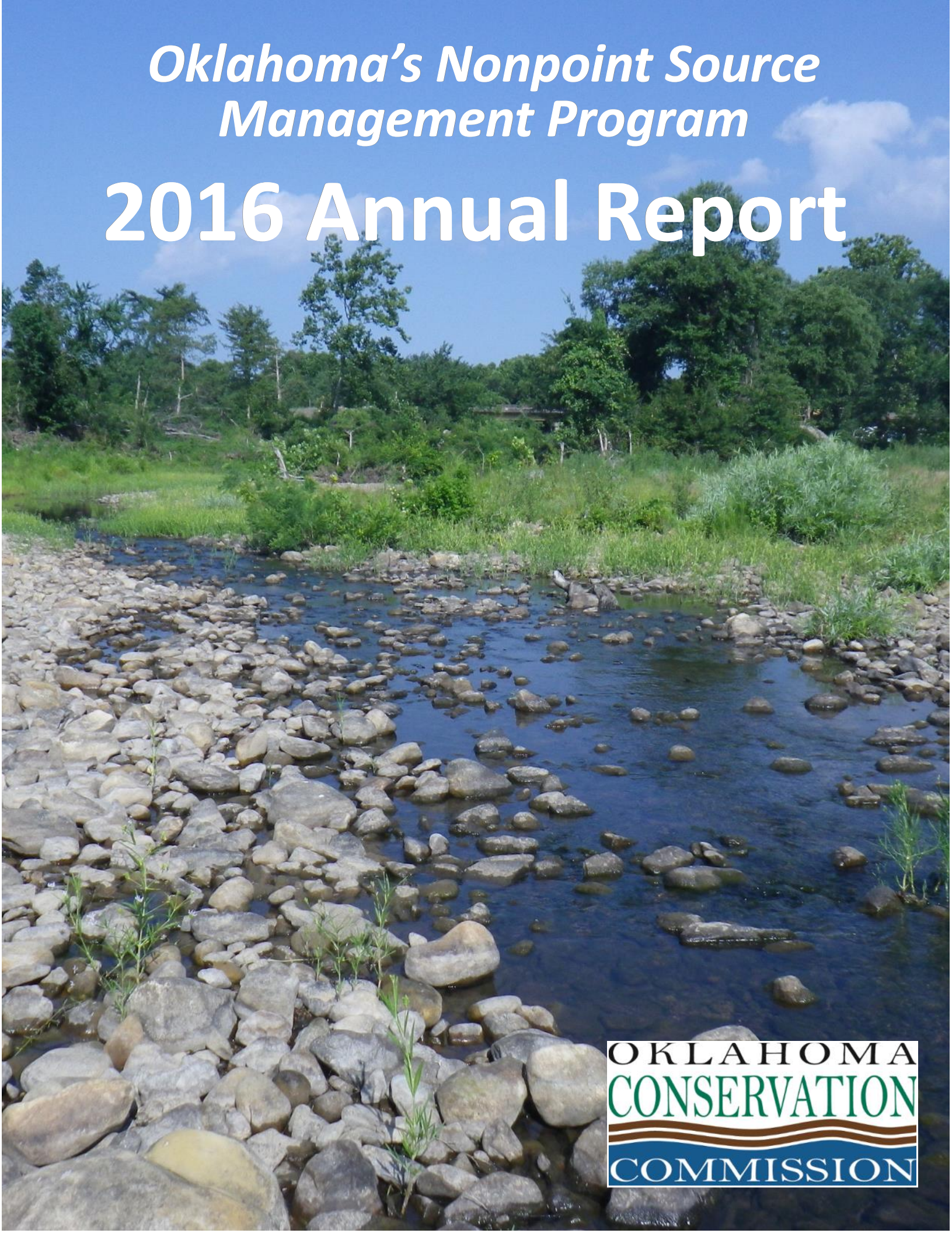
Oklahoma's Nonpoint Source Management Program

2016 Annual Report



OKLAHOMA CONSERVATION COMMISSION

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

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Cover photo: Billy Creek, LeFlore County, Oklahoma 2016
Back photo: Buffalo Creek, Latimer County, Oklahoma 2016

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 federally by Section 319(h) of the Clean Water Act (CWA), 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. This responsibility means monitoring and assessing waterbodies for NPS impacts and implementing programs to reduce these NPS issues, with the ultimate goal of restoring 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, to determine causes, extent, and sources of the 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, 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 Conservation Practices (CPs) through cooperative, targeted, voluntary efforts allows improvement and protection of water quality and other resources while maintaining agricultural production goals.

Oklahoma's NPS program is largely funded through the Environmental Protection Agency (EPA) Clean Water Act Section 319(h) NPS Management 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, 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 2016:

The OCC implemented its 2016 NPS Management Program efforts with approximately $1.8 million in U.S. Environmental Protection Agency (USEPA) Clean Water Act Section 319(h) funding, as well as with $2.3 million in state funds. The monitoring program is allotted 41% of the budget, the Blue Thumb education program receives 2%, and the remainder is used for technical support and implementation.

