

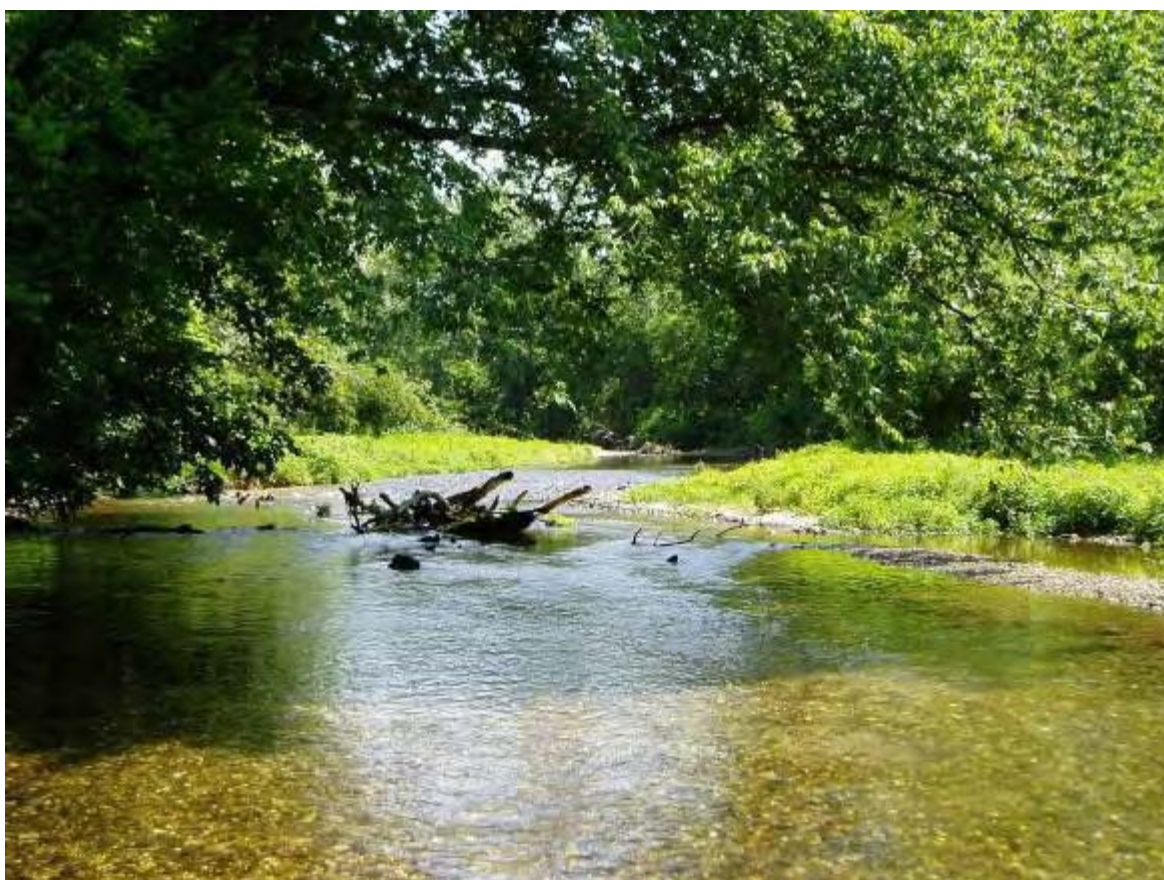
Oklahoma's Nonpoint Source Program 2008 Annual Report

Oklahoma Conservation Commission



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Oklahoma's Nonpoint Source Program

Oklahoma's Nonpoint Source (NPS) Pollution Management Program is a combination of federal, state, and local agency programs. The NPS Program is authorized federally by Section 319(h) of the Clean Water Act, which requires states to develop an assessment report that identifies NPS problems and a Management Program that develops and implements objectives for addressing them. The program is largely funded via 319 federal monies, state legislative appropriations, and many private landowners who voluntarily participate in the cost-share programs offered.

By statute, the Oklahoma Conservation Commission (OCC) serves as the technical lead agency of Oklahoma's NPS Program and is responsible for developing, promoting, and implementing efforts to abate NPS pollution and thereby restore support of the designated beneficial uses of affected waterbodies. The state follows an organized process to identify threats and impairments to water resources and determine causes, extent, and sources of the problems. The NPS Program is nonregulatory, using planning, implementation, monitoring, and education to reduce pollution to help waters meet water quality standards. The following is a reporting of the highlights of Oklahoma's NPS program for fiscal year 2008.

Oklahoma's NPS Program is nonregulatory, employing program areas of **planning, implementation, monitoring, and education** to reduce NPS pollution in waters across the state.



NPS pollution refers to that which originates from diffuse sources. The most prevalent NPS pollutants in Oklahoma are pathogens, sediment, and nutrients. The OCC uses implementation of best management practices (BMPs) and education to prevent or minimize origination and delivery of NPS pollutants to water bodies.

Partners in Protecting Oklahoma's Natural Resources

Oklahoma's NPS Program is a collaborative effort of federal, state, and local agencies as well as the citizens of the State of Oklahoma. Among the most significant of partners in OCC's program efforts are the 89 Conservation Districts across the state which serve as an invaluable resource for contact with landowners and leaders who partner to implement water quality programs at the local level. The following is an abbreviated list of the many partners who contribute to the Oklahoma NPS Program:

State Partners include:

- Oklahoma Association of Conservation Districts
- Oklahoma Corporation Commission
- Oklahoma Department of Agriculture, Food and Forestry
- Oklahoma Department of Environmental Quality
- Oklahoma Department of Wildlife Conservation
- Oklahoma Energy Resources Board
- Oklahoma Office of the Secretary of the Environment
- Oklahoma Scenic Rivers Commission
- Oklahoma Water Resources Board
- University of Oklahoma
- OSU Department of Biosystems and Agricultural Engineering
- Indian Nations Council of Governments

Federal Partners include:

- U.S. Environmental Protection Agency
- U.S. Department of Agriculture / Natural Resources Conservation Service
- U.S. Geological Survey
- U.S. Army Corps of Engineers

Other Important Partners:

- City of Oklahoma City
- City of Tulsa

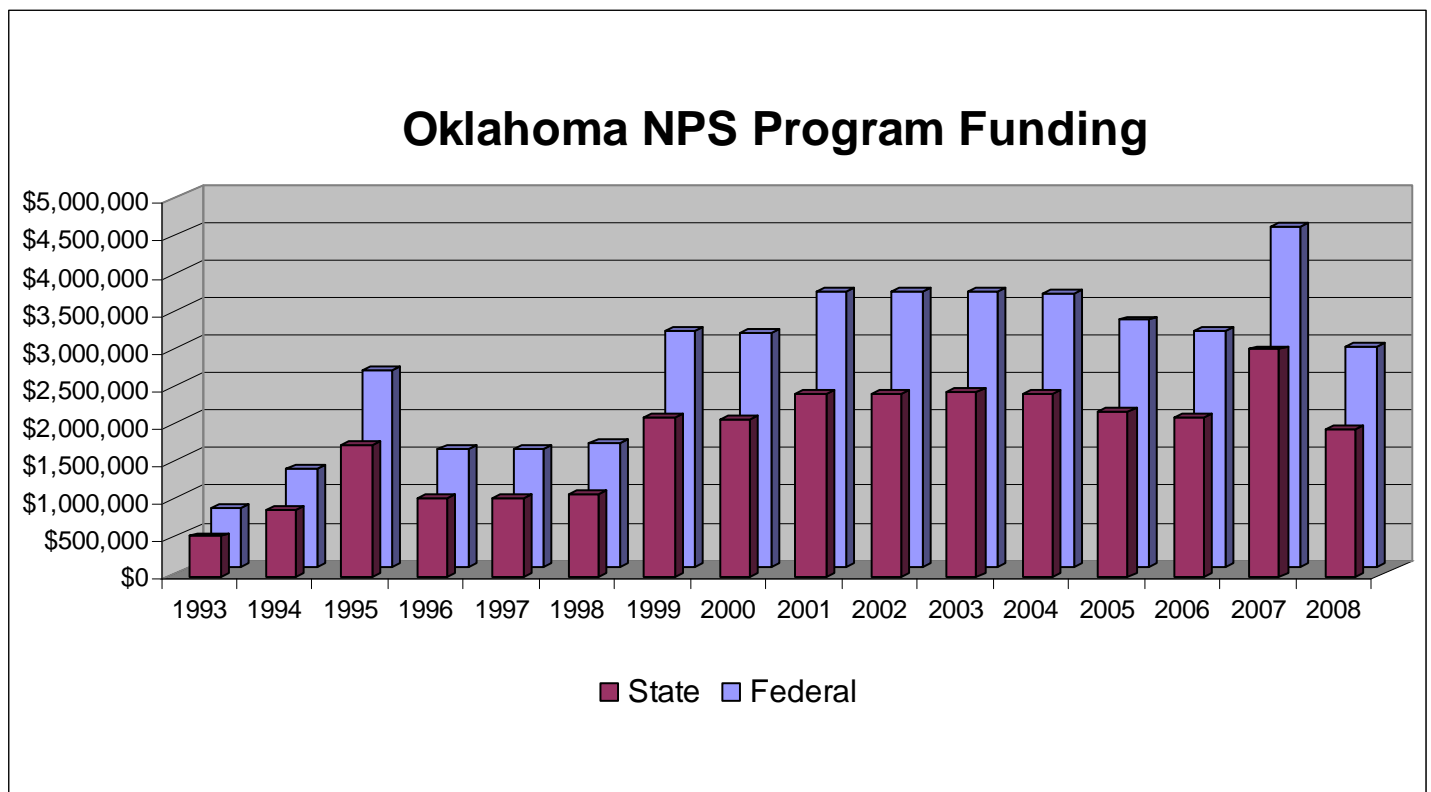
The USEPA provided partial funding for all activities.



