Oklahoma's Nonpoint Source Management Program Annual Report 2014



Oklahoma's Nonpoint Source Management Program

Overview:



Oklahoma's Nonpoint Source (NPS) Pollution Management Program is a combination of federal, state, and local agency programs. The NPS Program is authorized and funded

federally by Section 319(h) of the Clean Water Act, which requires states to 1) develop an assessment report that identifies NPS problems and 2) develop a Management Program that creates and implements objectives for addressing the problems. The core program elements are described in the *Oklahoma NPS Management Plan*.

By state statute, the Oklahoma Conservation Commission (OCC) serves as the technical lead agency of Oklahoma's NPS Program and is responsible for monitoring and assessing waterbodies for NPS impacts and implementing programs that work to reduce these NPS issues and restore full support of the designated beneficial uses of all waterbodies. With input from the NPS Working Group (comprised of more than 30 agencies, tribes, organizations, and universities), the state follows an organized process to identify NPS threats and impairments to water resources, determine cause, extent, and source of problems and to prioritize the watersheds needing improvement. Solutions to the NPS problems are then planned and addressed, primarily through projects in priority watersheds to provide implementation and education.

Oklahoma's NPS Management Program is **non-regulatory**. On-the-ground conservation is the primary focus, with less than 10% of funds supporting 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 for conservation efforts and to evaluate their effectiveness. **Implementation** of conservation practices (CPs) through cooperative, targeted, voluntary efforts allows improvement and protection of water quality and other natural resources while maintaining agricultural production goals.

Oklahoma's NPS program is largely funded through the Environmental Protection Agency (EPA) Clean Water Act (CWA) Section 319(h) NPS Pollution Program. The Oklahoma Secretary of Energy and Environment (OSEE) is the state administrative lead and recipient of CWA program funds, disbursing Section 319 dollars to OCC and partners and insuring that all NPS activities meet appropriate state and federal guidance and priorities. Federal funds are matched by monies from the State's Conservation Infrastructure Revolving Fund, state and local partners, and most importantly, local landowners who voluntarily participate in cost-share programs to install conservation practices which facilitate agricultural production goals while protecting soil and water resources. In recent years, Oklahoma has formed strong partnerships, networking with multiple agencies to secure matching funds to increase the total amount of funding available to address NPS issues.

In 2014:

The OCC implemented its 2014 NPS Management Program efforts with \$2.35 million in EPA CWA Section 319(h) funding and \$1.7 million in state funds. The monitoring program is allotted 24% of the budget (including \$500,000 in state funding), the Blue Thumb education program receives 13%, and the remainder is used for technical support and implementation.

A major accomplishment in 2014 was the revision of Oklahoma's NPS Management Plan, last updated in 2006. Oklahoma continued strengthening partnerships, particularly with USDA-NRCS, in projects focusing on water quality and soil health. OCC received funding for two Resource Conservation Partnership Program (RCPP) projects at the end of the year.

The following pages include highlights of Oklahoma's progress in implementing its NPS Management Program in 2014. While efforts funded through Section 319 are emphasized, projects conducted by program partners are also included. Readers are encouraged to access complete details on project and program efforts via **web links** where provided.

Oklahoma's NPS Management Program

Planning:

The revision of the Oklahoma NPS Management Plan was accomplished with input from over 30 groups over the course of a year. One of the major changes was a revision to the Universal Watershed Assessment (UWA) ranking system, which facilitates prioritization of 12 digit watersheds for conservation implementation efforts based on feasibility and likelihood of success.

Oklahoma's NPS Management Plan details both long and short term goals necessary to address NPS issues in the state. These goals are guided by the NPS Management Program mission:

The primary components of OK's NPS Program are planning, implementation, education, and assessment.

To conserve and improve water resources through assessment, planning, education, and implementation.

Long-Term Goals	Progress Toward Attaining	
By 2020establish a Watershed Based Plan (WBP), Total Maximum Daily Load (TMDL), implementation plan, or achieve full or partial delisting based on water quality success to restore or maintain beneficial uses in all watersheds identified as impacted by NPS pollution on the 2002 303(d) list, unless the original basis for listing is no longer valid.	 Oklahoma currently has: 665 approved TMDLs for waterbodies impaired by bacteria, turbidity, low dissolved oxygen, and nutrients, and work to address additional impairments is ongoing. Seven WBPs, and implementation of conservation practices (CPs) to improve water quality is ongoing in five of these. 45 published success stories on the EPA's 319 website, indicating delisting of impaired waterbodies due to CP implementation and education. 	
By 2040attain and maintain beneficial uses in waterbodies listed on the 2002 303(d) list as threatened or impaired solely by NPS pollution.	Oklahoma ranks second in the nation for NPS delisting success stories, with a total of 45. Strong partnerships with other agencies, particularly the NRCS, are resulting in additional funding for implementation of practices focused on water quality improvement.	
Short-Term Goals	Progress Toward Attaining	
Monitor at least 250 streams, rivers, and other waterbodies every five years to determine causes and sources of NPS impairments.	The water quality of more than 14,665 stream miles has been assessed and presented in the State's biennial Integrated Report. Summary reports are written for each basin at the end of each two-year monitoring cycle.	
Prioritize watersheds using the process described in the NPS Management Plan, then draft and update WBPs or similar planning documents for top priority watersheds.	Seven WBPs are currently approved. All watersheds in the state were assessed with the new prioritization scheme, and the OCC plans to draft 10 new WBPs per year starting in 2015.	
Provide educational information through the statewide Blue Thumb Program. Blue Thumb staff will work with Conservation Districts as requested to develop and maintain education programs.	Oklahoma's Blue Thumb Education Program currently has active volunteers in 42 of the 77 counties of the State, with 75 active monitoring sites. More than 45 Conservation Districts have joined the nonprofit Oklahoma Blue Thumb Association.	
Reduce NPS loading in priority watersheds with accepted WBPs through implementation of best management practices. Implement water quality restoration and protection efforts in additional priority watersheds annually, as identified by the Unified Watershed Assessment (UWA) in the updated NPS Management Plan.	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, including CW-SRF, NRCS, public companies, and private landowners. Work is scheduled for 2015 in several watersheds that ranked as high priority after the new UWA prioritization process.	

