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For more information on activities discussed in this report, visit our website: www.conservation.ok.gov

Oklahoma Conservation Commission Water Quality Division 4545 North Lincoln Blvd. Oklahoma City, OK 73105



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Cover photo: Medicine Creek in Comanche County, Oklahoma (2010)

Oklahoma's Nonpoint Source Program



Overview:

By state statute, the Oklahoma Conservation Commission (OCC) serves as the technical lead agency of Oklahoma's NPS Management Program and is responsible for monitoring and assessing waterbodies for NPS impacts and implementing programs to reduce these NPS issues and thereby restore support of the designated beneficial uses of affected waterbodies. With input from multiple agencies, tribes, organizations, and universities who form the NPS Working Group, the state follows an organized process to identify NPS threats and impairments to water resources, determine cause, extent, and source of the problems, and prioritize watersheds needing improvement. Solutions to the NPS problems are then planned and addressed primarily through projects in priority watersheds that provide implementation and education.

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. These and other core program elements are contained in the State's NPS Management Plan, available via the OCC website or by request.

The **long-term goals** of the Oklahoma NPS Management Plan (updated Dec. 2012) are as follows:

- By 2020...establish a Watershed Restoration
 Action Strategy (WRAS), Total Maximum Daily
 Load (TMDL), or Watershed Based Plan (WBP) to
 restore or maintain beneficial uses in all
 watersheds identified as impacted by NPS
 pollution on the 1998 303(d) list, unless the
 original basis for listing is no longer valid.
- By 2040...attain and maintain beneficial uses in waterbodies listed on the 1998 303(d) list as threatened or impaired solely by NPS pollution.

Short-term goals include:

- Reduce NPS loading in Priority Watersheds as indicated in relevant WBPs.
- Identify pollutant sources within watersheds monitored by the NPS Rotating Basin Monitoring Program for inclusion in the State's Integrated Report.
- Maintain Blue Thumb coverage across the state to include at least 100 monitored sites and 40 active Conservation District education programs.
- Draft WBPs in NPS impaired watersheds with sufficient data as requested by local groups.
- Identify alternative sources of funding to target and implement practices to achieve the long-term goals of the NPS Management Plan.

Progress towards NPS Management Plan goals is good. Specifically, implementation of practices to reduce NPS pollution has occurred in 7 of the top 10 priority watersheds. The water quality of more than 14,665 stream miles has been assessed and presented in the State's Integrated Report, which also provides potential sources of pollution for all impaired waterbodies. Oklahoma's Blue Thumb Education Program currently has active volunteers in 32 of the 77 counties of the State. The Oklahoma Department of Environmental Quality (ODEQ), which has responsibility for producing TMDLs, has submitted over 100 each year for the last several years. Oklahoma currently has 582 TMDLs for waterbodies impaired by bacteria and turbidity, and work to address all other impairments is ongoing. Finally, Oklahoma's NPS program has been successful at partnering with various agencies to secure funding and match federal funds to increase the total amount of funding available to address NPS issues.

This concise report offers highlights of Oklahoma's NPS Management Program for 2012. While efforts funded through Section 319 are emphasized, projects conducted by NPS Program partners are also included. Readers are encouraged to access more details on project and program efforts via web links where provided.

Mission Statement:

To conserve and improve the water resources of the State of Oklahoma through assessment, planning, education, and implementation.

As Oklahoma's lead technical agency for the Nonpoint Source (NPS) Management Program, the OCC Water Quality Division works with partners across the state to protect waters from runoff-driven pollution. Oklahoma's NPS Management Program is *non-regulatory*. On-the-ground conservation is the primary focus, and less than 10% of OCC funds support administrative duties. *Planning* and *educating* to address NPS problems are the backbone of OCC's program and are critical to its success. Long-term water quality *monitoring* and *assessment* are essential to help prioritize areas to target through the program and evaluate its effectiveness. *Implementation* of best management practices (BMPs) through cooperative, targeted, voluntary efforts allows improvement and protection of water quality and other resources while maintaining agricultural production goals.

Implementation:

Current OCC priority watershed implementation projects are located in two general parts of the state: the east and the west-central. The predominant agricultural practices vary between these two general areas, so the implementation focus is slightly different in each area. In the east, extensive poultry production and related land application of waste as fertilizer has contributed to the build-up of high levels of nutrients, particularly phosphorus, in the soils. Consequently, BMPs focus on riparian buffers and animal waste management. In the west-central part of the state, wheat and cattle production dominate agricultural activity, often contributing to waterand wind-driven soil erosion in conventional tillage operations in the sandy soils. No-till and field conversion BMPs are the focus of implementation efforts in this area. Establishing riparian buffers is an important component of all projects, as these vegetated regions act as filters to take up nutrients, and roots help stabilize streambanks to reduce erosion. Fencing livestock out of riparian areas also reduces the amount of fecal bacteria in the stream.