PLANNING

Oklahoma Nonpoint Source Management Program Funding

Funding for the NPS Program comes from the U. S. Environmental Protection Agency and the Oklahoma State legislature. During FY2008 the EPA provided \$2,928,900 and Oklahoma contributed \$1,952,600 to the NPS Program. *Cost share funds from participating landowners comprise a significant contribution to NPS Program funding not reflected in the chart below.*

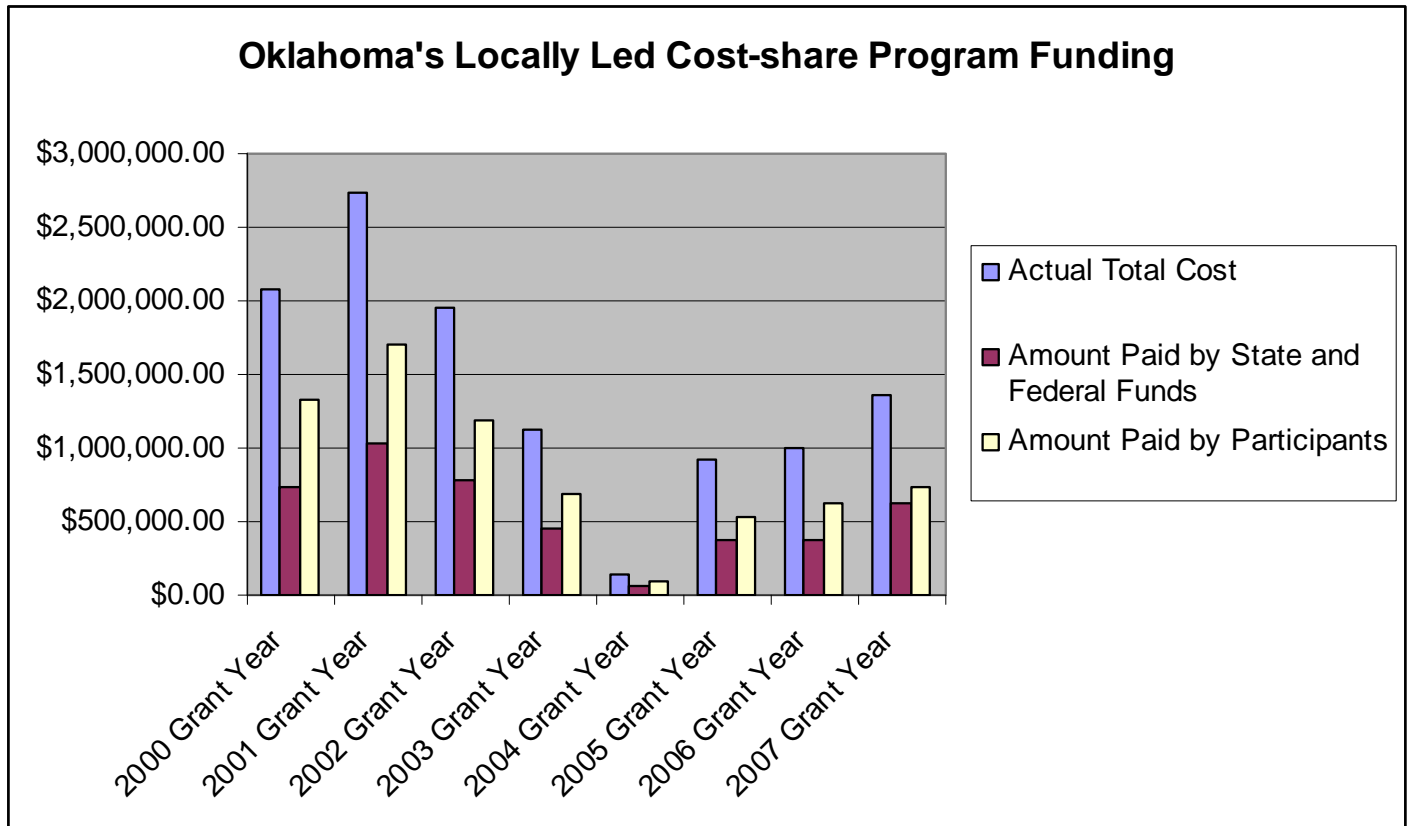


Watershed Project Planning

Watershed based plans (WBPs) detail all aspects of a proposed project, including goals, partners, staff, budget, and timelines. The WBP is a blueprint for determining where best management practices will be focused in a watershed. A well organized plan is vital to planning and implementing a successful watershed project that will result in improved water quality. Watersheds for which plans were submitted in FY 2008 include: Grand Lake, Lake Thunderbird, North Canadian, Elk City and Turkey Creek. These plans are currently under review by EPA Region 6.

Oklahoma's Locally-Led Conservation Cost Share Program Funding

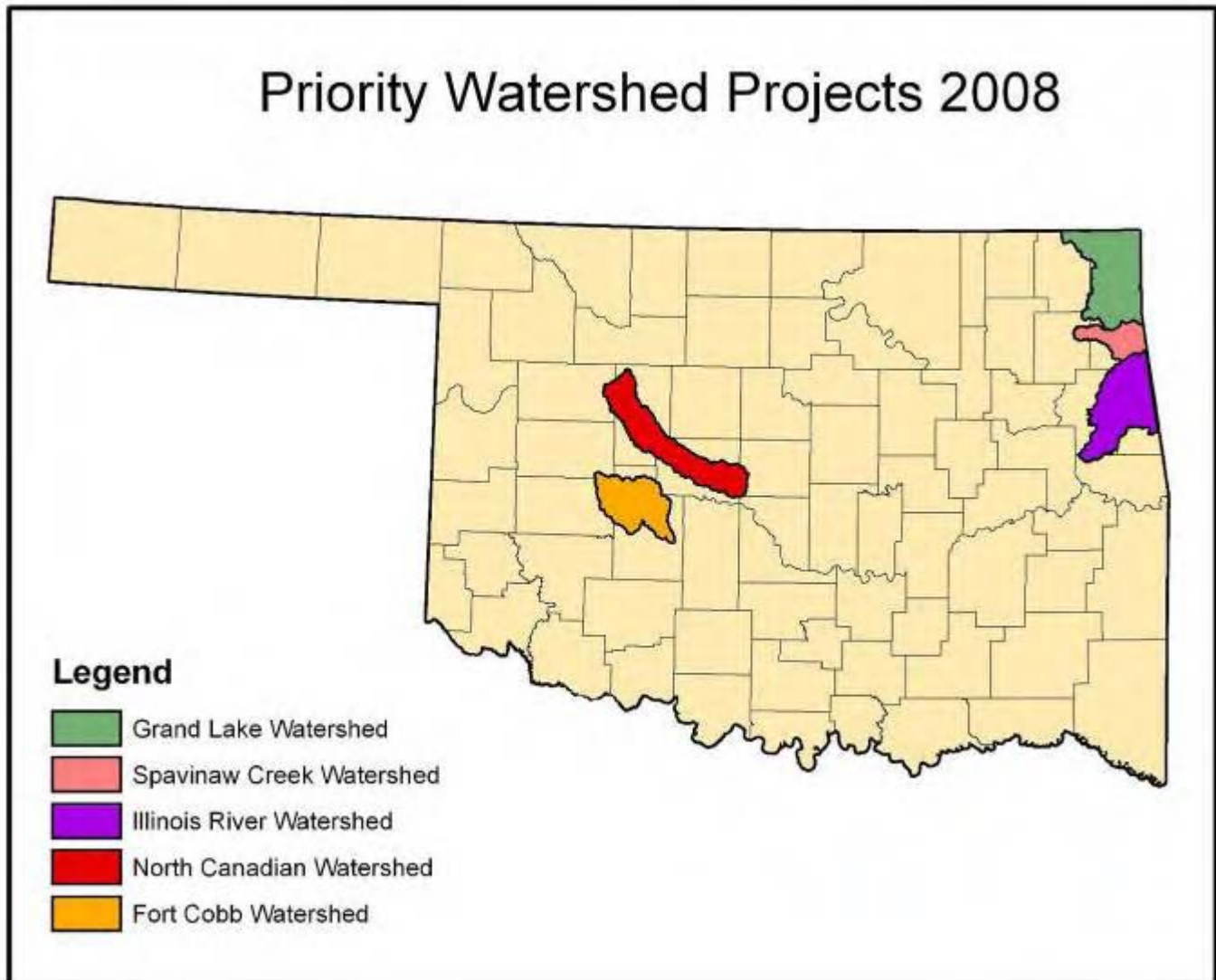
An important part of the project planning is deciding which BMPs to cost-share with landowners and at what percentage. In the 2007 grant year, this cost-share program provided \$628,076 in incentive payments to landowners to voluntarily apply water and soil conservation practices on their land. In turn, landowners contributed over \$729,321 of their own money for a total of \$1,357,397 spent protecting water quality through the cost-share program.