Major accomplishments for the NPS Management Program in 2016 include 1) progress in partnerships and projects in watersheds including Little Beaver Creek, New Spiro Lake, Grand Lake, Elk City Lake, and Wister Lake, 2) completion of multiple streambank restoration projects in the Illinois River Watershed, 3) expansion of the soil health education program focusing on the nexus between healthy soils and water quality protection, 4) expansion of education programs in support of partners including the Grand River Dam Authority, Oklahoma tribes, USDA NRCS, and others, and 5) continued water quality monitoring of streams across the state beginning the fourth cycle of the Rotating Basin Monitoring Program. In addition, Oklahoma program strategies for success were published and highlighted in National Studies completed by the USDA NRCS, the World Resources Institute, Lakeline- a publication of the North American Lake Management Society, and the Environmental Law Institute.

Highlights of Oklahoma's progress in implementing the NPS Management Program during FY2016 are included in the following pages. 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.

Planning:

The long- and short-term goals of the NPS Management Program are summarized in the table below and described in detail in the Plan. These goals are guided by the mission statement of the NPS Management Program: "To conserve and improve water resources through assessment, planning, education, and implementation."

The primary components of the Program are planning, implementation, education, and assessment.

Long-Term Goals	Progress Toward Attaining
By 2020...establish 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: • 11 approved TMDLs for 2016, for an overall total of 823 TMDLs for waterbodies impaired by bacteria, turbidity, low dissolved oxygen, and nutrients, and work to address additional impairments is ongoing. • Nine WBPs, and implementation of CPs to improve water quality is ongoing in five of these. • 55 published success stories on the EPA's §319 website, indicating delisting of impaired waterbodies due to CP implementation and education.
By 2040...attain 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 55. Strong partnerships with other agencies, particularly the NRCS, are resulting in additional funding for implementation of practices focused on water quality
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.	Nine WBPs are currently approved. All watersheds in the state were assessed with the new prioritization scheme, and the OCC plans to update or draft 10 WBPs per year starting in 2017.
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 29 of the 77 counties of the State, with 87 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 conservation 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 continues that will advance NPS related programs in watersheds prioritized in the Unified Watershed Assessment. This includes support for education and training, water quality monitoring, and partnering with USDA to focus conservation dollars in high priority UWA

Implementation:

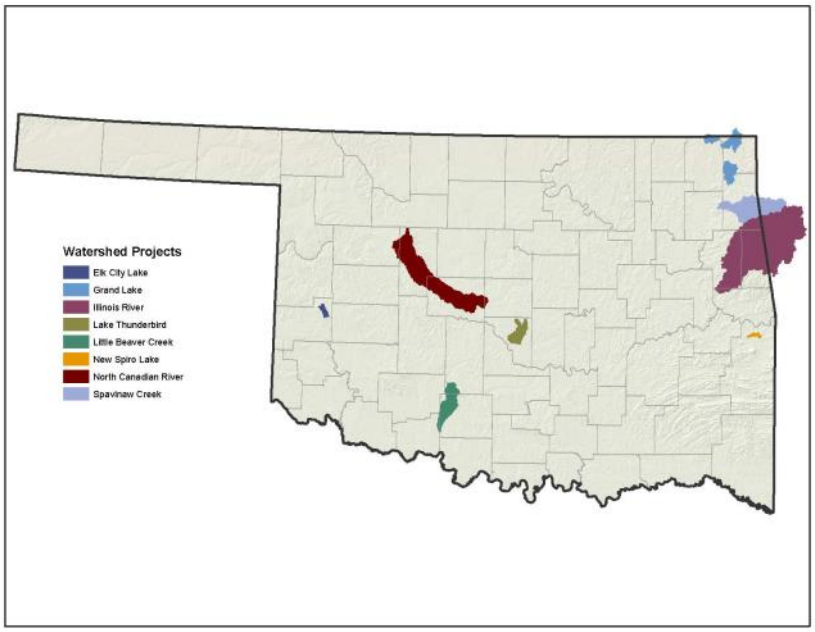
Current OCC **priority watershed implementation projects** are located in two general parts of the state: the east and the west-central. The predominant agricultural practices vary between these two general areas, so the implementation focus is slightly different in each area. In the east, extensive 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, 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, 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 CP focus, all OCC priority watershed implementation projects share a **common design** which has resulted in success both in number of participants who are implementing CPs in each area and in actual, measurable water quality improvement:

- Planning: have data/information that indicates NPS problems that can be addressed with a project
- Local leadership and buy-in: get support of local Conservation District and hire local coordinator; establish a Watershed Advisory Group (WAG) that includes all interests to drive implementation planning
- Targeting: 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
- Demonstration/Education: establish a demo farm where landowners can see a suite of CPs in action
- Partnerships: 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

Implementation Projects:

During FY2016, approximately $700,000 dollars in federal §319 funds, Oklahoma state funds, and private landowner funds were expended for implementation of CPs in eight priority watersheds (see map). Cost-share funds from participating landowners comprised a significant portion of these monies. 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 under *Priority Watershed Projects*.



Water Quality Monitoring

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 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. OCC has an extensive history of documenting reductions in critical NPS pollutants through the use of automated samplers to collect continuous flow-weighted measurements following installation of CPs.