Despite some differences in BMP focus, all OCC priority watershed implementation projects share a **common design** which has resulted in success both in number of participants who are implementing BMPs in each area and in actual, measurable water quality improvement:

- <u>Planning</u>: have data/information that indicates
 NPS problems that can be addressed with project
- <u>Local leadership and buy-in</u>: get support of local Conservation District and hire local coordinator; establish a Watershed Advisory Group (WAG) that includes all interests to drive implementation planning
- <u>Targeting</u>: use an effective model (e.g., SWAT) to locate pollution hotspots to target for implementation
- Effective monitoring: use a proven study design (e.g., EPA's Paired Watershed Method) and sampling method (e.g., continuous, flow-weighted sampling) to obtain sufficient data to evaluate impacts on water quality
- <u>Demonstration/Education</u>: establish a demo farm where landowners can see a suite of BMPs in action
- <u>Partnerships</u>: look for creative ways to engage other agencies, leveraging hard dollars and matching funds
- Long-term commitment: commit to have multiple phases in the project (i.e., be in watershed for more than 5 years) to allow project concepts to take hold and prove their way from producer to producer



Projects:

During FY2012, \$674,732 in EPA 319 funds and \$648,048 in Oklahoma state funds were expended for implementation of BMPs in four priority watersheds. Cost-share funds from participating landowners comprised a significant addition to implementation monies. A brief summary of each of the OCC priority watershed implementation projects is given below. Details of each project, including reports and Watershed Based Plans, can be accessed via the OCC Water Quality Division website under *Priority Watershed Projects*.



Honey Creek Watershed

The Honey Creek watershed is a subwatershed of Grand Lake O' the Cherokees, one of Oklahoma's premier recreational reservoirs and an important drinking water supply. The majority of the 79,000 acre Honey Creek watershed is located in the vigorous poultry and cattle producing area of northeast Oklahoma. Honey Creek is also affected by NPS pollution from residential and development sources. A watershed implementation project has been ongoing in this watershed since 2006, and extra funding has been awarded twice to continue implementation due to the high interest of landowners. Both FY 2011 and 2012 projects will conclude in December 2014. The Demonstration Farm located in this watershed continues to host meetings and tours for producers, as well as hosting attendees of the National NPS Monitoring Conference in October 2012.

In 2012, \$459,225 was spent on BMP implementation, with \$247,529 from EPA funds, \$52,783 from state funds, and \$158,914 from landowners. The following BMPs were installed:

- 17 acres riparian buffer
- 3,260 linear feet riparian fence
- 39,894 linear feet cross-fence
- 161 acres of pasture planting
- 27 heavy use areas

- 26 alternative water supplies (tanks)
- 11 wells for alternative water
- 13 ponds
- 3 water storage tanks
- 1 septic system

A **24% reduction in total phosphorus (TP) loading** relative to expected loading was observed after two years of implementation. Load reductions reported in GRTS for 2011 indicate that BMPs reduced TP loads by 5,825 lbs/yr, nitrogen loads by 37,090 lbs/yr, and sediment loads by 555 tons/yr, and similar reductions are expected for 2012.



Spavinaw Creek Watershed

Spavinaw Creek is an important tributary to Lakes Eucha and Spavinaw, which supply water to nearly 500,000 citizens. These reservoirs have experienced excessive algal blooms due in part to high nutrient levels from NPS pollution. Implementation of BMPs has been ongoing in this 230,000 acre watershed since 2003. Beaty Creek, a subwatershed, has been the focus of NPS projects and paired watershed monitoring since 1999. Currently, BMP implementation is proceeding through three grants.

In 2012, \$723,550 was spent on BMP implementation, with \$264,670 from EPA funds, \$142,600 from state funds, and \$316,280 from landowners. The following BMPs were installed:

- 413 acres riparian buffer
- 12,272 linear feet riparian fence
- 82,146 linear feet cross-fence
- 249 acres of pasture planting
- 3 heavy use areas

- 33 alternative water supplies (tanks)
- 16 ponds
- 3 winter feeding facilities
- 4 septic systems

Initial analysis of Spavinaw Creek and Beaty Creek water quality data relative to control watersheds indicates **significant reductions in expected phosphorus**, **nitrogen**, **and bacteria loading**. The 2011 GRTS report shows that BMPs installed that year were expected to reduce phosphorus loads by 107,040 lbs/yr, nitrogen by 142,520 lbs/yr, and sediment by 348 tons/yr, and reduction estimates for 2012 are expected to be similar.



Illinois River Watershed

The Illinois River is designated as one of the few scenic rivers in Oklahoma. Implementation of BMPs in the watershed has been ongoing for a number of years through several projects. Currently, two active grants are providing funding for additional work, with an emphasis on cooperating with the Conservation Reserve Enhancement Program (CREP) to protect large tracts of riparian areas. Implementation efforts are planned through 2014.