OCC staff assist landowners in planning and installing BMPs

IMPLEMENTATION

Priority Watershed Projects 2008



NPS Priority Watershed Project Funding

Total amount spent on BMPs from the beginning of the project until September 30, 2008

(from Federal, State, and landowner contributions):

- **Grand Lake Priority Watershed (FY04) = \$186,051**
- **Honey Creek Priority Watershed (FY06) = \$234,666**
- **Spavinaw Creek Priority Watershed (FY03) plus Spavinaw Creek Supplemental Projects (FY00, FY01, FY08) = \$2,341,830**
- **Illinois River Watershed Riparian Project (FY07) = \$2,730**
- **North Canadian Priority Watershed (FY07) = \$33,302**
- **Fort Cobb Watershed (FY05) = \$865,401**
- **Fort Cobb Watershed (FY01) = \$1,265,207**

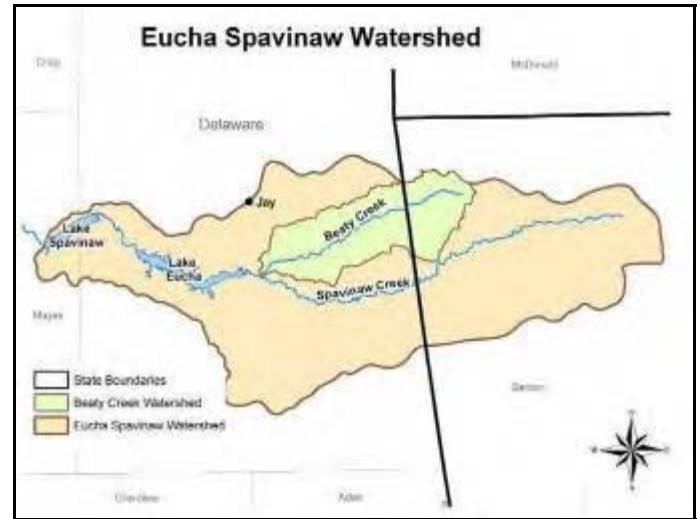
Spavinaw Creek

Watershed Implementation Project 2003-2010

The Spavinaw Creek watershed is located in northeastern Oklahoma in Delaware County. Spavinaw Creek is an important tributary to Lake Eucha, and eventually, Lake Spavinaw. These sister lakes supply water to nearly a half million citizens of Tulsa, Jay, and Spavinaw. Both Lake Eucha and Lake Spavinaw were on the EPA's 303(d) list in 2002, 2004, 2006, and 2008 for impairments from phosphorus and low dissolved oxygen. Due to their high nutrient levels, these reservoirs have experienced excessive algal blooms that have compromised the taste of the water and increased water treatment costs.

Lakes Eucha and Spavinaw have suffered poor water quality due to high levels of nutrients from phosphorus loading into streams via nonpoint source runoff. A study determined that Spavinaw Creek is the origin of 45% of the nutrient loading to Lake Eucha. Due to these problems, the OCC was awarded an EPA grant for a NPS cost-share program in the Spavinaw Creek Watershed to improve water quality by reducing non point source pollution.

The original allocation period for this project was from October 2003 until September 2008, **but due to its success, it has been extended until October 2010.**



A winter feeding facility in the Spavinaw Watershed.



The OCC has implemented a variety of best management practices (BMPs) in the Spavinaw Watershed, which have decreased the amount of nutrients and sediments flowing into the streams that enter Lakes Eucha and Spavinaw. The approved cost-share practices that have been implemented in the watershed in Delaware County include riparian management and improvement, riparian area fencing, stream bank stabilization, critical area planting, pasture establishment/management, rotational grazing, rural waste systems, animal waste storage buildings, feeding facilities, watering facilities or tanks, heavy use areas, ponds, wells, and waste and nutrient management.

As of September 2008, a total of \$2,341,830 has been spent on best management practices (BMPs) in the watershed, of which \$1,554,184 was paid to landowners for the cost-share program. An additional 41 cooperators signed up in 2008, bringing the total to 204 enrolled to install BMPs over the life of the project thus far.

In addition to implementation efforts, the OCC conducted educational tours of the 196 acre demonstration farm near Jay, OK. **Nearly 700 people attended the demonstration farm tours from 2006-2008.** The project also funded incentives for **removal of a total of 28,138 tons of poultry litter from this nutrient limited watershed.**



A frost-free watering tank installed as an alternative water source for cattle that have been fenced out of streams.

Work Completed

In 2008:

- 15 septic systems were installed
- 10 waste storage feeding facilities were built (a total of 35 from 2003-2008)

From 2003-2008:

- 234,034 feet of fence were installed for rotational grazing
- over 1,000 acres of pasture were planted and fertilized
- 17 ponds were built as alternative water sources for livestock
- 93 watering tanks were installed
- 47 water wells were drilled
- 30,627 feet of riparian exclusion fence were installed to protect over 200 acres of riparian and critical area
- 123 heavy use areas were built
- 58 septic systems were installed



Honey Creek

Watershed Implementation Project 2006 - 2010

The Honey Creek watershed lies in the southwestern corner of the Grand Lake Watershed. Honey Creek flows from Benton County, Arkansas, and McDonald County, Missouri, into Delaware County in northern Oklahoma. Honey Creek drains into Grand Lake O' The Cherokees, which is an important water supply for the cities of Grove, Langley, Afton, Ketchum, and Vinita. Grand Lake has been impaired by nutrients and sediments draining in from the watershed. The entry of excess nutrients from the watershed has caused the lake to fail the dissolved oxygen criteria and has led to algal blooms.



The goal of the Honey Creek project is to reduce the sediments and nutrients flowing into Grand Lake through planning and implementation of BMPs on private landowners' property throughout the watershed. A Watershed Advisory Group (WAG) of local landowners initially determined the BMP suite and cost share percentages that would be used for the project. Targeting and modeling were used to determine the areas of highest priority that were contributing the most pollution.

The Honey Creek project began in 2006 and will continue through September 2010. As of September 2008, a total of 13,814 acres in Oklahoma, which represents a quarter of the total acres in the Oklahoma portion of the watershed, are under contract to participate in BMP implementation. Water Quality staff continue to conduct site visits to inspect and certify best management practices in this project.



A wide variety of practices have been implemented to improve water quality in the watershed. The approved cost share practices implemented include: riparian area exclusion fencing, riparian management, pasture establishment/management (below left), winter feeding/waste storage facilities (left), septic tanks, and alternative water supplies such as wells, ponds, and watering tanks (below right).

As of September 2008, a total of 65 contracts have been written to install best management practices. This represents \$1,072,368 obligated for BMP implementation, of which \$234,666 has been spent.