Due to budget cuts, OCC and its partners are turning more and more to collaborative projects such as the Regional Conservation Partnership Program (RCPP) and the National Water Quality Initiative Program (NWQI) to fund implementation in priority watersheds. With these, OCC continues assistance in the technical delivery and the critical monitoring efforts needed to determine changes brought about by the prescription of CPs. OCC will remain flexible in the monitoring approach so that appropriate monitoring can determine changes in water quality in these watersheds with available funding and time constraints.

Ongoing projects include: Middle and Lower Neosho River Basin/Grand Lake RCPP Project; Elk City Lake RCPP Project; Little Beaver Creek NWQI Project; and the New Spiro Lake/Holi-Tuska Creek NWQI Project. These involve numerous partners, and in cases such as the New Spiro Lake/ Holi-Tuska Creek Project, partners are completing the monitoring with assistance from OCC.

Final reports have been submitted for the Spavinaw Creek (including Beaty Creek) and the North Canadian River Projects. The Illinois River (including Saline, Little Saliine, Baron Fork, and Flint Creeks) final report is nearing completion. Data collection continues for the New Spiro Lake/Holi-Tuska Creek, Elk City Lake, Middle and Lower Neosho River Basin/Grand Lake, and Little Beaver Creek projects.

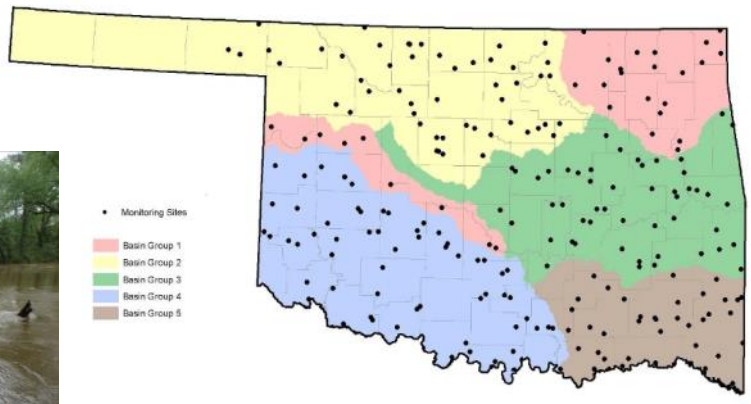
Water Quality Monitoring

Rotating Basin Monitoring Program:

The Rotating Basin (RB) Monitoring Program has allowed the identification of impaired streams to target for implementation projects, the determination of high quality streams used as reference sites to gauge the health of other streams, the detection of changes in NPS pollutants following implementation of CPs by NRCS, local conservation districts or other partners, and the use of data by Oklahoma Department of Environmental Quality (ODEQ) create total maximum daily loads for impaired streams.

For the RB program, a total of 245 fixed sites are monitored on a staggered, rotational schedule by basin (see map). During a five year cycle, sites are sampled every five weeks for two consecutive years to gather water quality data. This frequency allows for both the broad coverage of streams across Oklahoma and for the assessment of streams for attainment of beneficial uses. In addition, a fish collection and habitat assessment is performed. Benthic macroinvertebrates are collected twice a year. Approximately 100 sites are assessed each year.

In 2016, the OCC finished the third cycle of monitoring in Basin Group 4, continued the second year of the third cycle of Basin Group 5 and began the fourth cycle of Basin Group 1.



Breaking a period of extensive drought, 2015 was a year of record rainfall, culminating in December with an extensive 500 year flood event in much of Eastern Oklahoma.

By the end of 2016, much of Oklahoma is again experiencing a persistent drought. The drastic climatic shifts present a challenge in ambient monitoring of small and medium sized streams. If trends continue, OCC may need to make some revisions to the RB program as streams lose flow, become intermittent, or dry completely during times of excessive drought and sampling events become sporadic and too few to fulfill assessment requirements.

Water quality parameters assessed:

In field:
dissolved oxygen
water temperature
pH
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

Estimating Load Reductions


Automated Sampler

The OCC conducts intensive monitoring and assessment efforts to determine the impacts of CP implementation in all watershed implementation 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.

Watershed / Program	2016 Load Reduction Estimates*		
	Nitrogen	Phosphorus	Sediment
Illinois River	209,461 lbs/yr	18,455 lbs/yr	2,768 tons/yr
RCPP Projects	2,092 lbs/yr	321 lbs/yr	100 tons/yr
Statewide Locally-Led Cost-Share and Soil Health Program	56,468 lbs/yr	6,551 lbs/yr	1,001 tons/yr

*Estimates rendered using EPA's Spreadsheet Tool for Estimating Pollutant Loads (STEPL) Model. Totals recorded in GRTS.

Documenting Success

The OCC Water Quality Division submitted seven NPS success stories to EPA in 2016. 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. These practices reduced the runoff of soils, waste products, and associated nutrients and bacteria and resulted in improved turbidity.