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 in the soils, particularly phosphorus. Consequently, conservation practices (CPs) 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 water- and wind-driven soil erosion in conventional tillage operations in the sandy soils. No-till and field conversion CPs are the focus of implementation efforts in this area. Establishing riparian buffers is an important component of all projects since these vegetated regions act as filters to take up nutrients and 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 CP focus, all OCC priority watershed implementation projects share a **common design**, which has resulted in success both in number of participants implementing CPs in each area and in measurable improvements in water quality. Design elements include:

- Planning: obtain data/information that indicates NPS problems that can be addressed with project
- <u>Local leadership and buy-in</u>: recruit 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
- <u>Effective monitoring</u>: 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
- Demonstration/Education: establish a demo farm where landowners can see a suite of conservation practices in action
- Partnerships: look for creative ways to engage other agencies, leveraging hard dollars and matching funds
- <u>Long-term commitment</u>: commit to multiple phases in the project (i.e., presence in watershed for more than 5 years) to allow project concepts to take hold and prove their way from producer to producer

Implementation Projects:

During 2014, over a million dollars of combined federal §319 funds, Oklahoma state funds, and private landowner funds were expended for implementation of CPs in

five priority watersheds (map). Costshare funds from participating landowners comprised a significant portion of these monies. Conservation practice implementation in the three northeastern watersheds and the North Canadian watershed is proceeding through two §319 "special funding" grants. A brief update of implementation in each of the OCC priority watershed projects is given in the following pages. Details of each project, including reports and Watershed Based Plans. can be accessed via the OCC Water Quality Division website. All projects are scheduled to conclude by December 2015.



CONSERVATION

OKLAHOMA



Honey Creek

 In 1995, a Clean Lakes Study determined that algae blooms and low dissolved oxygen in Grand Lake were being caused by excess phosphorus. Agricultural practices and residential development were the likely sources. In 2002, Grand Lake and several streams, including Honey Creek, were placed on the State's list of impaired waters due to fecal bacteria and low dissolved oxygen.

- In 2006, the OCC began a Section 319 funded implementation project in partnership with the Delaware County Conservation District and the local NRCS. Funding for activities in this watershed was continued through 2015 due to high landowner interest and willingness to participate.
- Conservation practices (CPs) were installed on a voluntary, cost-share basis to reduce the amount of bacteria, phosphorus, and sediment entering the streams and lake. Typical CPs included fencing and alternative water supplies for protected riparian area establishment and management, buffer strip

establishment and streambank protection, animal waste management, pasture enhancement and management, proper poultry waste utilization, heavy use area protection, and septic system repair/replacement. Landowners were educated about CPs through demonstration farm tours and local presentations.

112 landowners participated in this project. Nearly \$3 million in federal, state, and landowner funds have been spent to install CPs, and improvements in water quality have been documented. Automated samplers were used to collect continuous, flow-weighted water samples from Honey Creek at sites upstream and downstream of the implementation area. After the first iteration of data analysis, fecal bacteria was found to be reduced by 40%, and phosphorus loads decreased by 15% after one year of implementation. Final data analysis will occur in 2015.

In 2014, 15 landowners spent approximately \$167,000 (41% from landowners) to install the following CPs:

- 31,619 linear ft cross-fence
- 4,619 linear ft riparian fence
- 10 alternative water systems
- 9 heavy use protection areas



Honey Creek is a 79,000 acre subwatershed of Grand Lake, one of Oklahoma's premier reservoirs in the northeast part of the state.



• 1 septic system replacement





Spavinaw Creek

Spavinaw Creek feeds Lakes Eucha and Spavinaw, which supply water to the citizens of Tulsa and surrounding communities.