Best Management Practices Implemented in Honey Creek (April 2007-September 2008)

- 170 acres of riparian area were protected with exclusion fencing
- Installed 6,650 feet riparian fencing
- Constructed 5 ponds
- Built 2 cake-out storage facilities
- Built 7 animal feeding/waste storage facilities
- Planted 50 acres of Bermuda and fescue
- Applied lime and fertilizer as recommended by soil tests
- Installed 34,387 feet of cross fencing
- Installed 23 watering tanks
- Drilled 11 water wells
- Moved 31,363 lbs of poultry waste from the Honey Creek Watershed
- Constructed 10 concrete pads and 19 gravel areas for heavy use areas
- Installed 4 septic systems and lateral lines



In 2008, a local landowner in the Honey Creek watershed entered an agreement with the Delaware County Conservation District to establish a demonstration farm on his property. This project is funded by the Honey Creek Project and landowner cost-share.

The demonstration farm will provide landowners the opportunity to observe a variety of best management practices that have been installed. Scheduled BMPs include riparian fencing, cross fencing, wells for livestock, watering facilities, heavy use areas, and a winter feeding/waste storage facility. These BMPs will be highlighted in educational tours conducted by OCC Honey Creek Project staff and Oklahoma State University Extension personnel. One tour was conducted on the Davis demonstration farm in 2008 (right).



The Honey Creek 319 Project joined with the Oklahoma Conservation Commission's Water Quality Division and the Oklahoma Department of Wildlife to conduct two tours on Honey Creek. The first tour took place on a portion of Honey Creek which highlighted erosion concerns and informed participants of the probable causes of the erosion. The second tour showcased a portion of Honey Creek that has been restored through a grant provided by the EPA (above).

Information on the Honey Creek project has been exhibited at poultry waste continuing education classes, Delaware County Cattlemen's Association meetings, the Jay Farm Fest, and the Grand Lake Earth Day Celebration.



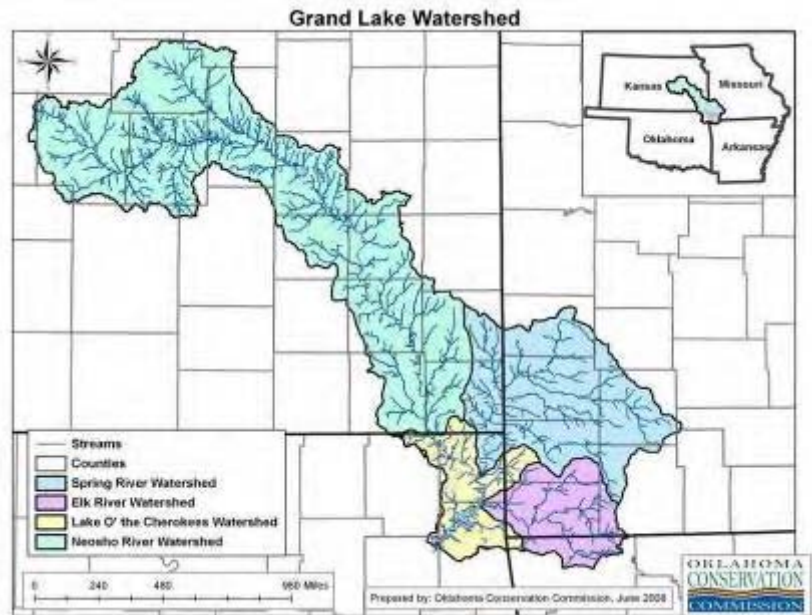
Grand Lake

Watershed Implementation Project 2004 - 2008

The Grand Lake Watershed is 10,298 sq. miles and is located in Kansas, Missouri, Arkansas, and four counties in northeastern Oklahoma. The Spring River, Elk River, and Neosho River drain into the 46,500 surface-acre lake. Grand Lake is impacted by excessive nutrients, pathogens, sediments and heavy metals entering the lake.

The focus of the Grand Lake Project was to educate citizens about ways to reduce runoff of nutrients, and sediments from residential and commercial areas.

The Grand Lake Watershed Project educates citizens on ways to reduce nutrients, sediments, and fecal bacteria in nonpoint source runoff through demonstration, training, and volunteer monitoring.



Eight bio-filter rain gardens (e.g., above) were constructed in the Grand Lake Watershed near Grove to demonstrate their ability to filter pollutants from urban runoff. In addition, one rain garden was constructed in Stillwater at the OSU Botanical Garden.

A nutrient management conference (below) was held on April 17, 2008 to educate the public, golf course managers, and city officials about the importance of soil testing and the proper use of fertilizer.



Accomplishments in 2008 include:

- Hosted a 5-day Soil Profile Course at Bernice State Park to train and certify soil profilers.
- Completed the Grand Lake Watershed Plan in cooperation with the Grand Lake Watershed Alliance Foundation, which includes citizens from all four states.
- Gave presentations about nutrient management, rain gardens, and septic systems at Grove Home and Garden Show and other public venues.
- Hosted an Earth Day Celebration at the Grand Lake Visitor Center, where rain gardens and an open soil pit were on display to the public.
- Maintained the Nutrient Management Garden at the Grand Lake Visitor Center.
- Improved the project website www.cleargrand.glaok.com



OCC and ODEQ hosted a Soil Profile Certification Course at Bernice State Park in April 2008 for Septic System Installers.



A nutrient management garden at the Grand Lake Visitor Center highlights native plants.



An educational outreach event was held at the Grove Wal-Mart on June 28, 2008. Water Quality Staff, OSU staff, and a master gardener volunteer presented information on soil testing, nutrient management, rain gardens, septic systems, and water quality to the public (left).

Improvements were made to an outdoor classroom (below) and adjacent trails at the Cleora Schools near Ketchum.

- Trails were improved with gravel and signage.
- A bridge was built, which crosses a stream on the nature trail.
- A deck was built overlooking a pond.
- An outdoor pavilion and rain garden were constructed.

The Cleora schools will promote the Blue Thumb Program on the established site, in addition to the wetland education program. The site will be available for area schools as a regional outdoor education center.

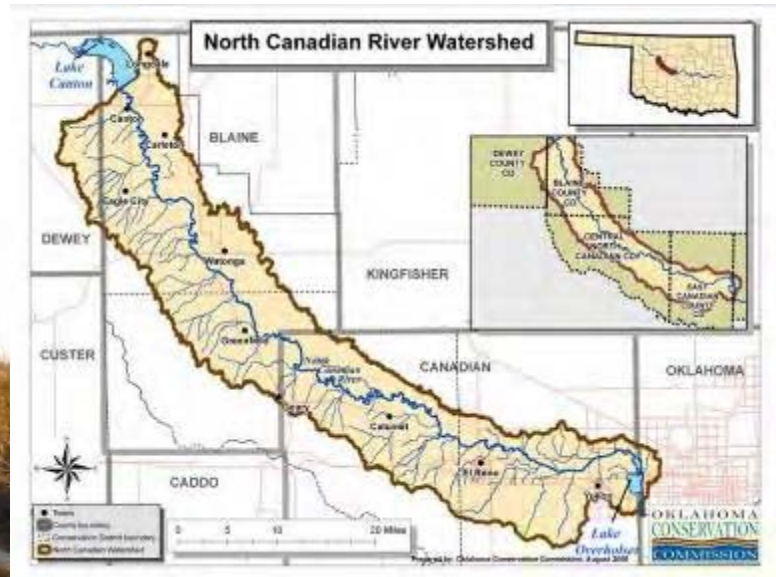


A total of \$186,051 was spent accomplishing the tasks of the Grand Lake Project.



North Canadian River

Watershed Implementation Project 2007 - 2010



The North Canadian River Watershed Project area lies in Blaine, Oklahoma, Dewey, and Canadian Counties in western Oklahoma, encompassing the area between Canton Lake and Lake Overholser. This area was chosen for a watershed implementation program because of the strong local leadership and initiative on the part of local conservation districts interested in addressing NPS issues in this watershed, which has repeatedly exceeded water quality standards for turbidity and *Escherichia coli* (*E. coli*).



Riparian area exclusion fencing in the North Canadian Watershed.

This three-year project, funded by the State of Oklahoma, the U.S. EPA, and cost-share contributions from landowners, will install best management practices that reduce bacteria, nutrients, and sediment entering the river. A local watershed advisory group set cost-share rates in September 2007. Sign-ups began in January 2008. Fifty-four contracts were written and \$33,302 in claims were paid through September 30, 2008.

The majority of the conservation plans written have included no-till farming (right top). Currently, a total of 8,289 acres are enrolled in no-till farming practices. In addition, five applications have been submitted for the carbon sequestration pilot program in the North Canadian Watershed.