Site	Parameter Delisted	County	Year delisted (per parameter)
Main Creek	Turbidity, *E. coli*	Major , Woods & Woodward	2010
Stillwater Creek	Turbidity	Payne, Noble	2010
Delaware Creek	pH, *E. coli*, TDS,	Osage & Tulsa	2006, 2008, 2010,
Honey Creek	*E. coli*	Delaware	2012
Caney Boggy Creek	Turbidity	Hughes, Coal & Pittsburg	2010
Canadian Sandy Creek	Turbidity	Pontotoc & Garvin	2010
Otter Creek	Turbidity	Kiowa & Tillman	2012

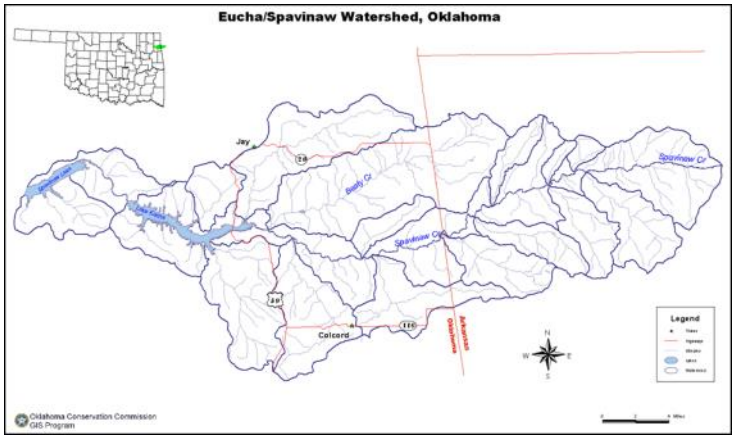
Oklahoma's 2016 Success Stories:

With the submission of the 2016 stories, Oklahoma has 55 streams that are recognized as EPA NPS Success Stories. Oklahoma is now second in the nation for documenting NPS pollution reduction, and the lead in the nation in the number of independent watersheds where our program has documented successful water quality restoration through voluntary NPS programs.

Priority Watershed Implementation Project

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. 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 on improving pastures through grazing management, both of which will reduce erosion and runoff of wastes and nutrients.
- Over $6 million was spent to install CPs from 2008– 2015. In the final phase (2011-2015) a total of $1.8 million was spent on implementation, of which ~$750,000 was contributed by landowners. The Spavinaw Creek project was successful in reducing nutrients and bacteria in the watershed (a 48% reduction in expected total phosphorus loading, 44% reduction in expected nitrate loading and a 39% decrease in expected ammonia loading). The final report for this project has been submitted to EPA.

Priority Watershed Implementation Project

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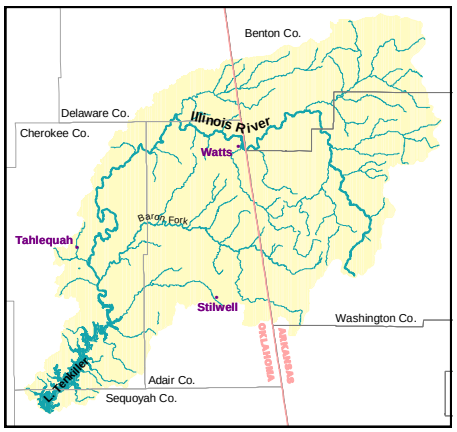
Illinois River

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.

- In 1993, a Clean Lakes Study of Lake Tenkiller, fed by the Illinois River, indicated substantial increases in chlorophyll-a due to excessive nutrient loading, most likely due to agricultural activities.
- 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 fencing and alternative water supplies. These practices allow vegetation to grow and effectively filter out pollutants as well as stabilize the highly erodible streambanks. Additionally, management of poultry litter application on fields in the watershed has been vital to reducing the runoff of phosphorus.
- Approximately $3.4 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, Oklahoma State University Cooperative Extension Service, Oklahoma Scenic Rivers Commission, Oklahoma Department of Wildlife Conservation as well as the USEPA, FSA, NRCS and local producers.
- Implementation ended August 2015. There are currently 49 long-term exclusion contracts that will be running for 10-15 years (ending 2029).
- Data analysis for this project is complete and indicates reduced phosphorus, nitrate, and bacteria loading in the Flint Creek watershed as compared to a non-CP area. The final report for this project will be submitted to EPA in 2017.



Total CPs installed:

- **Riparian Fence: 139, 090 ft**
- **Cross Fence: 152, 120 ft**
- **Animal Waste Facilities: 10**
- **Heavy Use Areas: 123**
- **Off-site Watering Facilities: 134**
- **Pasture Planting: 100 acres**
- **Wells: 24**
- **Septic System Replacements: 104**

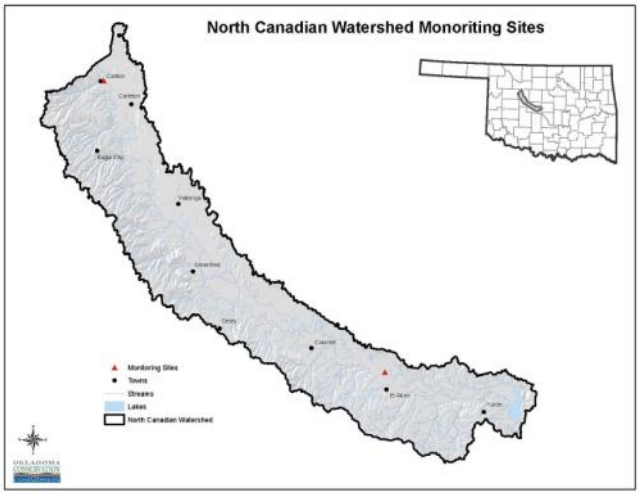
Fencing livestock out of riparian areas allows regrowth of vegetation, which filters pollutants and stabilizes streambanks.