 In 1997, a Clean Lakes Study determined that excessive phosphorus loading was causing severe algae blooms in Lakes Eucha and Spavinaw, leading to taste and odor issues in the Tulsa drinking water. Animal waste was one of the likely sources of this phosphorus. In 1998, the OCC began a demonstration project in the Beaty Creek watershed, a subwatershed of Spavinaw Creek. After noticeable improvements in water quality, a larger project was initiated in 2003 to encompass the entire Oklahoma portion of the Spavinaw Creek watershed.



• The Delaware County Conservation District and local NRCS were partners in the project, which has had tremendous landowner participation. The latest phase of

the project began in 2008 and is scheduled to conclude in December 2015. Conservation practices (CPs) have been installed on a voluntary, cost-share basis to reduce the amount of bacteria and nutrients entering the stream and lakes. The project has focused on creating and maintaining protected riparian buffer areas and improving pastures through grazing management, both of which reduce erosion and runoff of wastes and nutrients.

• Since 2008, 182 landowners have participated in this project. Over \$3.5 million has been spent to install CPs from 2008present, and water quality data has indicated significantly reduced levels of bacteria and phosphorus in Spavinaw Creek and its tributaries. Additional data analysis will occur in 2015 when the project concludes.

In 2014, 41 landowners spent approximately \$105,400 (37% from landowners) to install the following CPs:

- 7,201 linear ft cross-fence
- 7,170 linear ft riparian fence
- 95 acres of riparian area management
- 6 alternative water systems 1 pond

• 5 heavy use protection areas

- 5 septic system replacements
- 21 acres of pasture establishment

Fencing livestock out of riparian areas allows regrowth of vegetation, which filters pollutants and stabilizes streambanks.



f streams.

Proper pasture management is accomplished through cross-fencing and rotational grazing and reduces runoff of soil and bacteria into nearby streams.

AFTER: Reinforcement of heavy use areas with gravel, concrete, and geotextile reduces soil erosion.

BEFORE





Illinois River

• In 1993, a Clean Lakes Study of Lake Tenkiller,

The Illinois River watershed is one of Oklahoma's most valuable water resources. It has high recreational value as a Scenic River in addition to supplying drinking water.

- fed by the Illinois River, indicated substantial increases in chlorophyll-a due to excessive nutrient loading, most likely due to agricultural activities. After conducting a demonstration project in the Peacheater Creek subwatershed which resulted in significant nutrient reductions due to conservation practice implementation, the OCC initiated a project in 1996 to include the entire Oklahoma portion of the watershed.
- Conservation practices (CPs) have been installed on a voluntary, cost-share basis to reduce the amount of bacteria, phosphorus, and sediment entering the river and Lake Tenkiller. The highest priority CPs are those that keep livestock out of the stream, such as exclusion fencing and alternative water supplies. These practices allow vegetation to grow and effectively filter out pollutants and stabilize the highly erodible streambanks. Additionally, improved management of poultry litter application on fields in the watershed has been vital to reducing the runoff of phosphorus.



• Over \$3 million has been spent to install CPs by 227 landowners since 2007. Project partners include the Adair County, Delaware County, and Cherokee County Conservation Districts and the USEPA and local NRCS. Preliminary data analysis indicates reduced phosphorus, nitrate, and bacteria loading in the project area as compared to a non-CP area.

In 2014, 59 cooperators utilized approximately \$278,000 (17% from landowners) to install the following CPs:

- 15,879 linear ft cross-fence
- 1,982 linear ft riparian fence
- 1,980 acres of riparian area management
- 12 alternative water tanks



Fencing livestock out of riparian areas allows regrowth of vegetation, which filters pollutants and stabilizes streambanks.



- 15 heavy use protection areas
- 8 septic system replacements











North Canadian River

- Since 2007, conservation practices (CPs) have been installed on a voluntary, cost-share basis to reduce the amount of bacteria and sediment entering the river and lake. Conversion of conventional row crop fields to no-till or reduced-tillage fields has been one of the primary practices promoted through the project, as well as exclusion of livestock from riparian areas.
- A demonstration farm has been used to educate farmers about CPs and to advance research in collaboration with OSU. Research projects have included: effectiveness of different cover crop rotations, use of N-strips and GreenSeeker sensors to determine proper nitrogen application rates on fields, grid soil sampling, and different aspects of no-till.
- Numerous educational tours have been held for legislators and other government officials, educators, landowners, and students of all ages.
- Nearly \$2 million has been spent to install CPs, and data is being collected both upstream and downstream of the project area to assess the effects on water quality. The results of this monitoring will be included in the final report in 2015.

The North Canadian River, known as "The Oklahoma River" within Oklahoma City limits, has become an important recreational resource. In addition, it fills Lakes Overholser and Hefner, which supply much of the metro area's drinking water.



In 2014, approximately \$465,000 (12% from landowners) was spent to install the following CPs:

- 6,262 linear ft cross-fence
- 3,300 linear ft riparian fence
- 395 acres of riparian area management
- 11 alternative water tanks
- 132 acres of grass planting

- 6,572 acres of no-till
- 3 septic system replacements
- 10 acres of grassed waterways
- 8,755 acres nutrient management
- (grid sampling)



Demonstration farm tours educate farmers about the benefits of CPs.