A total of 100 acres of riparian area exclusion fencing has been installed and 10 additional landowners have signed up to participate. Contracts have been written to convert 831 acres of cropland into grassland. One grade stabilization structure and one septic system have been installed.

Other BMPs scheduled for implementation include: septic systems, grass planting, ponds, watering tanks, wells equipped with solar pumps, grade stabilization structures, pipeline, and a stream crossing.

EDUCATION

In August 2008, a no-till conference (above) was held in El Reno to educate landowners on the process of converting to no-till farming. A total of 89 participants attended the conference. The Blue Thumb education program has been very active in the North Canadian Watershed Implementation Project. Demonstrations have been provided to students to educate them on water quality and nonpoint source pollution (below left).



Ft. Cobb

Watershed Implementation Project, Supplemental

The Fort Cobb Watershed covers 314 square miles of southwestern Oklahoma in Caddo, Washita, and Custer Counties. The Fort Cobb Reservoir is the primary drinking water source for the Cities of Anadarko and Chickasha.

The Fort Cobb Reservoir and streams within the watershed have been listed for turbidity, phosphorus, pathogens, and pesticides on the 303(d) list.

The Fort Cobb 2001 project ended in 2007. The Fort Cobb 2005 project ended in 2008. Both projects focused on cropland erosion, riparian degradation, and pasture and waste management.

The goal of the projects was to reduce phosphorous loading to Fort Cobb Reservoir and its watershed. To achieve load reductions, the project promoted best management practices (BMPs) and provided technical and cost-share assistance to landowners who installed practices. BMPs in the Fort Cobb Project include: riparian exclusion fencing, no-till farming, crop to pasture land conversion, grade stabilization structures, and diversions.

Currently, there are 60 cooperators signed up for the 2005 Fort Cobb Project. Completed work includes: 15,354 acres of no-till farming, three grade stabilization structures, 14 acres of riparian area exclusion fencing, and 328 acres of grass plantings. As of September 2008, a total of \$865,401 was spent accomplishing these tasks under the FY05 Project.



No-till farming has been very successful in the Fort Cobb watershed at preventing sediment erosion.



Grade stabilization structures were installed to prevent excess erosion.



No-till farming can prevent sediment erosion that results from tilling.

Illinois River Watershed Riparian Protection Program



A supplemental effort to extend and compliment ongoing NPS management efforts in the Illinois River watershed began in 2008 with the hiring of a project coordinator in May 2008. This program provides match and complements the Conservation Reserve Enhancement Program (CREP) with focus on riparian area protection. The project area encompasses Delaware, Adair, Cherokee, and Sequoyah Counties in the Illinois River Watershed. The project is scheduled to continue until June 30, 2010.



Waste storage facilities such as this one are planned for the 319 Illinois River Project to reduce livestock impacts on streams.

As of December 2008, the program has obligated \$896,455 to 47 applicants for implementation of priority BMPs. Conservation plans have been written for a total of 13,034 acres. In addition, 27 existing septic systems are approved to be replaced.

Common best management practices for the Illinois River 319 Project:

- Septic system replacement
- Riparian area exclusion fencing
- Watering facilities (tanks and ponds)
- Wells and pipeline (alternative water supply for livestock)
- Animal waste storage facilities (cakeout storage, winter feeding facilities, and composters)
- Heavy use areas (concrete, gravel, geo-textiles)

Success has been noted in the in the Illinois River Watershed 319 Program from the **changed attitudes of the public**. Landowners have asked for assistance with fencing their cattle out of riparian areas without requiring an incentive payment for the land!

Conservation Reserve Enhancement Program (CREP)

The Conservation Reserve Enhancement Program (CREP) is a partnership between State (including local and state government, nonprofit groups and industry) and Federal Partners (USDA, FSA and NRCS) to protect and improve water quality by retiring environmentally sensitive land from agricultural production. CREP is entirely voluntary, providing incentive payments to producers in priority watersheds who enter into a 10-15 year contract to fence off and protect riparian buffer areas along streams in program zones. The CREP program requires a 20% non-federal match to receive the federal dollars. In Oklahoma, the OCC, City of Tulsa, Oklahoma Scenic Rivers Commission, FSA and NRCS are currently utilizing the CREP program to restore and protect thousands of acres of riparian area in the Oklahoma portion of the Illinois River and Eucha/Spavinaw watersheds.

Initial commitments (i.e., City of Tulsa, OSRC, and OCC program matching funds) are sufficient to implement a \$15 million dollar program in the Eucha/Spavinaw and Illinois River Watersheds. However, the OCC has requested an additional \$10 million from the state legislature as a portion of a multi-million dollar bond program. The \$10 million in state monies would secure an additional \$40 million in federal dollars and allow the program to expand into the Fort Cobb and Sugar Creek Watersheds. This match will elevate the program to a \$65 million dollar total investment in environmental protection for these sensitive watersheds.

Oklahoma's CREP program completed its first full fiscal year in September 2008. Producer sign-ups began June 2007 in the Illinois River and the Eucha-Spavinaw watersheds. Outreach meetings were held in Adair, Cherokee, Delaware, Mayes, and Sequoyah Counties. A media signing event was held along the Illinois River on October 26, 2007 to mark the first contract with landowner Jerry Hammons.

CREP Match Monies spent include:

- **Oklahoma Scenic Rivers Commission**
\$777,551 to protect 416 acres in the Illinois River Watershed
- **City of Tulsa (TMUA) and Land Legacy**
\$318,045 to protect 437 acres

Work Completed

- 53 applications have been taken for CREP (20 ready for contracts; 11 contracts completed)
- A total of 1,441 acres are enrolled or have contracts pending
- A total of 2,000 acres have been georeferenced



Public Outreach

During FY2008, the project coordinator and plan writers (OCC staff) have been busy contacting landowners. In addition to holding public meetings in each county, a total of 141 landowners have been visited, 198 telephone contacts have been completed, and 82 outreach letters have been mailed.

Poultry Litter Transfer Program

The purpose of this project, which was begun in 2002 and has been supplemented multiple times since, is to protect water quality in the Illinois River and Eucha-Spavinaw watersheds by reducing land application of poultry litter through exportation. The latest iteration was launched in late 2007 and uses lessons learned from the previous program to help expand the litter market. Now, buyers are eligible to receive \$0.03/ton/mile or up to \$8/ton for litter purchased from the Illinois River or Eucha/Spavinaw watersheds. Haulers and growers are not subsidized through this program and buyers are responsible for locating their own sources and haulers of litter.

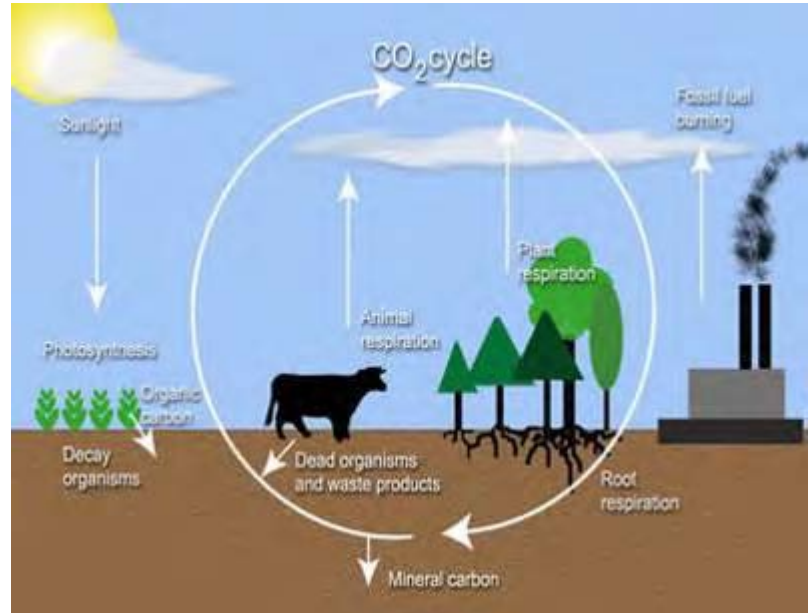
This revamped program is administered by local Conservation Districts, which ensure buyers complete the steps necessary to receive the subsidy. Conservation Districts who support the program are eligible to receive up to \$1.00/ton for the litter that moves to their district. In return for these administrative fees, Conservation Districts process claims and advertise the program. It is believed that this subsidy will help encourage cash-strapped districts to strongly endorse the use of poultry litter as an alternative to commercial fertilizer. Many one-time users of litter become repeat users; therefore, the intent of these subsidy programs is to get producers hooked on the economic and agronomic benefits of litter such that they will continue to purchase it beyond the life of the subsidy. Through the latest federally funded and now exclusively state funded programs, a total of 95,771 tons of poultry litter have been moved out of the Illinois River and Eucha-Spavinaw Watersheds since October 2007. Approximately \$325,000 federal and \$166,000 in state funds were spent to accomplish this effort.