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

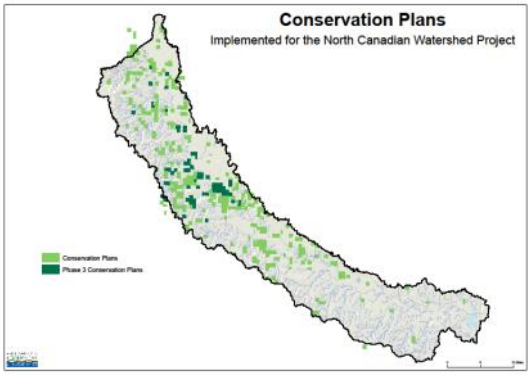
Freeze-proof tanks supply water to livestock fenced out of streams, and reinforcement of heavy use areas with gravel, concrete, and geotextile reduces soil erosion.

Priority Watershed Implementation Project

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 Overholser. 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.
- The North Canadian River Watershed Implementation Project resulted in nearly $3 million dollars of CPs being installed from 2008-2015. Landowners in and around the project area benefited from education, and they were able to observe improvements in the land and water quality.



- Significant reductions in nutrient and bacteria loads and turbidity levels were seen over the project period.

Total CPs installed:

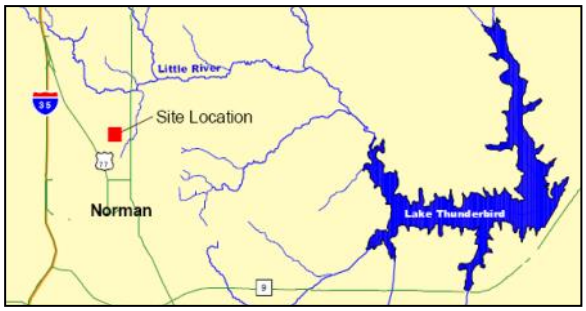
- **22,000 acres of no-till**
- **600 acres of riparian management**
- **83,080 linear feet of riparian fence**
- **1,312 acres of grass planted**
- **15,953 linear feet of cross fence**
- **54 alternative water supplies**
- **15 rural waste systems installed**

Priority Watershed Implementation Project

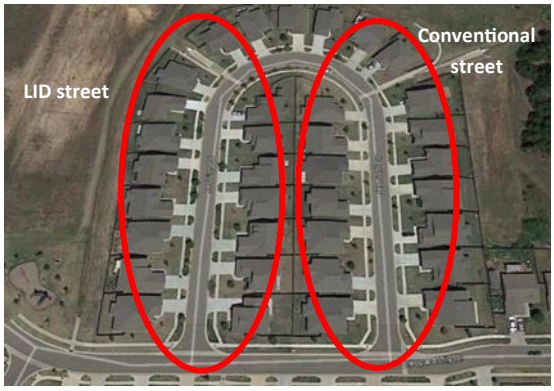
Lake Thunderbird LID

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.

- Lake Thunderbird and its tributaries are impaired by low dissolved oxygen (DO) and high turbidity. Significant taste and odor issues are associated with eutrophication.
- In 2008, the OCC began a project to start addressing water quality issues resulting from aggressive development occurring in the urban area. Workshops demonstrating Low Impact Development practices targeting civic officials and local developers were provided, along with efforts to update city ordinances to allow certain LID practices.

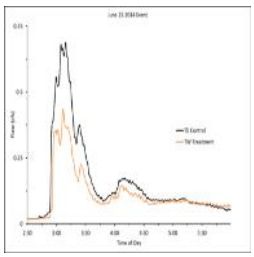


- A demonstration and research project was initiated in a new sub-division in the watershed in 2011. A local developer partnered with the OCC and the University of Oklahoma (OU) to implement and assess two LID practices. Eighteen houses were built with rain barrels collecting runoff from the roof and 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 water samplers were installed to sample stormwater runoff from each street. OU conducted data collection and analysis.



In FY 2016:

The project final report was submitted to OCC by OU. Data analysis showed that, overall, the presence of LID BMPs had a positive influence on water quality, especially with regard to total suspended solids, nitrogen compounds and trace metals.

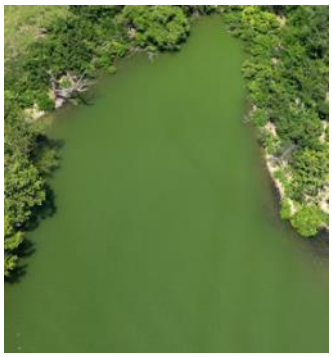


The final report also stated that the evaluation of the utility of green infrastructure technologies from both water quantity and water quality perspectives proved challenging, but that the positive hydrological differences would provide some degree of protection of downstream sources.