No-till farming reduces soil erosion, increases soil moisture, and leads to healthier soil overall,



allows filtering of pollutants.

Solar-powered pumps fill freezeproof water tanks for livestock fenced out of streams.

OKLAHOMA CONSERVATION



Lake Thunderbird LID

- Lake Thunderbird is impaired by low dissolved oxygen (DO) and high turbidity and has significant taste and odor issues associated with eutrophication. Streams in the watershed have high levels of fecal bacteria as well as low DO and high turbidity.
- In 2008, the OCC began a project to start addressing water quality issues resulting from aggressive development occurring in the urban area. The initial focus of work in the watershed was to provide education to city officials and residents about Low Impact Development (LID) practices. Workshops targeting civic officials and local developers were given, and efforts were made to update city ordinances to allow certain LID practices.
- A demonstration and research project was initiated in a new development in the watershed in 2011. A local developer partnered with the OCC and the University of Oklahoma (OU) to implement and assess two LID practices in

the Trailwoods neighborhood in Norman. Eighteen houses were built with rain barrels collecting runoff from the roof and rain gardens to filter stormwater runoff from the street. Seventeen houses were built on an adjoining street with conventional curbs and street gutters for stormwater and no rain barrels. Automated samplers were installed to sample stormwater runoff from each street. Sample collection and analysis is being conducted by OU.

In 2014:

The demonstration portion of this project concluded. All construction is complete, and the upkeep of the vegetation in the rain gardens will now be the responsibility of the homeowners. Data collection from the automated samplers to determine the efficiency of the LID measures in removing nutrients and sediment from storm runoff is continuing. Approximately \$71,937 was spent in 2014 on equipment, monitoring, and workshops. Data analysis and a final report will be produced in 2015.



The Lake Thunderbird Watershed is highly impacted by urban activities, especially from the Cities of Moore and Norman. The lake provides drinking water to Norman, Del City, and Midwest City.





Blue Thumb Education Program

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. In 2014, approximately 400 active volunteers participated in regular monthly water quality monitoring of 75 stream sites across the state. More than 6,200 volunteer hours were logged in 2014.

Blue Thumb staff and volunteers conducted the following activities:

- Held five training sessions for new volunteers;
- Conducted 12 Blue Thumb mini-academies for students of teachers who have attended Blue Thumb training sessions;
- Assessed water quality data from more than 900 site visits;
 - Completed 137 macroinvertebrate collections;
 - Conducted 22 fish collections in the southwest part of the state;

• Hosted and participated in numerous educational events for youth and the general public.





Blue Thumb facilitated the "North Canadian River Watershed Tour," a three-day intensive continuing education program for teachers. This tour, conducted

originally in 2011, was designed to provide education on general water quality issues, such as pollution prevention, stream ecology, and groundwater dynamics, all within the

context of one of OCC's priority implementation project watersheds. Participants were given presentations and materials that could be used in the classroom to create more student interest in these subjects.





In September, Blue Thumb celebrated 20 years of volunteer monitoring in central and western Oklahoma. The program hosted a conference and dinner to mark this achievement. More than 50 people attended this event, which provided educational presentations as well as outdoor activities.



Blue Thumb volunteers receive awards! The *Keep Oklahoma Beautiful* program presented Blue Thumb volunteers Ariel and Ava McAffrey and Katie Prior with the "Youth Initiative" award for the publication of their environmental books, *Bob Has an Idea* and *Bob Has a Blue Thumb*. The volunteers also won the "Best of the Environmental Best" award for these projects. In addition, they were second runners-up for the EPA Region 6 President's Environmental Youth 2014 Award.



Formed in 2013, the nonprofit Oklahoma Blue Thumb Association (OBTA) continued to expand the Blue Thumb model. During 2014, 45 conservation districts joined the association as lifetime members. Through OBTA, members have more ownership in the program, working at functions, seeking funds, and providing input to strengthen the program and expand its influential reach.





The Oklahoma Conservation Commission (OCC) has an extensive and unique monitoring program. Effective monitoring and assessment are essential to being able to determine the extent, nature, and probable sources of NPS pollution and show improvement due to conservation programs and efforts across the state.

Implementation Monitoring Program:

Implementation monitoring is performed to determine the effects of conservation practices (CPs) on water quality in high priority watersheds. Implementation monitoring usually involves sampling streams during defined periods before and after CPs are installed in a watershed. Currently, six sites are being monitored with automated samplers to collect continuous flow-weighted samples, which will allow determination of reductions in critical NPS pollutants due to implementation efforts. These sites include: Spavinaw Creek, Beaty Creek, Saline Creek, Little Saline Creek, two sites on the Baron Fork River, and Flint Creek. The autosamplers in the North Canadian River watershed project have been shut off due to persistent drought conditions. Weekly grab samples have been maintained at the autosampler locations when there is water available. Data analysis will be performed and reported on in December 2015 for all projects.



Monitoring is vital to document success in improving and protecting water quality.