In 2012, \$429,932 was spent on BMP implementation, with \$107,454 from EPA funds, \$227,445 from state funds, and \$95,033 from landowners. The following BMPs were installed:

- 1,536 acres riparian buffer
- 31,065 linear feet riparian fence
- 27,910 linear feet cross-fence
- 1 winter feeding/waste storage facility
- 14 alternative water supplies (tanks)
- 4 ponds
- 10 septic systems
- 2 wells

Preliminary analyses were performed on data collected using both a paired watershed and upstream/downstream design. **Significant reductions in expected total phosphorus, orthophosphorus, and nitrate loading were observed** in Flint Creek, a subwatershed, relative to a control watershed. The latest GRTS report shows that BMPs installed in 2011 reduced phosphorus loads by 9,509 lbs/yr, nitrogen by 96,443 lbs/yr, and sediment by 1,534 tons/yr, levels that should be reflective of the 2012 effort as well.



North Canadian River Watershed

The OCC began an implementation project in this watershed in 2007. Within four months of the initial BMP sign-up, all funds were obligated, yet interest remained high. Additional funding for BMP implementation was made available through two subsequent 319 projects, Phase II initiated in 2010 and Phase III in 2011. The focus of these projects is implementation of no-till farming methods and exclusion of livestock from riparian areas. An educational aspect has also been emphasized, with various workshops and outreach programs offered to landowners, local schools, and various other groups, and the creation of a demonstration farm where landowners can view many of the available BMPs in action.



Phase II Project: Federal \$352,622; State \$213,715; Total \$566,337 (90% complete in Dec. 2012) Phase III Project: Federal \$834,573; State \$556,382; Total \$1,390,955 (40% complete in Dec. 2012) The following BMPs were installed in 2012 at a cost of \$280,299 in federal 319 and state funds and \$16,602 in landowner funds:

- 951 acres no-till
- 67 acres riparian buffer
- 20,279 linear feet riparian fence
- 8 alternative water supplies (tanks)
- 12,516 linear feet cross-fence
- 83 acres of pasture planting
- 4 septic systems

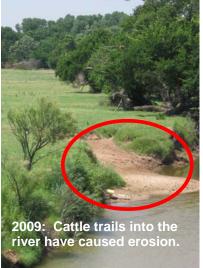
The 2011 GRTS report indicates that BMPs installed for that year through both projects are estimated to have reduced phosphorus loading by 1,562 lbs/yr, nitrogen by 13,365 lbs/yr, and sediment by 132 tons/yr. 2012 estimates are not completed yet, but should be similar.



Demo Farm Tour/Workshop



<u>Visible improvements</u>: The first photo to the right shows a portion of the North Canadian River in 2009, when cattle had direct access to the water. Manure was deposited directly into the river, and banks were trampled, contributing to erosion of soil into the water. The second photo shows the same spot in 2012, after cattle had been fenced out of the riparian area for three years. Vegetation has regrown in the bare area, increasing the bank's stability and reducing the erosion potential.





Other 319 Funded Projects

The USEPA Region 6 has made "special project" funding available to states at times when other states in the region have been unable to allocate their 319 funds in a timely manner. Oklahoma competed and received funding for several projects both in 2011 and 2012. The USEPA Region 6 awarded Oklahoma \$4.5 million in 319 special funding in FY 2011 and \$2 million in FY 2012 to pursue several small projects. In both years, the OCC received funding to supplement BMP implementation in the watershed projects which have already been discussed in this report (approximately \$4 million in 2011 and \$432,000 in 2012).

The table below shows the other grant projects which received 319 special funding. The total funding amount indicates the combination of state funding and federal 319 funding for each project. A brief description of each project follows.

Year Awarded	Agency	Project	Funding Amount
2011	Oklahoma Water Resources Board	Reducing the Impact of NPS Pollution Through the Establishment of Floating Wetlands in Eucha Lake	\$392,858 total; \$235,715 federal
2011	Oklahoma Water Resources Board	Creation of a Vegetated Wetland Throughout the Littoral Zone of Ft. Cobb Lake	\$241,559 total; \$144,935 federal
2012	Oklahoma State University with OCC	Bioretention Cells for Mass Load Reduction of Phosphorus and Sediment in Urban Watersheds	\$1,351,924 total; \$811,084 federal
2012	Land Legacy with Tulsa Metropolitan Utility Authority	Eucha/Spavinaw Watershed Riparian Protection Initiative	\$1,069,109 total; \$640,512 federal
2012	Oklahoma State University	Sediment and Phosphorus Load Reduction from Implemented Riparian Protection and Streambank Stabilization Projects	\$293,871 total; \$176,322 federal

Oklahoma Water Resources Board (OWRB)

The first OWRB project, "Reducing the Impact of NPS Pollution Through the Establishment of Floating Wetlands in Eucha Lake," began in March 2011 and will continue for two years. In 2012, installation of the 160 islands was completed, creating 6,400 sq. ft. of floating wetlands in the upper end of the lake. More than 20 species of native wetland plants were planted. Samples of the above-ground biomass were taken to determine nutrient uptake/removal by the plants, and data from sediment traps below the floating wetlands is being analyzed to provide an estimate of nutrient removal by plant root biofilm and wetland media. A fish assessment showed these wetlands to be habitat for young-of-year fish species, and various birds and otters used the areas for feeding and nesting.