Carbon Sequestration Program

In July 2008, the Oklahoma Carbon Sequestration Verification Program was launched when the Governor signed emergency rules into law. The Commission has statutory authority to verify carbon offsets from agriculture, forestry, and downhole injection of carbon dioxide for the purposes of enhanced oil recovery. Each of these sectors has the potential to help or harm water and air quality. This is why the Commission is pleased to develop another voluntary program that encourages protection of natural resources. As Oklahoma Verified Offsets become a recognized, credible commodity, more Oklahomans will participate in the carbon program, which means more CO₂ will be sequestered from the atmosphere and more waterbodies will be protected from nonpoint source pollution. For more information on the Carbon Sequestration Verification Program see the following website:

www.ok.gov/okcc/Carbon_Sequestration/index.html



In August 2008, Oklahoma's first agricultural carbon offset pilot program began in the North Canadian River Watershed. To launch the program, Western Farmers Electric Cooperative agreed to purchase from producers agricultural carbon offsets totaling 25,714 metric tons of carbon dioxide. The \$90,000 purchase will be disbursed in annual payments over three years. The carbon offsets are created when §319 Project participants implement no-till, pastureland management, or rangeland management. The practices, which are known to improve water quality and reduce erosion, also sequester carbon dioxide at a known rate because they minimize soil disturbance while optimizing vegetative growth. Other partners for the pilot program include the Oklahoma Association of Conservation Districts which is handling carbon contracts and payments to producers, and local Conservation Districts in Blaine, Dewey, and Canadian Counties which are assisting with carbon pilot program applications.

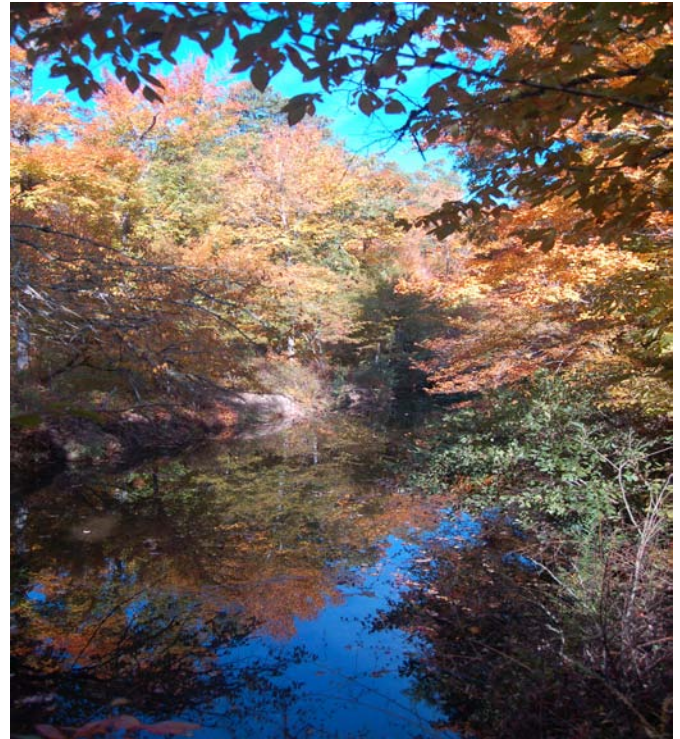
Silvicultural NPS Management Program

The Oklahoma Department of Agriculture, Food and Forestry – Forestry Services Division administers Oklahoma's silvicultural nonpoint source management program and the forestry best management practices that protect waters from nonpoint source pollution. The program relies on a non-regulatory approach to BMP compliance developed in cooperation with landowners and land users.

BMP Compliance Monitoring Project

In 2008, the Forestry Services Division initiated the third round of forestry BMP compliance monitoring. The Forestry Best Management Compliance Monitoring Project measures the implementation of BMPs across eastern Oklahoma's commercial forest area. The information gathered from the project is used to identify activities that need improvement. Then, the Forestry Services Division emphasizes these activities during training and education with landowners, loggers, foresters, and other land users.

In 2008, Forestry Services monitored 36 sites and in 2009 will compile the data and report the results based upon 100 monitored sites. Oklahoma's most recent BMP compliance monitoring shows a 91.6% compliance rate.



Education

In FY2008, the Forestry Services held five BMP workshops for loggers, landowners, and foresters. Training and education at these workshops focused on forestry best management practices. The workshops included presentations, discussions, videos, and a field trip. In addition, six Tailgate Sessions were held with loggers and landowners to discuss situations that they encounter and how they can use BMPs to protect water quality. The majority of the Tailgate Sessions were held on the job site in the Spavinaw Creek Watershed. Also, in FY 2008, BMP presentations were given to the Lion's Club, the Society of American Foresters, the State Fair of Oklahoma, and landowner groups visiting the Spavinaw Creek demonstration farm.

New 319 Grant

Forestry Services expanded its partnership with the Conservation Commission and applied for EPA Section 319 funds to carry out its comprehensive forest water quality program.

The approved project will include additional compliance monitoring, educational activities, carbon sequestration verification and a new timber bridge mat loan program. Forestry completed the Quality Assurance Project Plan in 2008 and will begin the project in 2009.



Properly installed waterbars on a mountain haul road in eastern Oklahoma.

MONITORING

Oklahoma's NPS monitoring program is a significant and collaborative effort between multiple federal, state, and local agencies. As the state's NPS technical lead, the OCC conducts much of this effort, having developed an extensive and unique monitoring program primarily focused on determining the extent, nature, and probable sources of NPS pollution through ambient and diagnostic monitoring activities. Oklahoma's NPS Program monitoring efforts help focus NPS Program planning, education, and implementation in areas where they can be most effective and are absolutely crucial in gauging their success over time.



During 2007 and 2008, OCC staff collected more than 3,505 water samples for analysis of conventional pollutants at over 182 sites. Biologists completed approximately 182 fish collections (below) with concurrent aquatic habitat assessments and collected nearly 400 invertebrate samples. A more complete description of the sampling by project will follow. All OCC monitoring is conducted following methods and sampling plans established in EPA approved Quality Assurance Project Plans (QAPPs).

Use of Monitoring Data

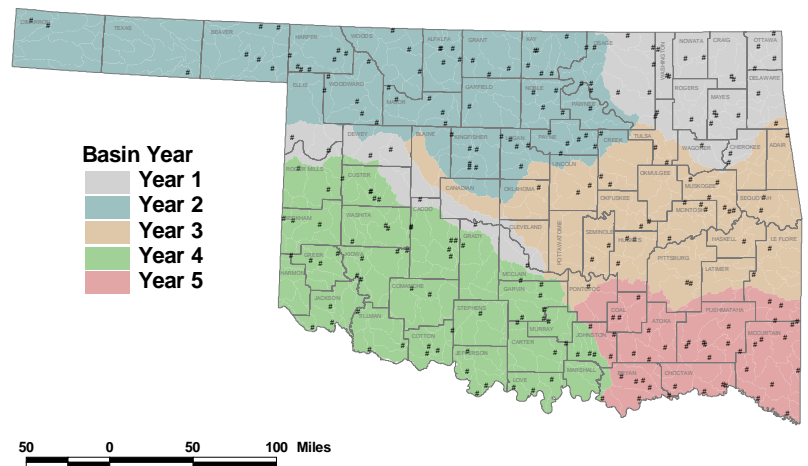
Nonpoint source monitoring data is used for many purposes including use support assessments for Oklahoma's Integrated Report, general project reporting, trend analysis, watershed targeting, TMDL



development, and effectiveness monitoring. Oklahoma's ambient water quality monitoring programs analyze available water quality data every two years as required by the Clean Water Act. Streams that are not meeting Oklahoma water quality standards are placed on the 303(d) List of impaired waters and remain there until collected data show a stream meets the standards. While watershed projects last from 2 to 5 years, it can take up to 10 years before significant improvements in water quality are statistically evident by monitoring and perhaps even longer to totally restore attainment of beneficial uses.