Rotating Basin Monitoring Program:

The *Rotating Basin Monitoring Program* (RBMP) 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 also serves a vital role in TMDL development for impaired streams. For the RBMP, a total of 245 fixed sites are monitored on a staggered, rotational schedule by basin (right). During a five year cycle, sites are sampled every five weeks for two consecutive years to gather water quality samples and data. Benthic macroinvertebrates are collected twice a

Rotating Basin Fixed Sit ing Basin Monitoring Group Basin Group 1 Basin Group 2 Basin Group 3 **Basin Group** 4 Racin Crown 5



year, and fish and habitat once during the cycle. Approximately 100 sites are assessed each year.

Water quality parameters assessed:

<u>In field:</u>
dissolved oxygen
water temperature
рН
turbidity
conductivity
alkalinity
hardness
inst. discharge

Lab: ammonia nitrite nitrate total Kjeldahl nitrogen ortho-phosphate total phosphorus chloride sulfate total dissolved solids total suspended solids

In 2014, the OCC finished the third cycle of monitoring in Basin Group 2, continued the second year of the third cycle of Basin Group 3, and began the third cycle of Basin Group 4. The effects of persistent drought, especially in the western part of the state, have impacted the amount of data being collected through the RBMP. Because macro-invertebrate collections require flowing water, many streams will not have this data during the third cycle of monitoring.









Estimating Load Reductions

The OCC conducts intensive monitoring and assessment efforts to determine the impacts of CP implementation in all watershed projects. Automated water samplers are installed in either an upstream/downstream design, with CP 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. Load reductions have been calculated for several of the implementation projects based on this continuous flow-weighted sampling, and ongoing monitoring will allow further assessment in the future. In addition, load reductions are estimated for each project annually using the EPA's Spreadsheet Tool for Estimating Pollutant Loads (STEPL) and submitted through EPA's Grants



Reporting and Tracking System (GRTS). Estimates of statewide load reductions as a result of CP implementation through the statewide Locally-Led Cost-Share Program, discussed later in this report, are also calculated.

	2014 Load Reduction Estimates			
watershed / Program	Phosphorus	Nitrogen	Sediment	
Honey Creek	3,472 lbs/yr	37,935 lbs/yr	624 tons/yr	
Illinois River	17,849 lbs/yr	216,603 lbs/yr	2,601 tons/yr	
North Canadian	17,161 lbs/yr	149,617 lbs/yr	1,134 tons/yr	
Spavinaw Creek	5,609 lbs/yr	62,387 lbs/yr	852 tons/yr	
Statewide Locally-Led Cost-Share	7,057 lbs/yr	71,894 lbs/yr	755 tons/yr	

Documenting Success

The OCC Water Quality Division submitted eight *NPS success stories* to EPA in 2014. These stories detail the results of cooperative efforts among the NRCS, OCC, conservation districts, and landowners to implement voluntary, cost-shared conservation practices (CPs) to improve water quality and result in delisting of at least one parameter from the 303(d) impaired waters list. In general, CPs focused on improving grazing land and cropland and protecting riparian areas. Examples include grazing and nutrient management, cross-fencing, alternative water supplies, conservation tillage, conservation crop rotations, riparian fencing, and supplemental grass planting, among others. These practices reduced the runoff of soils, waste products, and associated nutrients and bacteria and resulted in decreased turbidity. Funding for CP implementation came from NRCS programs (over \$9 million since 2005 in these watersheds), local cost-share (over \$57,000 in state funds since 2005), and from the landowners themselves. The EPA and the State of Oklahoma provided funding for the monitoring to document the improvements (\$500,000 annually from each agency).

Site	Parameter Delisted	Watershed County	Delisting Data Range *
Bird Creek	Turbidity	Choctaw	2006-2010
Crooked Creek	Turbidity	Grant	2007-2009
Deer Creek	Turbidity	Kay, Grant	2007-2009
Goose Creek	Turbidity	Pontotoc, Coal	2006-2011
Gray Horse	Turbidity	Osage	2007-2009
Mill Creek	Turbidity	McIntosh	2005-2008
Otter Creek	Turbidity	Garfield, Logan	2007-2009
Whitegrass Creek	Turbidity	Bryan, Choctaw	2006-2011

* The data that delisted these streams was collected in years prior to the drought.

Oklahoma's 2014 Success Stories:

With the submission of the 2014 stories, Oklahoma has 45 streams that are recognized as EPA NPS Success Stories. Oklahoma is now second in the nation for documenting NPS pollution reduction!

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 management 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.

Wetlands Program

OCC Wetland Program activities 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. The program is primarily funded through CWA §104(b)(3) Wetlands Program Development Grants (WPDG) with matching funds from state and local sources. In 2014, approximately \$119,000 in non-319 EPA funds were used to accomplish the following activities:

- Utilized a previously developed assessment method to identify and prioritize areas with the best chance for successful wetland restoration/ creation and NPS reduction in receiving waterbodies. This methodology was applied and tested in three priority watersheds.
- Continued to manage and further develop the Oklahoma Wetland Website, which hosts information on wetland activities and programs from government agencies (all levels), academia, tribes, and NGOs.
- Began to develop a database of restorable wetlands which will be continually updated and linked to the wetlands website.
- Participated on the US Army Corps of Engineers Interagency Review Team to consider a potential mitigation bank proposal and an in-lieu fee mitigation program.
- Cooperated with Oklahoma State University and the Oklahoma Water Resources Board in the development and validation of the Oklahoma Rapid Assessment Methodology (OKRAM) for wetlands. Modifications and validation will continue as grant funds are available.







