating Committee represents the Oklahoma departments of Agriculture and Forestry Services, Commerce, Environmental Quality, Tourism and Recreation, Transportation, and Education; also, the Oklahoma Water Resources Board, the Natural Resources Conservation Service and the U.S. Fish and Wildlife Service.

H<sub>2</sub>Oklahoma Festival's goal is to raise student awareness of how vital water is in their daily lives and of what they can do to help keep it clean and safe. ■



*Ilda Hershey, Water Quality Division, talks about water conservation and shows students how settlers had to haul their own water.*



*Denise Harkins, Customer Services Division, teaches students how to make rain sticks.*

# New Public Water Supply Regulations Addressed

On January 1, 2004, many Oklahoma community drinking water systems became subject to the new standards of the Disinfection Byproducts (DBP) Rule. The rule implements the 1996 amendments of the federal Safe Drinking Water Act. Initially, the new rule meant that about 75 percent of Oklahoma's community drinking water systems that use surface waters were noncompliant with national standards. Their overnight noncompliance resulted in part from the fact that many state surface water sources are rich in organic material.

The chlorination process that kills bacteria also transforms organic material into other compounds, many of which are possible contributors to increased risk of certain types of cancer. The additional treatment needed to comply with the new DBP rule can be complicated and expensive. Many water systems are ill-equipped and lack funding to remove organic material. Currently,



*Raw water pump station in Chandler.*

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there is no universal approach to meet the needs of all the noncompliant systems. DEQ is undertaking pilot study projects with some of them to find possible solutions.

The quality of Oklahoma's drinking water has not changed recently, but new federal rules designed to protect human health are becoming more stringent. In January 2006, the new Arsenic Rule becomes effective, lowering the previous limit by one-fifth. Approximately 25 Oklahoma water systems are expected to be in violation of the new standard when the rule goes into effect. Arsenic occurs naturally in our rocks and soils. Long-term, high exposure to arsenic has been linked to certain cancers.

DEQ is offering information, education and training for water system operators, administrators and consulting engineers to help them respond to federal regulation changes. Workshops are being held at Rural Development Centers and at DEQ in Oklahoma City. District engineers have already presented 10 regional workshops, and they will offer more sessions throughout 2005. They are also giving one-on-one technical assistance on-site. Finally, where



*District Engineers check a water clarifier during a technical assistance visit.*

necessary, DEQ will provide enforcement initiatives.

As science sheds light on emerging problems, EPA and the states respond with voluntary and regulatory solutions. Although challenging, the new rules are meant to protect public health. DEQ is committed to helping the regulated community do its part in preserving water quality for all Oklahomans. ■



*District Engineers Steven Hoffman and Robert Mullins examine the flow of water after it passes through various filters at a treatment facility.*

# Targeted Technical Assistance Improves Water Quality

*Nowata Water Treatment Plant.*



Oklahoma was selected to be the first state to pilot a highly specialized technical assistance program for reducing disinfection byproducts in drinking water. The City of Nowata participated in the Targeted Technical Assistance (TTA) pilot, and an

Area-Wide Optimization (AWOP) team facilitated the joint effort. Team members included staff from Public Water Supply Enforcement (Water Quality Division) and specially trained contractors working with the EPA Region 6 Office.

The project began October 19, 2004, when the team met for two days with the Nowata superintendent and plant operators. The study was initiated as plant operators lowered the chlorine residual concentration within the water distribution system, and

then helped develop a schedule for monitoring the system's chlorine concentrations and levels of disinfection byproducts in the finished water. After the initial site visit, team members stayed in contact with Nowata by phone and with periodic site visits. To chart the results, chlorine residual data were obtained from five points in the distribution system, and disinfection byproduct data were collected from the water plant, a nursing home, the fire station and one other site in the system.