Other 319 Funded Projects



The second OWRB project is to create a vegetated wetland throughout the littoral zone of Ft. Cobb Lake in order to reduce shoreline erosion and reduce the turbidity of the lake while also providing habitat for fish and wildlife species. Installation of wetland plants was accomplished in four coves, providing over one and a half acres of herbivore resistant vegetation. Despite severe drought conditions in 2012, most aquatic plants displayed growth, expansion, and reproduction both inside and outside the protected, enclosed areas. In the final months of the project, the OWRB, with help from the Oklahoma Department of Wildlife Conservation, will plant approximately 3,000 submergent aquatic plants within the enclosed areas to foster growth and expansion of species that were especially affected by the drought.

Oklahoma State University (OSU)

The first project, "Bioretention Cells...," began in September 2012 and will continue for two years. The overall goal of this project is to document the potential of bioretention cells for load reduction of phosphorus and other pollutants from urban stormwater runoff. At least 5000 sq. ft. of bioretention cells will be installed in the Hog Creek watershed in Oklahoma City. The influent and effluent



of the cells during storm events will be monitored using autosamplers. In addition, five bioretention cells that are already established in the Grand Lake watershed will be monitored. Water samples will be analyzed for common water quality parameters, including nutrients and bacteria. In 2012, preliminary bioretention cell locations were selected in the Hog Creek watershed, and preparations were made for installation of the sampling equipment.

The second OSU project, "Sediment and Phosphorus Load Reduction...," is also a two year project. This project will measure the load reducing capacity of riparian protection practices that have been implemented through watershed projects. The effectiveness of both streambank stabilization practices and more passive riparian management practices will be assessed using a variety of tests and models. Only planning activities were completed in 2012.

Land Legacy

The Land Legacy project is a two year project in partnership with Tulsa Metropolitan Utility Authority (TMUA). This project will expand the current land conservation program to new portions of the Eucha/Spavinaw watershed and provide additional education and technical assistance programs to landowners. To date, Land Legacy has placed 1,751 acres of land under permanent conservation easement, protecting nearly seven miles of riparian area in the Spavinaw Creek watershed. In 2012, a map of high priority areas to be targeted for protection was produced. Outreach efforts have been planned for the duration of the project.

Other OCC Programs:

Oklahoma's NPS Management Program is a cooperative effort, blending partners from multiple state and federal programs to accomplish water quality protection and improvements. Each of the programs described here is coordinated by the OCC and works to complement NPS efforts of the agency. With support from EPA 319 funds, OCC staff have been able to engage relevant partners, generate interest, and obtain grants to leverage additional match for non-EPA grants.

Multiple Program Partners Leverage More \$\$'s for Optimal Water Quality Benefit

Conservation Reserve Enhancement Program (CREP)

The CREP is a Farm Service Agency (FSA) program which protects and improves water quality by retiring environmentally sensitive land from agricultural production for up to fifteen years. In Oklahoma, the OCC, City of Tulsa, Oklahoma Scenic Rivers Commission (OSRC), Land Legacy, United States Department of Agriculture (USDA), and Natural Resource Conservation Service (NRCS) are partnering with the FSA CREP to restore approximately 24,000 acres of riparian buffer areas in the Oklahoma portion of the Illinois River and Eucha/Spavinaw Watersheds. The CREP program requires a 20% non-federal match from the State in order to receive the federal dollars. The City of Tulsa and the OSRC have committed funding to match the program, and the OCC is providing 319 funding for staff to administer the program and to complete water quality monitoring associated with the implementation to document success over time. Initial commitments are sufficient to implement a \$15 million dollar program in the Eucha/Spavinaw and Illinois River Watersheds. In 2012, approximately \$100,000 in federal CREP funding and \$500,000 in 319 match were expended.

The Oklahoma CREP, which began in 2007, has accomplished the following:

- 598 acres of riparian buffer (106 new acres in 2012 and 265 acres pending)
- 58,421 linear feet of riparian fencing (10,975 lf in 2012)
- 82,803 tree seedlings planted (17,071 in 2012)

Over 1,900 acres of wooded riparian buffer easements have been fenced off through the 319 program to complement the enrolled CREP areas. CREP only addresses areas that are in agricultural production and devoid of trees at the time of enrollment, so the opportunity to include wooded areas has expanded interest in CREP. The combination of the two programs allows continuous fencing of a riparian area instead of piece-meal participation and optimizes the 319 funding to enable more implementation to occur overall. Analysis of the topography in these watersheds has indicated that one acre of riparian area receives runoff from 13 acres in the watershed, so more than 32,000 acres are being filtered through the protected riparian areas in these watersheds. STEPL estimates of the effect of BMPs installed in 2011 indicate load reductions of 2,706 lbs/yr for phosphorus, 30,294 lbs/yr for nitrogen, and 437 tons/yr for sediment. Visit OCC's *CREP web page* for more information.