Rotating Basin and Probabilistic Monitoring

Through OCC's Rotating Basin Monitoring Program (RBMP), routine water quality (physical and chemical), instream habitat, and biological (fish and benthic macroinvertebrates) data are collected in support of EPA mandates to assess state waters regarding their support of water quality standards. It serves a dualistic role in fulfilling NPS Program requirements for an NPS Assessment Report as all data are analyzed and submitted biannually to the ODEQ for compilation in the state's Integrated Report. Data from the RBMP continue to comprise a significant contribution in initial and continuing assessment of state streams (next two pages).



Through this program, all complete USGS eleven digit notation watersheds across the state are monitored in a five year rotation. Each basin is monitored for a two-year period every five year cycle resulting in a total of **245** sites throughout the state. The RBMP is currently in its second five year cycle.

In 2008, a total of 107 sites were monitored, representing Basin Years 2 and 3. The final report summarizing data for the first cycle of streams in the Lower Red Basin (Basin Year 5) was submitted to EPA.

Also in 2008, OCC permanently incorporated a probabilistic monitoring component in the RBMP to provide data necessary for extrapolation of stream assessments from a system to an areal scale. Generated by EPA technical staff, fifty randomly chosen sites from the new basin year are visited once for collection of chemical, physical, and biological data. Data generated from this assessment allows for statistical representation of a basin's water quality based upon the sites monitored, much the same as an opinion poll of a small group of people can be extrapolated to represent the populations' sentiments concerning a matter.



Collecting fish by boat electroshocking.

INTEGRATED REPORT

Per Clean Water Act requirements, Oklahoma assesses its surface waters for beneficial use attainment and compiles these results into the state's Integrated Report. This report is generated biannually and is a compilation of assessments resulting from data gathered through state, federal, tribal, and local agencies.

Much of the data assessed for the Integrated Report is derived from Oklahoma's NPS Monitoring Program, particularly OCC's Rotating Basin Program and OWRB's Beneficial Use Monitoring Program (BUMP). During the 2007/2008 reporting cycle, there were a total of 4,064 waterbodies assessed, including 32,349 miles of rivers and streams. Selected assessment results from the approved 2008 Integrated Report are presented in the tables to the right and the map on the following page. For more detail, the reader is referenced to the report in its entirety found at the following URL:

http://www.deq.state.ok.us/wq/dnew/305b_303d/2008_integrated_report_entire_document.pdf

River and stream beneficial use support summary (from DEQ 2008).

| USE | Total Size | River Miles | | | |
|---|------------|-----------------------|---------------------|-------------------|-----------------------------|
| | | Size Fully Supporting | Size Not Supporting | Size Not Assessed | Size with Insufficient Info |
| Aesthetic | 32,325 | 4,756 | 501 | 17,584 | 9,484 |
| Agriculture | 32,269 | 7,258 | 3,628 | 17,739 | 3,645 |
| Emergency Water Supply | 1,520 | 1,520 | 0 | 0 | 0 |
| Fish Consumption | 32,336 | 1,748 | 1,084 | 28,419 | 1,085 |
| Cool Water Aquatic Community Subcategory | 1,595 | 401 | 428 | 571 | 195 |
| Habitat Limited Aquatic Community Subcategory | 716 | 24 | 166 | 414 | 111 |
| Trout Fishery | 34 | 0 | 1 | 24 | 9 |
| Warm Water Aquatic Community Subcategory | 30,084 | 1,904 | 5,833 | 16,364 | 5,984 |
| Navigation | 213 | 213 | 0 | 0 | 0 |
| Primary Body Contact Recreation | 31,250 | 756 | 7,699 | 21,504 | 1,291 |
| Public and Private Water Supply | 14,788 | 1,068 | 395 | 6,517 | 6,808 |
| Sensitive Water Supply | 1,510 | 0 | 0 | 1,510 | 0 |
| Secondary Body Contact Recreation | 1,118 | 123 | 163 | 671 | 161 |

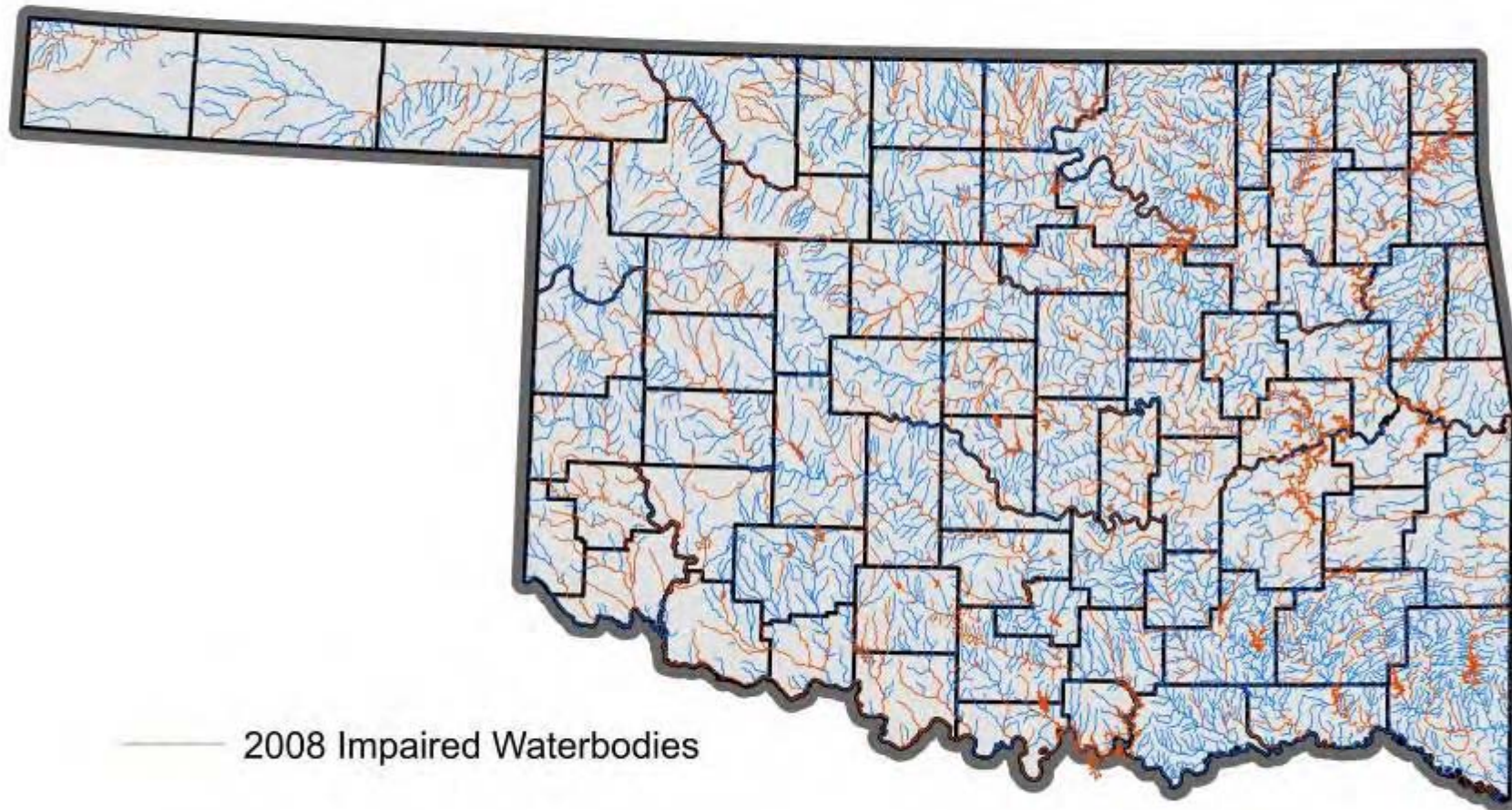
Top ten impairments by affected stream miles (adapted from DEQ 2008)

| Impairment | Size (Miles) |
|------------------------|--------------|
| Enterococcus | 6,977 |
| Turbidity | 4,012 |
| Escherichia coli | 3,495 |
| Fecal Coliform | 3,094 |
| Dissolved Oxygen | 2,547 |
| Total Dissolved Solids | 2,277 |
| Chloride | 2,137 |
| Sulfates | 1,982 |
| Lead | 1,437 |
| pH | 762 |

Top ten potential sources by affected stream miles (adapted from DEQ 2008).

| Potential Source | Size (Miles) |
|--|--------------|
| Source Unknown | 9,898 |
| Grazing in Riparian or Shoreline Zones | 7,091 |
| Rangeland Grazing | 6,905 |
| Wildlife Other than Waterfowl | 6,887 |
| On-site Treatment Systems (Septic Systems and Similar Decentralized Systems) | 6,740 |
| Wastes from Pets | 4,873 |
| Residential Districts | 4,486 |
| Highway/Road/Bridge Runoff (Non-construction related) | 4,111 |
| Non-irrigated Crop Production | 4,006 |
| Municipal Point Source Discharges | 3,274 |

2008 303(d) Impaired Waterbodies



Implementation Monitoring

Monitoring is a vital part of OCC priority watershed projects implemented across the state. Data is needed to characterize pollutant loading from sources in the watershed and to prioritize areas for implementation of practices to reduce pollution. Water quality data is also vital to evaluate the success of load reduction strategies and pollution abatement measures. Calculating loading for tracking water quality changes and for use in developing TMDLs is best accomplished through the use of automated water samplers. OCC has developed unique methods for deploying and maintaining autosamplers (right) that have proven vital in documenting the effects of implementation projects in the short timespans dictated by national NPS Program requirements.