The pilot project was a success. As a result of lowering the Nowata water distribution system's chlorine residual concentrations for the study, disinfection byproduct concentrations were also reduced to the point that the system complied with the required Maximum Contaminant Levels established by federal rules. To help system operators across the state understand and deal with the new disinfection byproducts regulations, DEQ will continue its TTA efforts. Oklahoma and DEQ are honored to have been chosen the first state in the nation to participate in the technical assistance program. ■

# Storm Water Management at Highway Construction Sites

The Department of Environmental Quality (DEQ) has developed a special working relationship with the Oklahoma Department of Transportation (ODOT) since EPA delegated the federal storm water program to DEQ in September 1997. When DEQ assumed responsibility for the storm water portion of the National Pollutant Discharge Elimination System program, the department implemented a co-permit, or joint permit status, with ODOT and its road construction contractors.

ODOT staff and contractors have a long history of working toward improved erosion control on road construction projects and ODOT rights-of-way. Since 1999, ODOT and DEQ have co-sponsored training at the Association of General Contractors office complex, ODOT's Resident Engineers Academy and various ODOT district office facilities. ODOT has also been supportive by arranging training in the form of on-site visits to projects for contractors, ODOT inspectors and DEQ employees.



*Representatives from DEQ and ODOT inspect highway construction erosion-control measures.*

Site inspection and enforcement continue to be among the tools DEQ uses to bring road con-

struction projects into compliance with permit conditions. As a whole, highway construction and mainte-

nance contractors appear better engaged and more successful these days with the erosion control

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and pollution prevention aspects of their work. Since 1999, DEQ has needed to issue fewer enforcement actions in response to referrals, complaints or routine inspections. This directly reflects the willingness and ability of ODOT and its contractors to address problems quickly and efficiently.

Technical assistance and outreach to supplement inspection and enforcement appear to be helping to reduce noncompliance levels. DEQ's goal is to promote cooperation between the regulated community and the agency, and to help the community develop a more positive attitude toward permit compliance and the environment. Although enforcement alone directly affects a targeted project and, to an extent, those involved, technical assistance and outreach can touch many individuals and entities at once. Attitudes and actions seem to change for the better when individuals are aware of the potential effects of construction activity on water quality, exposed to best

management practices and given insight into the roles of regulation and DEQ, as well as their own responsibilities. The relationship of the regulated community with DEQ is evolving into one of partnership and mutual cooperation.

ODOT has offered a great deal of cooperation, holding inter-agency management meetings and helping to develop productive working relationships among the agencies' staff. Technical assistance and joint training efforts are frequent, and compliance with permit requirements has been improving, as noted during recent DEQ inspections. Using all of the tools at its disposal — inspection, enforcement, technical assistance and outreach — DEQ is experiencing improved cooperation and compliance from ODOT and contractors coupled with a growing stewardship attitude. ■



*Joe Willingham of DEQ and Michele Dolan of ODOT verify the proper installation of a silt fence at a highway construction site.*



*Best management practices at this construction site include silt fences and mature vegetation maintenance.*

# Maximum Daily Loads Set for Pollutants to Protect Fort Cobb Watershed

The federal Clean Water Act requires Oklahoma's Department of Environmental Quality (DEQ) to improve water quality where minimum standards, including goals and pollution control targets, are not already met. This is accomplished by establishing limits known as Total Maximum Daily Loads, or TMDLs, for each pollutant that exceeds Oklahoma standards.

The "load" in TMDL refers to the amount of each pollutant that a waterway can receive and not violate water quality standards, taking pollution from all sources into account. TMDLs set pollutant levels that allow water bodies to safely achieve their "beneficial uses," such as water for drinking, recreation, aesthetics, irrigation, fishing and swimming. A TMDL document uses scientific data collection and analysis to determine the amount and source of each pollutant entering the system. It allocates pollutant loads to each source at levels that ultimately could restore water quality to clean water standards.



*Black locust trees planted along a riparian zone at Lake Creek.*

During the development of a TMDL for the Fort Cobb watershed, the beneficial uses of Cobb Creek, Lake Creek, Willow Creek, Fivemile Creek and Fort Cobb Lake were evaluated for the potential effects

of excess nutrients, suspended solids, siltation, turbidity and pesticides. The resulting report recommends a 68 percent reduction in phosphorus loading to Ft. Cobb Lake. Pesticide levels were found

not to exceed water quality standards. No point (or end-of-pipe) sources are located in the watershed, so nonpoint sources account for the pollutant levels. For ex-

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ample, storm water runoff from nearby agricultural land contributes to the excess pollutants in the Fort Cobb watershed.