Other OCC Programs



The OCC Soil Health Education Program is a statewide initiative focused on teaching conservation districts about the relationship between soil health, air, and water quality so that they may share the knowledge with their local communities. Housed under the Carbon Program within the OCC Water Quality Division, the training program uses hands-on learning to delve into soil health principles through easy-to-use techniques for understanding, assessing, and restoring soil health. OCC Water Quality Division staff also represent the agency on soil health projects with partners exploring and promoting the use of cover crops on demonstration farms, with the goal of increasing this practice among agricultural producers to reduce wind erosion and water runoff from agricultural lands. In 2014, the NPS Program supported the Carbon and Soil Health Programs with \$32,098 in technical support.

In 2014, the Soil Health Education Program:



- Partnered with NRCS and OACD to offer soil health education to over 500 conservation district employees and board members, and NRCS staff at all five conservation district Area Meetings. The goal of the sessions was to interest conservation districts in attending an in-depth full day Assessing Soil Health training.
- Taught that the rate of water
- infiltration into the ground can be an indicator of soil health, and that soil temperature is demonstrably lower when soil is covered



 Used the NRCS tabletop rainfall simulator to show how rain carries soil particles into waterways when soil isn't covered.





• Provided intensive "Assessing Soil Health" trainings to more than 60 OCC, NRCS, and conservation district employees.



workshop to six conservation districts to provide them with a bucket of tools to use to discuss soil health and water quality with their producers during quick field tests. 13

Other OCC Programs: Soil Health, continued

OKLAHOMA CONSERVATION



The Soil Health educators also traveled to Washington, D.C. to testify before the U.S. House Agriculture Committee's Subcommittee on Conservation, Energy, and Forestry at the invitation of Congressman Frank Lucas. The testimony was followed by a rainfall simulator demonstration at the NRCS People's Garden in partnership with Virginia NRCS. The rainfall simulator emphasizes in real time the link between soil health and water quality by visibly showing how much soil and debris flow into waterways from different surfaces such as pavement, cropland, and grassland.





Other Activities of Note

- Created Soil Health webpages that explain the division's and Oklahoma partners' respective Soil Health initiatives.
- Created an Oklahoma Soil Health Partnership brochure explaining soil health-related initiatives in Oklahoma.
- Partnered with NRCS to offer soil health education to attendees at the Oklahoma Wildlife Expo. Indoor and outdoor rainfall simulators ran all day Saturday and Sunday. More than 30,000 people attended.
- Exhibited soil health at the Governor's Water Conference in OKC with over 300 state, municipal, and private sector water quality professionals and legislators in attendance.
- Exhibited soil health at the Tulsa Farm Show, which had an attendance of over 30,000 people.
- Presented on soil health at the Oklahoma Soil and Water Conservation Society annual meeting.
- Spoke to the Oklahoma Ag Leadership Program class about soil health.
- Presented on soil health to Langston University students.
- Worked with conservation districts to verify acres for the OACD WFEC **Carbon Project**. Certified 11,000 acres for OACD payments to 23 producers totaling \$16,407, with an estimated sequestration of 4,688 metric tons of CO2e.
- Represented the agency at the USDA Soil and Water Resources Conservation Act (RCA) round table discussion in collaboration with NRCS and the Northeast Climate Hub. Discussion centered around three core topics: water resource management, soil health, and the resilience of soil and water resources to climate change and extreme weather events. Presentations were followed by discussions of regional resource problems and potential solutions to these problems.
- Began a partnership with OSU on a USDA Project called Soil Health On-Farm Field Trial Demonstrations. The project's
 objective is to provide training and tools to county extension educators, conservation district and NRCS staff to establish
 scientifically sound, replicable, on-farm demonstration trials for practices that benefit soil, air, and water quality.



Other OCC Programs



Oklahoma Locally-Led Cost-Share Program

OCC's Locally-Led Cost-Share Program (LLCP) is a state-funded program providing technical and financial assistance to landowners and producers to install conservation practices to protect soil and water resources and reduce NPS pollution. The program is administered by OCC personnel and is implemented locally through the conservation districts who interact directly with landowners, NRCS, and other entities to draft the necessary conservation plans. Landowners and producers participate voluntarily and contribute a minimum of 40% match based on pre-established cost-share rates by practice. OCC's LLCP is a critical mechanism to promote voluntary implementation of NPS controls statewide and serves as primary match for federal Section 319 funds. Contracts for 2014 were awarded in all 77 counties, exceeding \$1.4 million in total implementation cost. Multiple conservation practices were installed and include:

- 184 ponds
- 111 alternative water tanks
- 43,382 linear ft cross-fence
- 1,740 acres pasture / hayland planting
- 151 acres range seeding
- 3 diversions
- 1 terrace
- 14 grassed waterways

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 Section 319 funds in a timely manner. The OCC competed for and received funding to supplement conservation implementation efforts in priority watershed projects both in 2011 (\$4 million) and 2012 (\$431,835). Partners also received grants from the special projects dollars. Three grant projects which received Section 319 special funding in 2012 were still underway in 2014, one from Land Legacy / City of Tulsa and two from Oklahoma State University. All projects are scheduled to be completed in 2015. A brief update of each project follows.