Wetlands Program

Wetland activities initiated by the OCC provide demonstration, restoration, and protection of wetland resources. Every wetland project the OCC pursues has the potential to improve water quality, particularly with regard to NPS pollution. Specifically, these projects include youth and adult wetland education, watershed-based assessment and planning, wetland assessment, stream corridor restoration, and wetland restoration. The program is primarily funded through CWA Section 104(b)(3) Wetlands Program Development Grants (WPDG) with matching funds from state and local sources. In 2012, approximately \$100,000 in non-319 EPA funds were used to accomplish the activities below:

- Completed a draft wetland program plan to prioritize statewide wetland management activities for the next 5 to 6 years.
- Completed an initial floristic quality assessment (FQA) project with the University of Oklahoma which is the first step towards developing a FQA that is capable of assessing wetland conditions in Oklahoma.
- Secured a grant to incorporate wetlands into watershed based planning. Specifically, an
 assessment method will be developed to identify and prioritize areas for wetland
 restoration that will have significant chance of successful wetland creation or restoration
 and provide benefit to receiving waterbodies through NPS reduction. The methodology
 will be tested in three priority watersheds.





Sugar Creek Cooperative Conservation Partnership Initiative

The Sugar Creek Cooperative Conservation Partnership Initiative (CCPI) is a \$3,000,000 effort involving the Oklahoma NRCS, the OCC, the South Caddo Conservation District, the North Caddo Conservation District, the Caddo County Board of Commissioners, and local landowners. Two million dollars in NRCS EQIP funding is being matched by one million dollars from partners to install practices to control gully and streambank erosion in the channel and floodplain of Sugar Creek and its territories. This work enhances the benefits achieved with FEMA funding after the extreme flooding event in 2007 (photo lower left) by making repairs on private lands in the Sugar Creek watershed that did not qualify for FEMA assistance. This past year, \$472,070 in CCPI funds were used to install 16 grade stabilization structures and four diversions to divert runoff from unstable, erodible areas. In addition, tree sprigs were planted in 11 acres of vulnerable riparian area to provide stability, and eight gullies were reshaped and filled. Load reduction estimates in GRTS for these installed BMPs indicate 770 lbs/yr less phosphorus, 2,928 lbs/yr less nitrogen, and 117 tons/yr less sediment.





Carbon Program



Program Wins Stewardship Award

The Oklahoma Carbon Program received the 2012 "Planet"

Environmental Stewardship Award from the Henry Bellmon Sustainability Awards program. The awards are to raise awareness and reward those people, agencies, organizations, or companies who dedicate themselves to a balanced approach toward quality of life, responsible economic growth and environmental stewardship. The Carbon Program has been recognized as a leader in sustainability locally, nationally, and internationally for its innovation at developing a program that is outside of the federal regulatory arena, yet succeeds at meeting regulatory goals through voluntary means.

Program Recognized in International Report on Voluntary Markets

The Carbon Program was recognized in a report by Forest Trends Ecosystem Marketplace called *Bringing it Home: Taking Stock of Government Engagement with the Voluntary Carbon Market* in which Oklahoma was one of only three U.S. states (including Oregon and California) featured alongside programs in other countries including Australia, Chile, Brazil, Netherlands, Japan, and China.

Verifier Trainings Held

- Annual Verifier Continuing Education Training was attended by 32 conservation district, OCC, OSU, and NRCS staff.
- Rangeland Monitoring Workshop held in Woodward was attended by 26 conservation district staff, OCC staff and invited producers. Instruction provided by NRCS and OCC.
- Nutrient Management Workshop held in Geary was attended by 17 district and OCC staff. Instruction provided by NRCS, OSU, OCC, and OSU Cooperative Extension Service.
- Soil Sampling Workshop held in Geary attended by 15 district and OCC staff who learned from OSU how to use a closed tube soil probe for use in the Program.



N. Canadian River Carbon Offset Pilot Program and WFEC /CIG Project

The three-year Pilot Program pairs carbon contract payments with 319 Project cost-share funds to incentivize the installation of best management practices (BMPs) that sequester carbon dioxide (CO2) and reduce bacteria, nutrients, and sediment entering the impaired North Canadian River. The Pilot Program was merged into the WFEC Expansion Project



in 2012, which is funded in party by a Conservation Innovation Grant from the USDA-NRCS. In 2012, the Program verified roughly 2,000 acres of forestry; 9,000 acres of rangeland; 8,000 acres of grassland and 22,000 acres of no-till.

According to a 2012 analysis of data entered into the EPA GRTS model, practices enrolled in the carbon program in 2011 prevented 7,559 tons of sediment,159,262 lbs of N, and 30,157 lbs of P from entering Oklahoma waterways.

Pilot Program Results 2009-2011

- 26,045 acres certified
- 10,350 metric tons CO2e sequestered

Pilot + CIG Results thru 2011

- 55,387 acres certified
- 22,095 metric tons CO2e sequestered

WFEC/CIG 2012 Preliminary Results

- 43,000 acres verified
- 19,000 metric tons CO2e sequestered



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Monitoring:

Effective monitoring and assessment are essential to being able to document NPS problems and show improvement due to conservation programs across the state. The total cost of the monitoring program is approximately \$1,000,000 annually. In 2012, due to the successful partnership between the OCC and NRCS to document improvements in streams, the Oklahoma state legislature granted \$500,000 in state funds to support monitoring, the first time that state money has ever been allotted to the OCC for monitoring.