In cooperation with the Oklahoma Conservation Commission, DEQ considers various combinations of best management practices to improve water quality, such as riparian buffers, no-till cultivation, winter cover for row crops, conversion of highly erodible cultivated lands to pasture, grade-stabilization structures, and diversions and terraces to reduce sediment and nutrient loss from land. Other best practices might include limiting livestock access to creeks, nutrient management plans and education on fertilizer application.

DEQ encourages residents of the Fort Cobb watershed to continue to take advantage of opportunities to cost-share with the Oklahoma Conservation Commission. Assistance is available for activities such as establishing riparian areas like those with black locust trees along Lake Creek, an impaired stream leading to Fort Cobb Lake. Landowners have also installed creek jacks to help stabilize Sandy Creek's banks. Among other benefits, such activities decrease the amount of phosphorus going into the lake. ■



*Cattle fencing at Lake Creek.*

# New Storm Water Permit Issued

The Department of Environmental Quality (DEQ) is focusing on storm water pollution prevention in urban areas. On February 8, 2005, DEQ issued a new storm water permit pertaining to communities with a population of 10,000 or more and a population density of at least 1,000 per square mile. The Phase II Small Municipal Separate Storm Sewer System (MS4) permit affects small suburbs around Oklahoma City, Tulsa, Norman and Lawton. Approximately 45 communities to date have been designated as subject to Phase II storm water regulations.

The permit requires regulated communities to develop a storm water management program (SWMP) to achieve substantial reductions in pollutants discharged into the state's water bodies. Programs must include the following six minimum-control measures:

- Public education and outreach
- Public participation and involvement
- Illicit discharge detection and elimination
- Construction site storm water runoff control



*Construction site storm water runoff control is a required minimum-control measure in the storm water management program.*

- Post-construction storm water management in new development and redevelopment
- Pollution prevention and good housekeeping for MS4 operations

DEQ has adopted a list of EPA-approved "best management practices" for each minimum-control measure. Regulated small MS4

communities are encouraged, however, to tailor their plans for local storm water problems and to schedule implementation with measurable goals for the 5-year permit term.

DEQ recently assisted regulated small MS4 communities by holding day-long workshops in Oklahoma City and Tulsa. The

agency encourages municipalities to take a watershed approach to local storm water management, working with neighboring MS4s to develop cooperative programs. By working together and sharing costs, municipalities will realize more environmental benefits at a lower program cost. ■

# TMDL Program Limits Watershed Pollutants

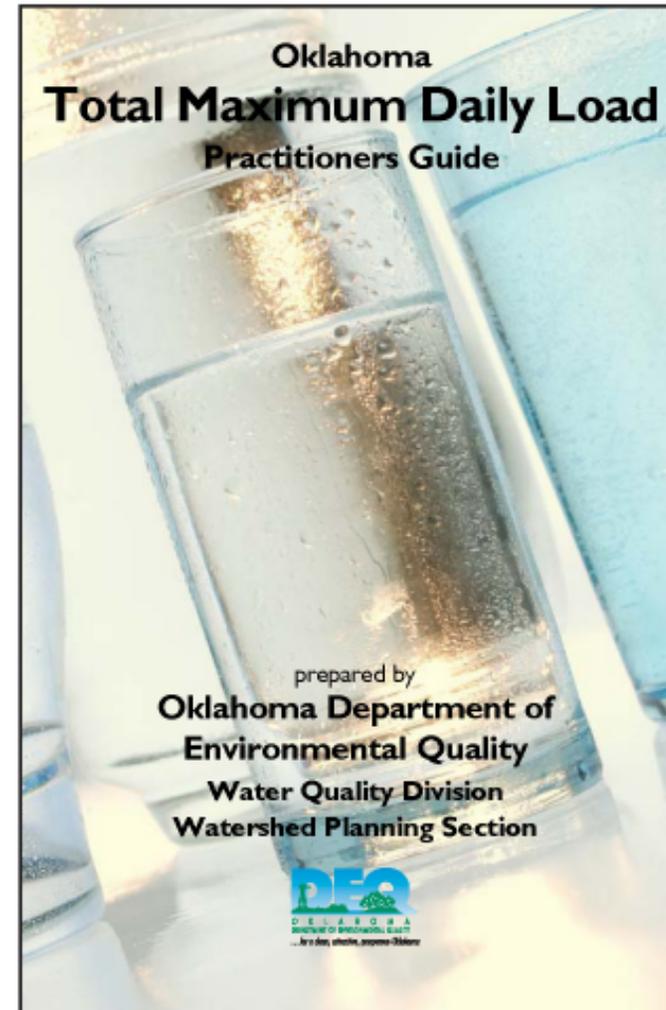
The Oklahoma Department of Environmental Quality (DEQ) is charged with regulating municipal and industrial activities that diminish the quality or purity of Oklahoma lakes, rivers and streams. The water bodies are sources of the state's drinking water, recreation and aquatic habitat, among other uses. To help maintain water quality, municipal treatment systems collect wastewater, apply biological and chemical treatments, and then release the treated water into the environment. DEQ issues permits to cities and industries, setting the conditions for discharges of treated wastewater. Permitting determines the types and quantity of pollutants that may be discharged into the water by each facility.