Land Legacy and Tulsa Metropolitan Utility Authority



The Land Legacy project is a partnership with Tulsa Metropolitan Utility Authority (TMUA). This project is working to create riparian buffers throughout the Eucha/Spavinaw watershed through the purchase of permanent conservation easements. Land Legacy has placed more than 2,000 acres of land under permanent conservation easement, protecting seven miles of riparian area in the Spavinaw Creek watershed. An additional 2.36 linear miles of riparian area were permanently protected through conservation easements in 2014. The total amount of the Section 319 award was \$640,512, with an additional \$428,597 in local funding promised as match.

The TMUA has committed more funding to this project. To date, the TMUA has spent approximately \$2.5 million, with about \$650,000 spent in 2014. Outreach to landowners continues, and a final report on the project is expected in December 2015.



Oklahoma State University (OSU)

OSU received \$176,322 in FY12 §319(h) Special Project funding to conduct a study to quantify sediment and phosphorus load

reduction from riparian protection in the Barren Fork Creek and Spavinaw Creek watersheds. Approximately 29% of soil samples from streambanks in the Barren Fork Creek watershed had phosphorus levels high enough to be of environmental concern from immediate phosphorus loading if the streambank erodes. With a combination of soil analysis and video reconnaissance, the team has determined that more than a third of the Barren Fork watershed has unstable banks that likely provide 10 to 15% of the estimated dissolved phosphorus load and a significant total phosphorus load. Importantly, three to four times less sediment and phosphorus was estimated to enter the stream when there is an established riparian buffer along the streambank. Current efforts are aimed at quantifying corresponding values for the Spavinaw Creek watershed.



A second OSU project was awarded \$811,084 in FY12 §319(h) Special Project funding to study bioretention cells in urban watersheds. In conjunction with the Oklahoma Conservation Commission and Geographica, LLC, this project has been undertaken at two locations—Grove and Oklahoma City, Oklahoma. At the Grove site, researchers are monitoring and assessing the ability of bioretention cells amended with fly ash to remove phosphorus from urban runoff. At the Oklahoma City site, a neighborhood with conventional stormwater drainage has been retrofitted with bioretention cells at varying scales to document and demonstrate their performance at improving runoff quantity and quality at the neighborhood scale. This project is located in the Lake Thunderbird watershed, one of the priority implementation areas.

In 2014, collection of storm runoff samples began, as well as collection of soil cores from the 7-year-old bioretention cells in the Grove community. That data is currently undergoing quality assurance. At the Oklahoma City site, all of the bioretention cells were successfully installed via a subcontract with Ladonco, LLC, an Oklahoma-based company. In 2014, approximately \$324,000 was spent on this project.



NPS Program Partner Activities

Oklahoma's NPS Management Program is a collaborative effort of federal, state, and local agencies, as well as nonprofits and citizen groups. Here are just a few examples of partner agencies which usually do not receive federal Section 319 funds yet have programs that mitigate NPS pollution and improve and protect water quality in the state.

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



The Agricultural Environmental Management Services Division of ODAFF continued to oversee the development and implementation of Comprehensive Nutrient Management Plans (CNMPs) for poultry feeding operations (PFOs) in the eastern part of the State through a cooperative agreement with the NRCS. Based on soil type and topographic features of the farms, potential environmental risks associated with manure handling, storage, application, and carcass disposal were evaluated and mitigated. Conservation practices and general land management practices were recommended in the CNMPs. Under this agreement, ODAFF developed 35 CNMPs in 2014, and this program will continue in

2015. As the PFO owners implement these plans, most of the nutrients from the litter is utilized by crops grown on the fields, thus reducing the amount of nutrients built-up in the soil in these scenic river watersheds.

Other notable achievements in 2014 include: 2,780 technical assistance meetings with cattle, swine, and poultry producers; 3,549 soil samples collected for nutrient analysis; 151 CNMPs and 34 Animal Waste Plans written.

City of Tulsa

The City of Tulsa continues its multifaceted Storm Water Quality program to improve the quality of Tulsa's storm water runoff. The program includes a very active public education/outreach component with audiences as large as 600,000; signs and billboards; electronic newsletters; a popular website; a new education campaign titled "Save Our Streams"; television commercials airing on two major television stations during prime time; hands-on training at schools, day camps, numerous public events; and sponsoring events and conferences. The focus is on public reporting of illicit discharges and improper disposal into storm sewers and area waterways; the proper management and disposal of used motor vehicle fluids, household and pet waste; proper application and disposal of pesticides, herbicides, and fertilizers; and implementation of Low Impact Development features and green infrastructure.