EPA grant funding provided 260 rain barrels and 500 soil test certificates. These were disseminated to homeowners in the watershed through the Cleveland County Conservation District.

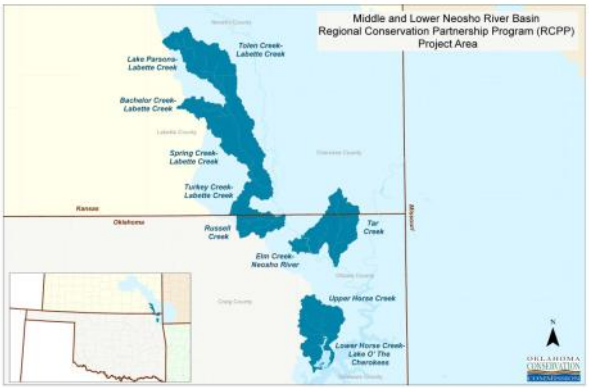
Regional Conservation Partnership Program Project

Middle and Lower Neosho River Basin/Grand Lake



Grand Lake is an important water supply, flood water retention, electrical power generation, and recreation source for the region. Eutrophication in the lake led to severe blue-green algae blooms in 2011 and bacteria outbreaks at beaches in 2014.

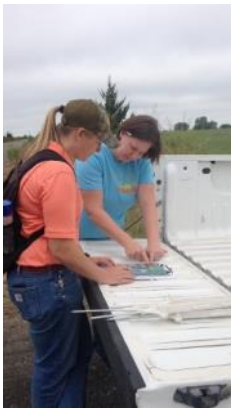
- The Neosho River Watershed is a high priority for both Kansas and Oklahoma and each state has devoted significant effort towards diagnosing and solving water quality degradation in the watershed.
- The Regional Conservation Partnership Program (RCPP), created by the farm bill of 2014, promotes coordination between NRCS and its partners to deliver conservation assistance to producers and landowners.



- Many of the streams, rivers, and reservoirs in the watershed have water quality problems and impairments related to excess nutrients, sedimentation, and bacteria. Of particular concern to both states are watersheds in the Middle and Lower Neosho Basin, because of concerns raised by stakeholders in the watershed and, in part, because these watersheds contribute directly to water quality degradation in Grand Lake.

In FY 2016:

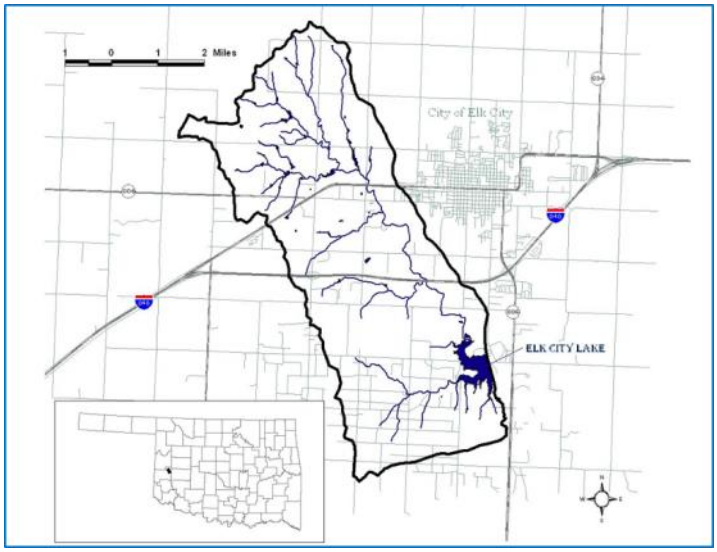
- Water monitoring continues in five streams on a monthly basis.
- A Watershed Advisory Group was developed to help set the priorities for the program. WAG meetings were held in 2015.
- Program meetings were held to set up ranking sheet, cost-list and screening tool.
- Outreach meetings were held to inform landowners about the program within the watersheds.
- Nine applications were reviewed and visits were made to the properties to discuss resource concerns. Eight applications were screened and ranked, with five choosing to continue in the program.
- Conservation plans were written and are awaiting funding from NRCS.



Elk City Lake

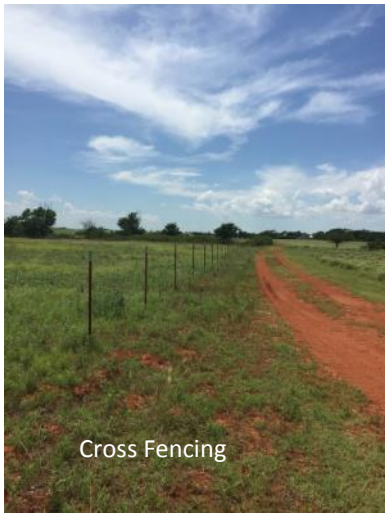
Partners in the Elk City Lake Watershed RCPP will work cooperatively with landowners to install conservation practices on cropland and rangeland in the watershed that contribute to nutrient and sediment related water quality impairments in downstream waterbodies.