Rivers and streams often span long distances, and any number of pollution sources can be present within their drainage areas. So how does DEQ ensure that these sources do not endanger public and aquatic health? The department's Total Maximum Daily Load program establishes pollutant limits in drainage areas, also

known as watersheds, across the entire state. The Total Maximum Daily Load, or TMDL, for a given body of water is the amount of pollution that it can accept and still meet state water quality standards. TMDL also refers to the process of calculating such a load and apportioning it across the various sources of pollution located in the watershed.

One type of pollution – "point" source pollution – comes from individual discharge points such as municipal or industrial wastewater treatment facilities. The origins of another type of pollution are more generally distributed and harder to quantify. "Nonpoint" sources include runoff from fields and pastures and construction sites. Nonpoint source pollution can also come from nature. The federal Clean Water Act requires states to conduct a TMDL study on any lake, river or stream that does not meet water quality standards. In Oklahoma, more than 500 such water bodies have been identified to date.

TMDL studies determine the location of each pollution source



*Recently completed guidance document regarding the TMDL process (available at [www.deq.state.ok.us](http://www.deq.state.ok.us)).*

and the amount of pollution it generates. Studies must account for future growth in the area and include a factor of safety. When a TMDL study has been completed, it must be implemented. A share of the pollution reduction needed to

meet water quality standards is allocated to each source within the watershed. Reductions allocated to point sources are enforced with discharge permits issued by DEQ. Nonpoint source reductions are purely voluntary; the federal Clean

Water Act does not specifically require them. However, programs operated by the Oklahoma Conservation Commission offer various funding incentives to encourage nonpoint sources to make improvements.

TMDLs are required only for water bodies that do not meet state water quality standards. Several state agencies together have developed a process to monitor and assess Oklahoma's water resources. A comprehensive list of assessments

can be found in the Oklahoma Integrated Water Quality Assessment Report, which identifies water bodies that require a TMDL study because of failure to meet water quality standards. The report is available on the DEQ Web site.

Congress funds TMDL projects through federal grants administered by EPA. As a regular grant recipient, DEQ routinely contracts with other state agencies, universities and private consultants to conduct Oklahoma's TMDL studies. A guidance document for those interested in the TMDL process can be found at [www.deq.state.ok.us](http://www.deq.state.ok.us). ■



*A water valve in Oklahoma.*

# Questions Answered at Biomonitoring Workshop

To protect human health and the environment, the federal Clean Water Act prohibits discharge of pollutants into a body of water without a permit. The permit establishes the quantities of pollutants that can be discharged, sets monitoring and reporting requirements, and lists other provisions to protect water quality and health. The Water Quality Division implements and oversees whole effluent toxicity (WET) testing, or biomonitoring, for Oklahoma's major industrial and municipal facilities and some minor dischargers. WET testing assesses the effects of effluent on the receiving stream's aquatic life.

The division hosted a biomonitoring workshop on March 2, 2005. The yearly event gathers representatives from state and local government, laboratory representatives and regulated facilities to discuss new rules, biomonitoring fundamentals and any laboratory issues needing attention. More than 120 people attended the March workshop.