The OCC's monitoring program has allowed identification of impaired streams to target for

implementation projects in addition to finding high quality streams used as reference sites to gauge the health of other streams. The data collected is also used to create TMDLs for impaired streams. OCC monitors 245 fixed stream sites and 250 probabilistic (randomly selected) sites across the state every five years (about 150 streams per year) through the Rotating Basin Monitoring Program. Through this crucial monitoring program, OCC conducts the majority of the state's assessment of wadeable streams for Integrated Reporting (305b and 303d) and documents improvements due to NPS program activities by OCC and its partners in watersheds across the state.

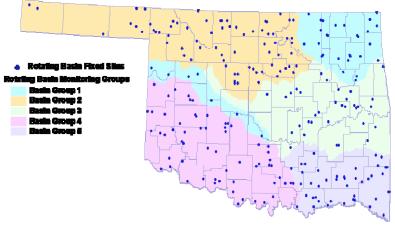


During the five year cycle, **18 physical and chemical parameters are measured at each fixed site every five weeks for two consecutive years**. In addition, an intensive fish collection

and instream habitat assessment are performed once every five years at each site, and aquatic macroinvertebrates are sampled twice a year for the two consecutive years. Each of the probabilistic sites are visited once for collection of the same 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.

Rotating Basin Monitoring Program





The OCC also conducts separate, more intensive monitoring and assessment efforts to determine the impacts of BMP implementation in all watershed implementation projects. Automated water samplers are installed in either an upstream/downstream design, with BMP implementation occurring in the area between the samplers, or in a control/treatment design, where an adjacent watershed is used as a control for the implementation watershed.



Education:

http://www.ok.gov/conservation/Agency_Divisions/Water_Quality_Division/WQ_Blue_Thumb/BT_About_Blue_Thumb/

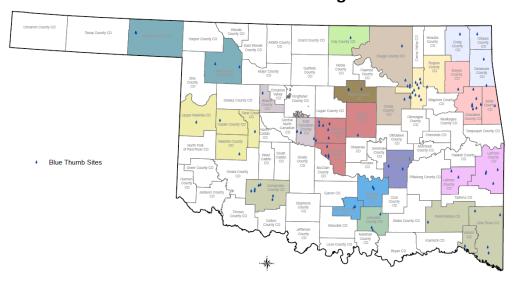
The OCC accomplishes much of its public education through its nationally recognized Blue Thumb Education Program, a program designed to teach citizens about reducing NPS pollution through hands-on involvement. Approximately \$350,000 in EPA 319 funds are used annually to conduct this program. In 2012, over 200 volunteers participated in regular monthly water quality monitoring of 85 stream sites in 32 counties across the state, in addition to completing 20 fish collections and habitat assessments and 112 macroinvertebrate collections. Counting middle school, high school, and college students, more than 500 volunteers participated in stream activities during the year. Approximately 6,000 volunteer hours were logged in 2012.



Blue Thumb held three stream monitoring trainings, five mini-academies, and one groundwater screening event, providing meaningful hands-on education to participants. The Blue Thumb program provided presentations at Earth Day events, demonstration farms, schools, churches, festivals, and fairs.



Active Blue Thumb Monitoring Sites in 2012





In November, Blue Thumb hosted its two-day, biennial volunteer conference. This year's theme was "The Magic of Woods and Water." It offered educational talks on topics such as wildlife photography, climate change, and natural landscapes, while allowing the volunteers to network with each other.



Blue Thumb also hosted a "Quality Urban Streams Workshop" in December in cooperation with staff from OSU, the City of Broken Arrow, and the Indian Nations Council of Governors. Forty-four people attended this event and learned ways to maintain quality streams in urban environments. Topics covered included urban riparian area management, outreach education/social marketing to reduce urban pollution, low impact development (rain gardens, permeable pavers/pavement, green roofs), ordinances to allow low impact development, and stream restoration.



Documenting Success:

http://water.epa.gov/polwaste/nps/success319/

The OCC Water Quality Division submitted ten NPS success stories, representing delisting of 11 streams, to EPA in 2012. These stories detail the results of cooperative efforts of the NRCS, OCC, conservation districts, and landowners to implement voluntary, cost-shared BMPs to improve water quality. In general, BMPs focused on improving grazing land and cropland and protecting riparian areas. Typical BMPs included:

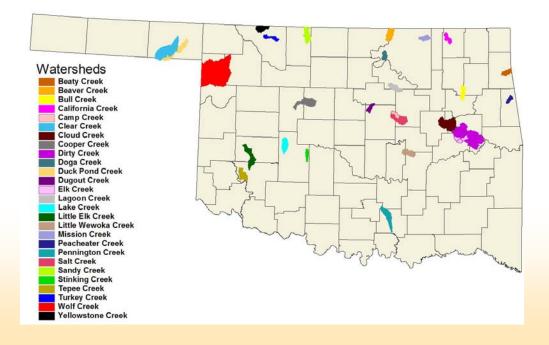
- grazing management
- cross-fencing
- alternative water supplies
- supplemental hay planting
- brush and weed management
- nutrient management