- The Elk City Lake was constructed in 1970 primarily for flood control but is now operated by the City of Elk City for recreation.
- Elk City Lake has had both water quantity and quality problems related to excess nutrients, sediment, and bacteria.
- The primary purpose for the project is to restore water quality and protect West Elk Creek, and downstream Elk City Lake from future degradation.
- Land use in the watershed is primarily range, pasture, and cropland with little to no riparian buffer along much of the stream courses and direct access by livestock.



In FY 2016:

- Monitoring continued on West Elk Creek with monthly grab samples and additional runoff samples after rain events
- Conservation Practices installed:
  Grass planting (80 acres)
  Cross fencing (6,651 feet)
  Cover crops (160 acres)
  Brush management (30 acres)
- Performed grid soil sampling on 545 acres
- Completed a solar powered pump and well drilling.

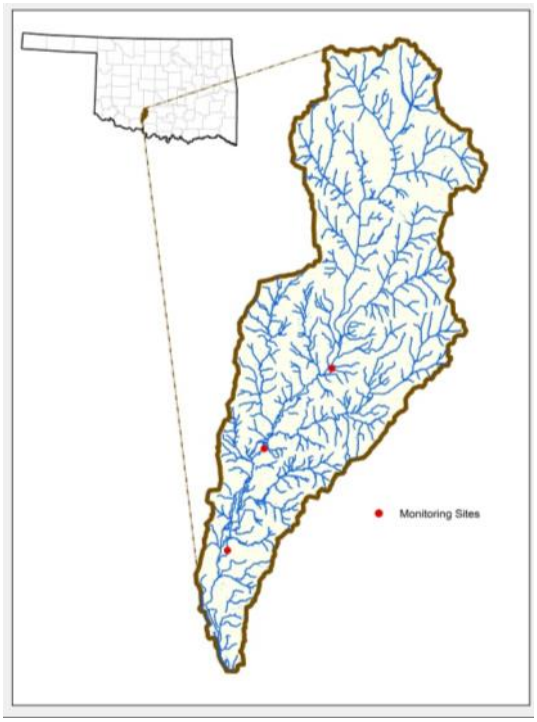

Cross Fencing

National Water Quality Initiative Program Project

Little Beaver Creek

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

- In 2015, four sub-watersheds of the Little Beaver Watershed were chosen as NRCS National Water Quality Initiative (NWQI) watersheds. Through NWQI, NRCS provides technical and financial assistance to help farmers and ranchers install conservation practices that will improve downstream water quality.
- The Little Beaver Creek drains a watershed that is 126,457 total acres. Land use is primarily pasture (62%) with some cultivated crops (27%) and deciduous forest (10%). It flows into Lake Waurika.
- Little Beaver Creek was listed as impaired on Oklahoma's 2012 Integrated Report for high levels of *E. coli* bacteria. Waurika Lake is listed as impaired for chlorophyll –*a* and turbidity.
- In 2011, the NRCS established a local emphasis area (LEA) in Cotton, Stephens and Jefferson counties that includes the lower half of the Little Beaver Creek watershed. This program provided extra funding to install practices which protect water quality and quantity. Emphasis was given to adoption of renewable energy resources, exclusion of livestock from streams, and cedar removal.
- The Oklahoma Conservation Commission will continue to promote conservation practice (CP) implementation in this watershed through the Stephens County and Grady County Conservation Districts. NRCS will continue to offer financial and technical assistance throughout the project. A final report will be submitted upon completion of project in 5 years.



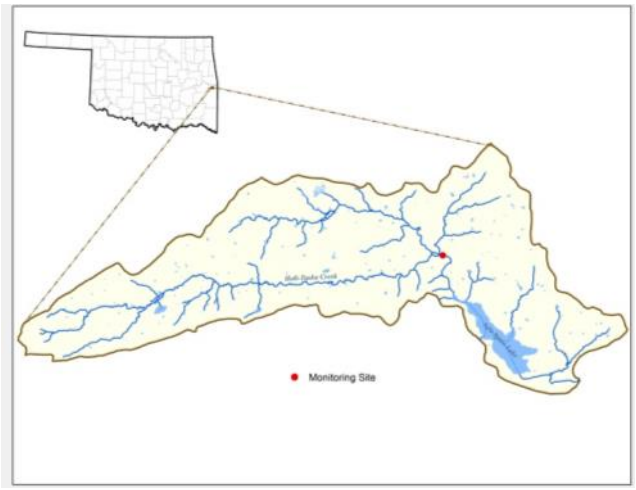
In FY 2016:

- Water monitoring continued on Little Beaver Creek. Three sites (as shown on map) are sampled approximately once per month.
- Conservation practice implementation continued to be strong in 2016 with the majority of contracts including some component of reducing livestock access to streams.
- Based on the success of enrollment and practice adoption, partners applied for and successfully received funding through the NWQI pilot Program to fund additional conservation planning in the remaining two HUCs in the Little Beaver watershed, This planning should help lead to additional conservation installation and hopefully to delisting of Little Beaver Creek.