*One of the main reasons for biomonitoring and treating effluent.*

A panel discussion was added to this year's agenda. Lab representatives from five states answered questions for permittees during a panel discussion. Panelists also reviewed sampling techniques, new effluent testing criteria, documentation of procedures and discharge-monitoring report submission. The discussion gave all

a chance to clarify issues and procedures. Phillip Jennings, Effluent Toxicity Coordinator for EPA's Region 6 Office, introduced a draft implementation guidance document and fielded questions about the document, rules and regulations. Discussions were lively on all topics.

The event generated requests

for biomonitoring workshops to be held at other locations around the state, to enable both new and experienced employees to better understand biomonitoring philosophy and science. A second workshop was requested for city leaders who must fund the testing; a session for elected officials is now in the planning stages. ■

# Geographic Computer Technology Demonstrated at Capitol

On Geographic Information Systems (GIS) Day at the Capitol, DEQ staff showcased the Web-based GIS applications that are providing a wealth of environmental data and 3-D techniques that are supporting environmental restoration projects. The event provides an annual venue for state, federal, tribal and private organizations to demonstrate how they use GIS to achieve their goals. Participants take advantage of the opportunity to learn from colleagues about what is new in the field and what other organizations are accomplishing with the technology.

DEQ staff demonstrated the interactive Web-based Data Viewer. This GIS application provides public access to basic geographical information as well as information about regulatory activities and water quality monitoring data. Staff also showed how GIS 3-D capabilities help planners and regulators with environmental restoration projects. The audience, ranging from elementary school children to state legislators, expressed great interest in DEQ's Tar



*David Pruitt of the Water Quality Program Management Section demonstrates 3-D GIS capabilities.*

Creek Data Viewer. The application is a valuable tool for those trying to define and address this significant

environmental problem.

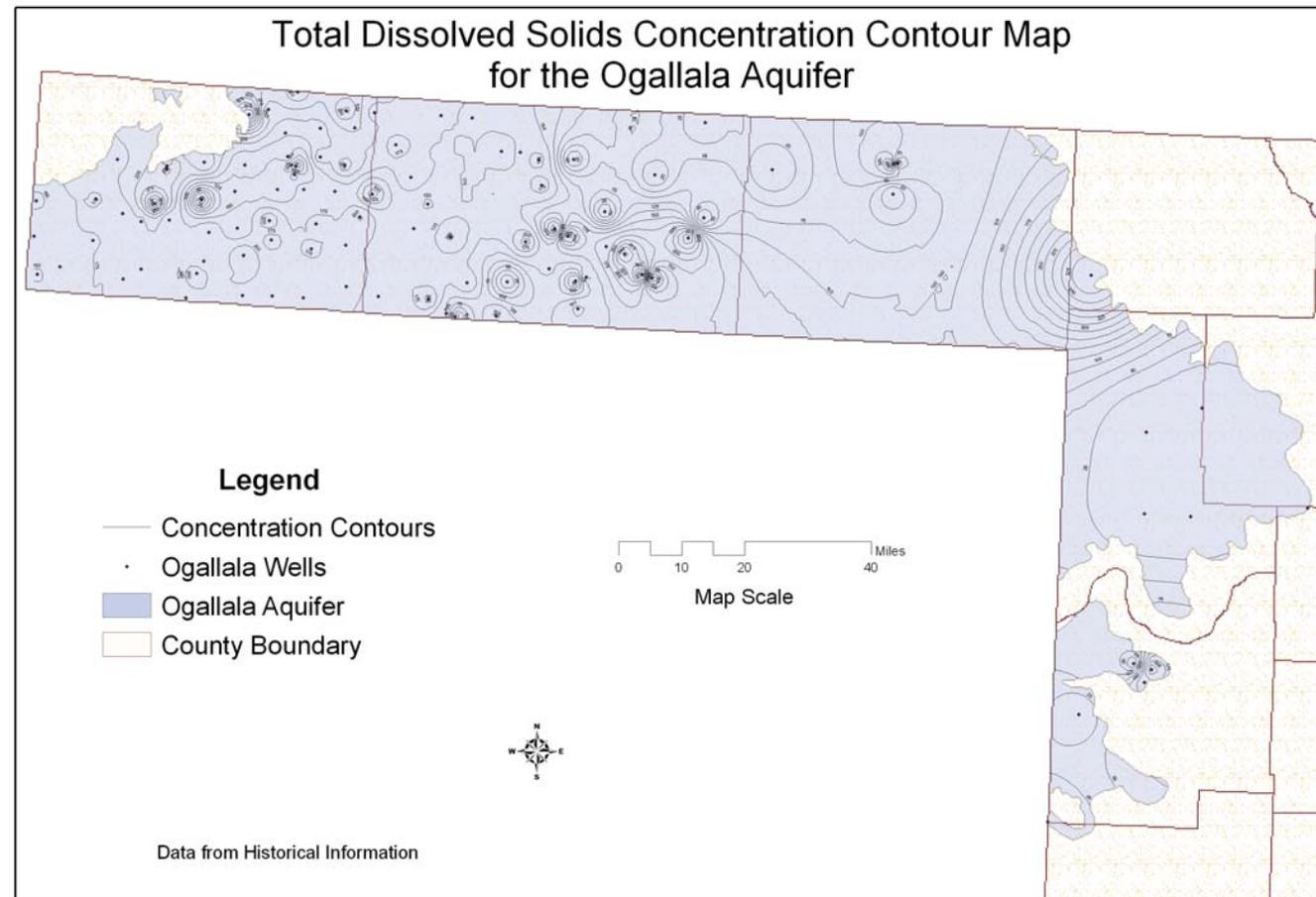
This was the 11<sup>th</sup> annual GIS Day to be held at the capitol, per-