- heavy use area protection
- conservation tillage (no-till, mulch till, or strip till)
- conservation crop rotations
- waste storage facilities
- contour farming (terraces, diversions, waterways)
- riparian fencing

These practices reduce runoff of soils, waste products, and associated nutrients and bacteria. Improved dissolved oxygen values often indicate reduced nutrient runoff. Funding for the implementation of these practices came from NRCS programs (over \$38 million in 2012), local cost-share (over \$500,000 in 2012 state funds), and from the landowners themselves.

Oklahoma's 2012 Success Stories

Site	Parameter(s) delisted	County
Pennington Creek	Enterococcus	Johnston
Stinking Creek	Dissolved Oxygen and Turbidity	Caddo
Tepee Creek	Dissolved Oxygen	Kiowa
Salt Creek	E. coli and Dissolved Oxygen	Lincoln, Creek
Camp Creek	Dissolved Oxygen and Turbidity	Lincoln, Creek
Lagoon Creek	E. coli	Pawnee, Creek
Turkey Creek	Dissolved Oxygen	Woods
Doga Creek	Dissolved Oxygen	Osage
Beaver Creek	Dissolved Oxygen	Kay, Osage
Duck Pond Creek	Dissolved Oxygen	Beaver
Clear Creek	Dissolved Oxygen and Enterococcus	Beaver



Oklahoma now has 26 streams (map at left) that are recognized on the EPA's NPS Success Story website. This puts the state in the top five states in the nation for documenting NPS reduction.

NPS Program Partner Activities

Oklahoma's Nonpoint Source (NPS) Program is a collaborative effort of federal, state, and local agencies as well as the citizens of the State of Oklahoma. The following pages provide brief summaries of some of the activities of NPS program partners which usually do not receive federal 319 funding yet contribute to the goal of reducing NPS pollution in the state.

Oklahoma Department of Agriculture, Food, and Forestry (ODAFF)

In 2012, the Agricultural Environmental Management Services Division of ODAFF continued work on two important projects that mitigate NPS pollution and improve and protect water quality:

Development of Comprehensive Nutrient Management Plans (CNMPs): In cooperation with the OK NRCS, CNMPs were developed for animal feeding operations (AFOs). CNMPs are conservation plans designed to evaluate and mitigate the potential environmental risks associated with AFOs. The CNMP documents the practices of an AFO to address natural resource concerns and includes elements such as manure handling, transfer and storage, manure application, general land management/conservation, record keeping, and carcass disposal. ODAFF has completed 28 CNMPs for poultry, swine, and dairy operations. The completed CNMP provides the operator a strong foundation to improve the operation's efficiency, document current environmental management practices, and address remaining environmental concerns.

BMP Implementation at Poultry Operations in Eastern OK: ODAFF staff provide technical assistance and education to poultry operators, meeting one-on-one with poultry operators to discuss the importance of adhering to the operation's CNMP or animal waste management plan (AWMP). The inspector and operator review topics such as pollution prevention and BMPs and inspect the farm together to document BMPs, noting any deficiencies. Finally, soil samples are collected from the land application areas in order to evaluate soil quality and changes in phosphorus concentration over time. The inspector also conducts a follow-up meeting/inspection at the poultry operation to verify that the BMP deficiencies (if any) have been corrected.

In 2012, approximately 25 meetings/inspections were conducted, and soil samples were collected from 168 fields. Of the soil samples collected, 78% reported soil test phosphorus (STP) values less than 120. These results indicate that poultry operators are working to effectively manage waste applications and maintain STP values well below thresholds that would prohibit additional waste applications. This EPA Pollution Prevention grant will continue for one more year.

Save The Illinois River, Inc. (STIR)

Save the Illinois River, Inc. (STIR) expanded its pet waste disposal program, installing disposal stations in additional Tahlequah parks, OSRC public use areas, Lake Tenkiller State Park, and Siloam Springs, AR, city parks. Biodegradable plastic bags are available, at these stations accompanied by signage encouraging citizens to dispose of pet wastes in trash containers rather than contributing to NPS pollution.



NPS Program Partner Activities

STIR and the Greater Tenkiller Area Association (lake association) cooperated in creating a watershed protection ad for the 2012 and 2013 Tenkiller Lake Guides. The ad promotes homeowner management of fertilizer and pesticides. An educational brochure on nonpoint source pollution control was also produced, and STIR sponsored an outdoor educational event for area school children in cooperation with the OSRC. More information about STIR can be found at



http://www.illinoisriver.org

City of Oklahoma City Storm Water Quality Mgmt. Division

Oklahoma City's municipal separate storm sewer system (MS4) discharge is permitted through the Oklahoma Department of Environmental Quality. Although regulated as a point source, many pollutants which discharge from the system originate as non-point sources throughout the draining landscapes. The Storm Water Quality Management Division is composed of five sections: Construction Auditing, Industrial Auditing, Environmental Water Quality, the Household Hazardous Waste Collection Facility, and Public Outreach. The purpose of the Division is to provide inspections, enforcement, water quality assessments, household hazardous waste services, and public outreach to citizens, businesses, and government agencies so they can comply with the Clean Water Act and enjoy a safe and clean environment. The two auditing sections insure that best management practices to control runoff water quality are in place.