Numerous publications have been created that are distributed at many events annually, including the state fair, the home and garden show, and Earth Fest. Many other programs have been implemented, including inspection of industrial, commercial, and construction sites; investigations of illicit discharge and improper disposal into local waterways; several water quality monitoring projects; and aggressive enforcement, including fines, for Pollution Ordinance violations. Approximately \$831,000 from storm water utility fees funded these activities, and partner agencies include the Tulsa County Conservation District, Indian Nations Council of Governments, and Green Country Stormwater Alliance.



City of Tulsa and United States Geological Survey (USGS)

The City of Tulsa, in collaboration with the USGS, has been monitoring five stream and nine lake stations in the Eucha/Spavinaw Watershed since 2002, collecting monthly and storm-

event water quality data and continuous hydrologic data. The goal is to quantify nutrient inputs from sub-basins in the watershed, as well as to monitor lake hydrology and water quality. The City of Tulsa Metropolitan Utility Authority provides approximately \$250,000 annually for this monitoring.







NPS Program Partner Activities

City of Tulsa, ODAFF, and Arkansas Natural Resources Commission

In 2014, the City of Tulsa / Tulsa Metropolitan Utility Authority (TMUA), the Oklahoma Department of Agriculture, Food, and Forestry (ODAFF), and the Arkansas Natural Resources Commission (ANRC) formed the new Eucha/Spavinaw Watershed Management Team (WMT). With annual TMUA funding of approximately \$540,000, the team:

- develops and implement CNMPs
- annually reports amounts and locations of all transported and applied poultry litter
- samples and analyzes soils
- conducts on-site inspections
- documents and reports violations to ODAFF and ANRC.

Results will be presented in a report in 2015.





OK Water Resources Board and OK Dept. of Wildlife Conservation

The OWRB received FY2011 Section 319 Special Funding for a project to vegetate the littoral zone of Ft. Cobb Lake. The project concluded at the end of 2013, but in 2014, the ODWC and OWRB replanted species in the existing exclosures to recreate wetlands in the lake, with the goal of reducing shoreline erosion and turbidity in the lake.

In addition, 1,600 plants were planted within cages and pens in Lake Stanley Draper to replace plants lost since introduction in 2009. This was accomplished through a cooperative effort between ODWC, OWRB, and the Oklahoma City Parks and Recreation Department.

Also in 2014, OWRB, ODWC, and the City of Hobart installed floating wetlands in the upper end of Hunter Park Lake to provide wildlife habitat and nutrient reduction. The wetland media was donated by the Grand River Dam Authority.



Conservation Reserve Enhancement Program (CREP)

The CREP, which began in 2007, is working to protect and improve water quality by restoring land in agricultural production to natural riparian areas through 15-year easements in the Eucha/Spavinaw and Illinois River watersheds. The program is a partnership between state and federal partners, including the US Department of Agriculture (USDA), Farm Service Agency (FSA), Natural Resources Conservation Service (NRCS), EPA, OCC, City of Tulsa, Oklahoma Scenic Rivers Commission, local conservation districts, and landowners. In 2014, expenditures totaled \$35,238 in federal CREP funding, \$302,948 in state

funds, and \$60,000 in landowner matching funds. Thirteen acres of riparian buffer were fully enrolled in CREP in Adair and Cherokee Counties, and 88 additional acres are pending enrollment. The following conservation practices have been installed through the CREP and are currently active:

- 672 acres of riparian exclusion
- 17 alternative water supplies: 15 water tanks and 2 ponds
- 1 heavy use area protection

Analysis of the topography in these watersheds has indicated that one riparian acre receives runoff from 13 upland acres. 2,259 acres of wooded riparian area have been protected through the 319 program to complement the 672 enrolled CREP acres, resulting in more than 38,000 acres filtered through riparian vegetation in these sensitive watersheds. The USEPA provided partial funding for many activities discussed in this report. The report itself is written as an output of §319(h) FY2015, C9-996100-18, Project 2.

For more information on activities discussed in this report, visit our website: http://www.ok.gov/conservation/Agency_Divisions/index.html Click on "Water Quality"

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





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Cover photo: Wolf Creek in Comanche County, Oklahoma (2014)

Back photo: Bishop Creek in Cleveland County, Oklahoma (2014)

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and effective monitoring, assessment, and implementation, **Oklahoma's NPS Management Program** continues to demonstrate its success in improving water quality. Oklahoma has ranked in the top five states for documented NPS success stories and for reported nutrient load reductions over the last several years.

Through extensive partnerships, education programs,

The achievements of Oklahoma's NPS Management Program would not be possible without the funding and support of the USEPA, Oklahoma Legislature, and hundreds of private landowners whose voluntary participation is paramount to the conservation and restoration of Oklahoma's natural resources. The OCC will continue to strive for fishable, swimmable waters statewide, with the hope that, one day, all Oklahoma streams fully meet their designated uses.