haps the most successful yet with more than 30 exhibitors showcasing their GIS-aided achievements. ■

# Mapping Software Ties Data to Aquifer Locations

Using Geographic Information Systems (GIS) software, the State-wide Ground Water Quality project is incorporating two years of ground water monitoring data with spatial maps of aquifer locations. This integration will result in more accurate assumptions about the chemical quality of water in a given aquifer.

The system incorporates reliable information about the location of ground water samples that have been collected and tested. Division staff entered the data into *Spatial Analyst*, an Environmental Systems Research Institute software product that operates as a supplement to *ArcMap* GIS mapping software. *Spatial Analyst* then produces a map with contour lines of the user-defined space. Each contour line represents a specific value of the item being mapped. In this way, the relationship between locations and data is visually apparent, giving researchers a more precise view of the characteristics of water by location. ■



*This map provides an example of the type of information available at [www.deq.state.ok.us](http://www.deq.state.ok.us).*

# DEQ Determines Costs of Compliance with the Clean Water Act

Every four years, EPA reports to the U.S. Congress on the costs required for municipalities and other public entities to comply with the Clean Water Act, a process known as the Clean Watersheds Needs Survey. EPA enlists the participation of the states. As in previous cycles, DEQ staff assisted with the project in 2004. Agency staff gathered information about expected costs for Oklahoma cities, towns and rural sewer districts to build or upgrade wastewater treatment plants, sewer systems and storm water systems. To be included, the project costs had to be eligible for Clean Water State Revolving Fund financing, even if actual project funds might come from other sources.

The previous survey had been conducted in 2000. At that time, DEQ identified \$586 million of eligible costs for projects planned in Oklahoma. (The needs for the entire U.S. in that period amounted to \$181 billion.) In 2004, the survey showed that Oklahoma's documented need



*Construction of the new wastewater treatment plant in Miami, Oklahoma was funded partially with Oklahoma's Clean Water State Revolving Funds. (Photo courtesy of Juli Mathews, Miami's Assistant Superintendent of Utilities.)*

for planned wastewater projects was slightly more than \$1 billion.

The national cost survey effort

closed with a final meeting in May 2005, to review national figures and the draft report to Congress. Con-

gress uses the survey results to determine state revolving loan fund allocations. ■

# Safe and Affordable Drinking Water Assured by Regulation and Project Funding

The U.S. Congress first passed the Safe Drinking Water Act in 1974. The purpose of the law was to protect human health by regulating the nation's public drinking water supplies. The law has been amended twice, in 1986 and 1996. Originally the act focused on water treatment that would assure safe drinking water at the tap. The 1996 amendments, recognizing the need for protection source-to-tap, address source water protections, system operator training, funding for water system improvements and public information. Innumerable protective actions have been taken under the authority of the act to protect drinking water and its sources — rivers, lakes, reservoirs, springs and ground water wells.