In 2008, the OCC added eight additional autosamplers to its current schedule. Five autosamplers were installed in the Lake Thunderbird Watershed, while 3 were installed in the North Canadian Watershed Project area. The eight new autosamplers join the existing 13 for a total of 21 active autosamplers!

Currently, autosamplers are used to collect continuous flow-weighted composite samples. Because autosamplers provide continuous data, they can be used to show statistical significance in water quality changes, such as those resulting from success of implementation projects, within a shorter period of time. Pre-implementation data collected by these autosamplers will be compared to the post-implementation data collected to determine if implementation and education efforts have improved water resources in the project area.



21 Total Active Autosamplers

8 autosamplers were added in 2008:

5 in the Lake Thunderbird Watershed
3 in the North Canadian Watershed

13 existing auto samplers:

6 in the Illinois River Watershed
3 in the Spavinaw Watershed
2 in the Honey Creek Watershed
2 in Beaty Creek Watershed



Fish are important biological indicators of water and habitat quality.

EDUCATION

The Blue Thumb Program is a water quality environmental education program that teaches citizens about reducing nonpoint source pollution. The Blue Thumb program is best described as a “train-the-trainers” program, where volunteers are encouraged to spread the information they learn to educate their local community. Blue Thumb volunteers participate in public education, groundwater screening, and stream monitoring. In addition to its general role as an education program, Blue Thumb directs and implements public education and outreach in priority watersheds.

In FY 2008, five new volunteer water-monitoring trainings (e.g., right and below) were held to initiate 107 new potential Blue Thumb volunteers. In addition, four mini-academies were held at schools for 38 students of Gage High School, Skiatook High School, and Tulsa High School. Currently, 25 counties have active Blue Thumb monitoring programs.



www.bluethumbok.org



In FY 2008, volunteers monitored 83 stream sites across the state. Each site is monitored monthly for dissolved oxygen, temperature, pH, chloride, ammonia, nitrogen, nitrate, ortho-phosphate, and turbidity.

Volunteers also assist with the benthic macroinvertebrate collections and fish collections at their sites. **In FY2008, volunteers collected fish from 23 sites and macroinvertebrates from 52 sites.** All data collected by volunteers is used in stream assessments by OCC.

Volunteers attend quarterly quality assurance (QA) checks to assure that the data collected is of acceptable quality. **Over 80 QA sessions were conducted during FY2008.**

From October 1, 2007 through September 30, 2008, a total of 8,606 volunteer hours were logged under the Blue Thumb Program. This sets a record for Blue Thumb hours recorded in one year! Volunteers participating in chemical monitoring of their stream logged over one-half of the total hours. The remainder of the volunteer hours was logged from participation in training, quality assurance sessions, educational events, fish and macroinvertebrate collections, and groundwater monitoring.

In addition to monitoring streams, volunteers participated in ground water screenings, curbside marking on stormwater drains, and educational events throughout the State.

In April, a Blue Thumb Earth Day Celebration was held along Chisholm Creek in Oklahoma County. The Blue Thumb event educated local residents on how they can take better care of Chisholm Creek and the Environment. Additionally, the Grand Lake Festival on Earth Day in Grove promoted Blue Thumb activities.



The Enviroscope model was used at a Blue Thumb Earth Day Celebration on Chisholm Creek to demonstrate nonpoint source pollution in a watershed.



Participants learn about macroinvertebrates in West Elm Creek during the outdoor portion of the Blue Thumb volunteer training.

Additional 2008 accomplishments include:

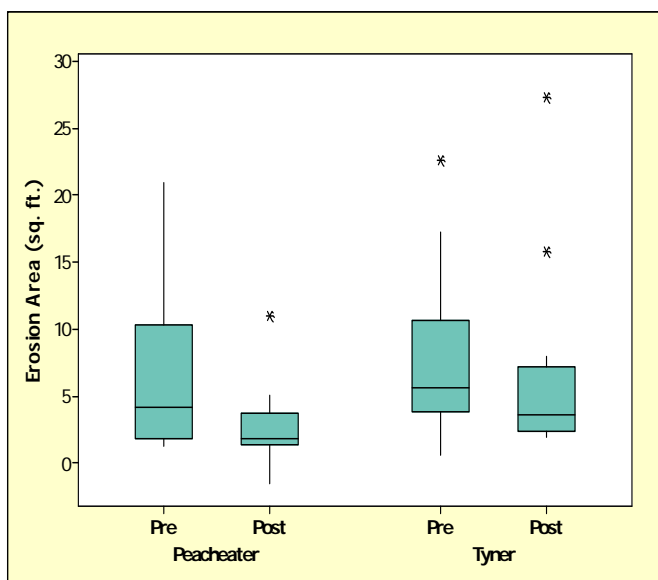
- 10 new stream monitoring sites were added
- A new webpage was created at www.bluethumbok.org
- This year was the second year for the production of the Blue Thumb Calendar, which showcases streams monitored by volunteers and contains information on how to protect water quality and the environment
- Blue Thumb Staff assisted with educational activities at Natural Resource Days
- Volunteers wrote Data Interpretations



In February 2008, a Blue Thumb exhibit was used to educate participants at the No-Till Conference in OKC.

Success Stories

The OCC Water Quality Division has received national recognition for its projects to improve water quality. The OCC submitted two more NPS success stories to EPA in 2008; the Lake Creek story was approved and is now promulgated at the *Section 319 Nonpoint Source Success Stories* website (URL: www.epa.gov/nps/success/), while the Peacheater Creek story is pending approval. Analysis of monitoring data from Beaty Creek has shown continued improvement due to BMPs, and this success will be described in a success story for the EPA website soon. A brief synopsis of these stories follows.



Peacheater Creek: In December 2007, the North Carolina State University Cooperative Extension newsletter *NWQEP Notes* highlighted the success of the Peacheater Watershed Implementation Project. The report described remarkable success from implemented agricultural BMPs in achieving nutrient load reductions and streambank stabilization implemented in the Peacheater Creek watershed from 1998 through 2002. Common BMPs included riparian buffers, alternative water supplies for cattle, and pasture management. Success was shown with **decreased phosphorus loading by 71%**, and decreased total nitrogen loading by 58%. The report can be viewed at:

www.bae.ncsu.edu/programs/extension/wqg/issues/notes126.pdf

Lake Creek: Lake Creek lies in Caddo County within the Fort Cobb Watershed implementation project boundaries. Best management practices implemented in the watershed included deferred and rotational grazing, grade stabilization structures, diversion terraces, riparian exclusion fencing, critical area planting and revegetation in riparian zones. These practices reduced the amount of sediment, pesticides, and nutrients in the creek. The improvements from the implementation project allowed Lake Creek to be **removed from the 303(d) list in 2002 for pesticides and unknown toxicity**. In addition, Lake Creek regained the Fish and Wildlife Propagation beneficial use. The education and implementation provided in the Fort Cobb Watershed improved the surface and ground water quality in Lake Creek.

Beaty Creek: The most recent analysis of Beaty Creek data shows significant improvements in water quality from the post-implementation period (2003-2007) relative to the calibration period (1999-2001). It was calculated that a **66% reduction in total phosphorus loading** has been achieved in Beaty Creek during the post-implementation period. Reductions in average total phosphorus loading and total phosphorus concentration were observed for Beaty Creek as well. In the Beaty Creek watershed, Total Kjeldahl nitrogen (TKN) loading was reduced by 80% and ortho-phosphorus loading was reduced by 53%. Ammonia loading was reduced by 87% over what was expected without BMP implementation.

CONCLUSION

The Oklahoma Conservation Commission's administration of the §319 nonpoint source program and related programs continues to manifest improvements in the quality of the state's waterbodies. As we move forward with our partners, further improvements are to be expected.



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