In the past year, the Storm Water Quality Management Division accomplished the following:

- Reached over 2,759,690 people through presentations, public service announcements, paid advertisements, quarterly e-newsletters, workshops, and exhibitions.
- Removed over 243,200 pounds of floatable debris from segments of the Oklahoma River.
- Received 637,746 pounds of hazardous home chemicals, used oil, and batteries.
- Distributed 13,555 pounds of various viable products for re-use to the public through the Solid Waste Abatement Program (SWAP).
- Performed over 7,277 construction and industrial site inspections; worked with facility managers, operators, or owners when water quality issues were identified to eliminate or reduce runoff contaminants.
- Responded to 370 spills, HAZMATS, and pollution reports which included vehicle accidents where pollutants may enter the MS4, illegal dumping, sediment discharges, illicit connections to the storm drainage systems, and private/public sanitary sewer discharges.

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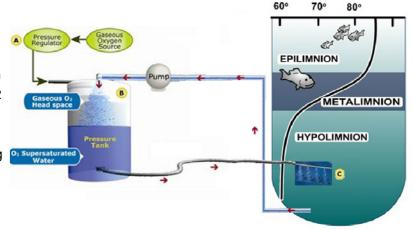
More information is available at http://www.okc.gov/pw/SWQ/storm4.html

ARRA Projects

The OWRB managed the American Recovery and Reinvestment Act (ARRA) funding in the state. Of eleven state projects funded in 2009, five projects were characterized as addressing nonpoint source pollution, of which three were completed in the fall of 2012 (see table below). Prior to implementation, these projects were reviewed by the Oklahoma Conservation Commission and determined to be consistent with Oklahoma's NPS Management Plan.

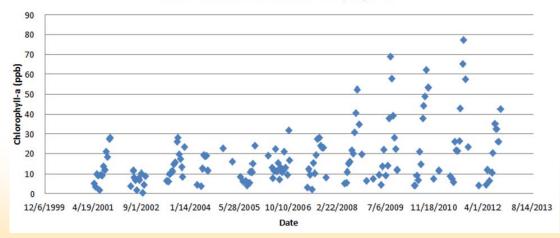
Agency	Project	Loan Amount
OWRB and Central Oklahoma Master Conservancy District	Lake Thunderbird In-Lake Restoration	\$1,501,285
occ	Riparian Restoration in the Illinois River and Eucha/Spavinaw Watersheds	\$2,000,000
Oklahoma State University with OCC	Riparian Restoration Along Cow Creek in Stillwater	\$2,000,000

OWRB: The OWRB conducted the Lake Thunderbird in-lake restoration ARRA project. The goal of this project was to mitigate the low dissolved oxygen in Lake Thunderbird by installing a supersaturated dissolved oxygenation system (SDOX) in the lake. The summer of 2012 was the second summer of operation for the SDOX system at Lake Thunderbird and the data indicates that the system is effective in increasing dissolved oxygen, reducing oxidation-reduction potential conditions responsible for sediment phosphorus release, and reducing average chlorophyll-a values. Because of these initial



results, the Central Oklahoma Master Conservancy District has committed to funding operation of the SDOX system for the summer of 2013. For more information related to the SDOX system and Lake Thunderbird restoration efforts visit the project website at http://www.owrb.ok.gov/studies/reports/reports.php

Site 1 Historical Chlorophyll-a



ARRA Projects

OCC: The OCC's streambank restoration work in the Illinois River and Eucha/Spavinaw Watersheds is another 2009 ARRA-funded project. In 2012, eleven sites were improved from highly erodible to stable through engineering work which included reestablishing native vegetation along streambanks, re-sloping banks, and installing instream structures as necessary. This resulted in restoration of over 7,000 linear feet of streambank in the project area, reducing sediment and nutrient loading.





OSU: The third ARRA-funded project which addresses NPS issues is the Cow Creek stabilization project, a project accomplished through a partnership between the OCC and OSU. A section of Cow Creek with highly eroded banks was jeopardizing OSU buildings and utility structures. In 2012, streambank stabilization and site rehabilitation was completed, with resloping and revegetation of the banks, and the addition of rock to the streambed to slow headcutting and erosion. A backwater wetland area was installed to filter stormwater runoff from agricultural fields and a portion of the water treatment plant lagoon discharge before it enters Cow Creek. Educational signage was installed in the area as part of a new multi-disciplinary riparian and streambank research, education, and demonstration facility.







Hope for the Future....