Maintaining supply infrastructure and implementing the protections required by the new rules called for a significant capital investment. In 2001, DEQ surveyed water system infrastructure needs statewide. The survey revealed that to keep Oklahoma's water systems working properly and in



*Delaware County Rural Water District #10 is a new water system located near Grove, Oklahoma. DWSRF funded two water wells, 159,000 linear feet of water line and a 350,000-gallon elevated storage tank.*

compliance would amount to about \$2.3 billion over the next 20 years.

To help Oklahoma communities and those of other states meet regulatory requirements, the Safe Drinking Water Act Amendments of 1996 authorized EPA to fund state revolving loan programs. In Oklahoma, the Drinking Water State Revolving Fund assists public water systems with low-interest loans for repair and replacement of drinking water infrastructures. The program is jointly managed by DEQ and the Oklahoma Water Resources Board, helping to ensure that drinking water supply systems are properly constructed, operated and maintained in compliance with regulations. Regulations together with technical and financial assistance assures Oklahomans of safe, affordable drinking water.

The EPA grant provides just under \$10 million a year for the state loan program. Since the program's inception, Oklahoma communities have received 37 loans totaling more than \$159 million. Much has been accomplished, but the loan program still falls short of meeting the projected statewide need. To help remedy the situation, the state has issued bonds in excess of

\$200 million to supplement the EPA funds. The bond issue will make state-administered loans available to communities at rates approximately 30 percent lower than if communities had issued their own bonds.

More than \$126 million has been set aside to fund 26 community projects in the next year, serving approximately 340,000 Oklahomans. The loan funds "revolve," meaning that as loans are repaid, the capital again becomes available to finance other projects, creating a long-range source of funding for

keeping our water supply safe. In fiscal 2005, revolving loans financed improvements in three small, rural water systems. All three projects are now in operation.

- Grady County Rural Water District #1 made water system improvements for the Town of Pocasset and the surrounding rural area, using a \$200,000 revolving loan and a \$150,000



*Grady County Rural Water District #1 expanded its water system to include two new wells and the construction of 23,000 linear feet of water line.*

Rural Economic Action Plan (REAP) grant. The project included construction of two new ground water wells south of Pocasset; 23,400 feet of 6-inch water line; and a new telemetry system. The project, completed in November 2004, resulted in an increased water supply to meet current demands.

- Delaware County RWD #10

secured a loan in the amount of \$4,845,604 to build a new water system located near the Town of Grove. The system consists of two water wells; a 350,000-gallon elevated storage tank; a chlorine booster station; and 159,000 feet of water line. The project was completed in February 2005.

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- The Town of Mooreland (Woodward County) combined a \$325,000 loan with \$147,000 in grants from the Oklahoma Economic Development Association and Oklahoma Department of Commerce for improving the downtown water distribution system. The project replaced a 4-inch cast-iron water line with 8-inch PVC. A large portion of the water line beneath the town's sidewalks was replaced on both sides of Main Street. The project was completed in July 2004. ■



*The Town of Mooreland made improvements to its downtown water distribution system that included replacing the early 1900s cast-iron water line with PVC, new sidewalks and decorative street lamps along Main Street.*

# Innovative Construction Increases Water Pressure

The Town of Rush Springs needed to augment the size of its water tank to increase both water pressure and storage capacity. Construction was to be funded by a Drinking Water State Revolving Fund loan, so representatives of Rush Springs designed and presented several plans to DEQ. The most cost-effective design was selected. The plan called for building a base for a new tower and simply placing the old tower on top. This may sound simple, but as the photos show, it was no easy task. ■



*A new foundation and base are created.*

*more photos on the following pages*



*The base of the new tower is shown to the right of the existing tower.*



*The construction crew separates the old tower from its base.*



*A crane raises the existing tower off its base.*



*Construction workers prepare the bottom of the existing tower.*



*The top of the old tower is lifted up to join the new base.*



*Lifting...*



*Almost there...*



*The top portion of the tower is in place. The crew seals the two towers together.*



*The new tower stands 120 feet tall (46 feet taller than the former tower).*

# Partnering Builds Water Treatment Plant



*Dew drops on a yellow flower petal sparkle in one of Oklahoma's magnificent sunrises.*

When managing multi-partner projects, establishing a partnering process early in the game has longlasting advantages. Among other things, it establishes a team-building environment, fos-

ters communication and problem-solving, and builds mutual trust. Murry Fleming, CH2M Hill Engineering, approached the City of Bethany about using such a process to facilitate the recent

upgrade of Bethany's water treatment plant. Project partners are the City of Bethany, CH2M Hill Engineering Firm and Walters-Morgan Construction Company. DEQ is financing the project with

a \$10 million, low-interest loan from the Drinking Water State Revolving Fund. For the plan to work, all partners would have to abide by process principles.

Key elements of the particular process Fleming had in mind are commitment, equity, trust, mutual goals and objectives, implementation, continuous evaluation and timely responsiveness. Developed about 10 years ago, formal partnering is used by the U.S. Army Corps of Engineers and supported by the Association of General Contractors of America. Voluntarily agreeing how to resolve contracting issues in a mutually beneficial way ensures a cooperative approach to achieving project goals. This is the spirit of partnering.

The particular process that Fleming promotes has now been written into Bethany's construction specifications. Project participants drafted a "partnering charter" and signed their names, committing to work as a team to implement the charter mission, goals and processes. "When you work with three different entities,

you must all buy into the same goal and have the willingness to work together as one team," Fleming says.

The partnering process sets the stage early for communication and cooperation. Team members get acquainted and work out issues as they create their partnership charter, developing rapport and a problem-solving network that prove valuable once the project is underway. As the work progresses, Bethany, CH2M Hill and Walters-Morgan Construction continue meeting quarterly in a relaxed environment away from the work site. They take turns facilitating discussions about the past quarter's contracting issues and resolutions. They always remember to thank those who contributed to solutions. The meetings build solid working relationships and camaraderie and create a sense of openness within the project team.

As the Bethany project progresses, the City, CH2M Hill and Walters-Morgan, even though three separate entities, will continue to focus as a team on their mutual mission statement: To build a high-quality water treatment facility that serves the citizens of Bethany well. ■



*Candy Akins, CH2M Hill Engineer, and Clyde Treat, City Engineer, discuss construction progress at Bethany's Water Treatment Plant.*



Concrete walls, floor and pads poured for new Chemical Building at Bethany's Water Treatment Plant.



*Ice forms a protective cover for budding trees during an early spring ice storm in Oklahoma.*

# Engineers Receive System Operator Training

*Water Quality Division engineers attending "A" level (the highest level) water laboratory training.*



The Water Quality Division (WQD) delivers in an interesting way on its commitment to ensure high quality water, both for drinking and in our state's rivers and lakes. Since agency staff must communicate regularly with water and wastewater system operators, it stands to reason that they would communicate best if they spoke

the same language and understood the same concepts. Therefore, division staff now undergo exactly the same training and certification as the water and wastewater treatment plant operators they encounter in the field.

The concept has merit. DEQ's field personnel must communicate existing and pending regulations

and advise system operators on how to achieve and maintain compliance. They need to understand the effects of the regulations on actual system operations. They also need to be able to offer realistic options for responding to those effects.

"The Water Quality Division promotes staff training and profes-

sional certification as a core value. We strongly believe in and seek opportunities to provide staff with the tools and credibility essential to successfully perform their tasks. Giving our field staff the opportunity to become certified water or wastewater operators, depending upon their specific assignments, is a natural and logical step," said Glen Jones, Assistant Division Director. "We have received public comments that express the value that could be added by these staff credentials."

Early in 2004, WQD began developing the method and guidelines to select staff for certification. By April 2005, all field staff had earned the appropriate licenses. Since then, DEQ's trained and licensed inspectors have been doing a better job of helping water and wastewater treatment plant operators understand and implement regulations and solve problems in the field. The certification gives increased credibility and utility to those involved in assuring that Oklahoma's drinking water and wastewater meet federal regulations. ■