New Spiro Lake/Holi-Tuska Creek

- The water quality of New Spiro Lake has deteriorated over recent decades. The lake has excessive chlorophyll-*a*, too little dissolved oxygen, and high turbidity impairing its beneficial uses as a public water supply and warm water aquatic community.
- In 2015, through the collaboration of NRCS, the OCC, the Oklahoma Department of Environmental Quality and local input, Holi-Tuska Creek was selected for the National Water Quality Initiative (NWQI) Program. NRCS is providing financial and technical assistance to the landowners and farmers to work the land in a sustainable way which provides cleaner water.
- Land in the watershed is used primarily for cattle grazing and forage. Poultry production is also high, with an inventory of over 60 million animals. Land application of poultry litter to this watershed basin is estimated at 31,000 kg per year.
- The New Spiro Lake Monitoring Program has three components: watershed load monitoring, volunteer creek monitoring, and lake monitoring. Monitoring is being conducted by the private consulting firm Bio x Design, with the assistance of the Town of Spiro and the Oklahoma Conservation Commission.

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service



In FY 2016:

- Oklahoma Blue Thumb held trainings in Spiro to help begin volunteer monitoring in the New Spiro Watershed.
- Water quality monitoring continued in the New Spiro Lake and on Holi-Tuska Creek.

Blue Thumb Education Program

The Blue Thumb Education Program is the primary education arm of the Water Quality Division for nonpoint source pollution. The Program used its arsenal of educational tools to reach over 10,000 people in 2016. Additionally, about 400 Blue Thumb volunteers (teachers, students and others) monitored 87 streams across Oklahoma and many of them manned educational booths, made presentations and started watershed groups. As a result, more than 6,500 volunteer hours were logged in 2016.

Blue Thumb staff completed the following:

- Held four New Volunteer Trainings
- Led two groundwater screenings with local conservation districts
- Conducted six mini-academies for teachers and professors that incorporate Blue Thumb monitoring into their curriculum
- Completed 118 benthic macroinvertebrate collections and twelve fish collections
- Worked with over 80 volunteer monitors on their quarterly quality assurance sessions.
- Hosted and participated in over 100 educational events across the state.

Blue Thumb took 15 teachers on a Grand Adventure! The workshop, co-sponsored by the Grand River Dam Authority, was modeled after the summer camp conducted in 2015. The teachers spent three days learning about the Grand Lake Watershed, both above and below ground. They left the workshop, which included a driving tour of the watershed and trip down a hole into a bat cave, with rainfall simulators, small erosion tables, a Healthy Waters Healthy People workbook and a t-shirt. But most important, they left with a new appreciation for the watershed they live and work in.

Friends of Pennington Creek and Crow Creek Community are still going strong. Friends of Pennington Creek hosted its first regatta and Crow Creek Community has planted three vacant lots along the stream with native grasses, trees and wildflowers to show what a healthy riparian area can look like.

The biennial Blue Thumb Conference was held in west central Oklahoma and was preceded by a Google Earth workshop. Volunteers now have the tools to make their own watershed maps. They also got an up close and personal look at macroinverte-brates and fish to learn to identify them and they got a great geologic tour of a part of Red Rock Canyon by volunteer John Harrington.

With the success of last year's A Grand Adventure Summer Camp, two camps were held in 2016. Each camp had about 25 children who learned about lake and stream monitoring and being good stewards.

Soil Health Education Program

The OCC Soil Health Education Program is a statewide initiative that teaches about the relationship between soil health, air and water quality. This Water Quality Division program uses hands-on learning to delve into soil health principles by teaching easy-to-use techniques for understanding, assessing, and restoring soil health. 2016 activities included trainings, demonstration farm support, educational field days, and exhibiting at conferences and other events.

Trainings. The program held 10 Plant ID for Soil Health trainings across the state in partnership with Oklahoma NRCS and conservation districts. There were 245 attendees, including agriculture producers, district directors, and staff from partner agencies. Feedback was excellent, with many participants suggesting additional trainings in the future. One or more employees or directors attended from 34 Conservation districts. Trainings provided an overview of plant anatomy and plant-soil interaction, including simple tricks attendees could use to identify native and livestock-beneficial plants. Understanding soil and plant dynamics encourages producers to implement practices that reduce soil erosion and NPS runoff from land into waterways.

On-Farm Demonstration Education. The program partnered with OSU, the Oklahoma Association of Conservation Districts, and local conservation districts to provide financial, administrative, and educational support to nine On-Farm Soil Health Demonstrations. The producer-led projects provide opportunities for local producers in the areas to learn that demonstrated practices increase yields and improve soil health. Practices underway include cover crop mixes on cropland, pasture, and no-till fields. This partnership project enabled $9,358.66 to pass through to conservation districts or producers, and earned $2,954.26, which offset 319 funding for WQ Division program staff.

Event Education & Exhibits. Program staff provided soil health education at over a dozen events with more than 2,000 attendees, including Natural Resource Days and Soil Health Field Days held by conservation districts; OACD Area and Annual Meetings; Conservation Day at the Capitol, and the Oklahoma Compost Conference. Staff also provided educational support to the National Land and Range Judging Contest.

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.

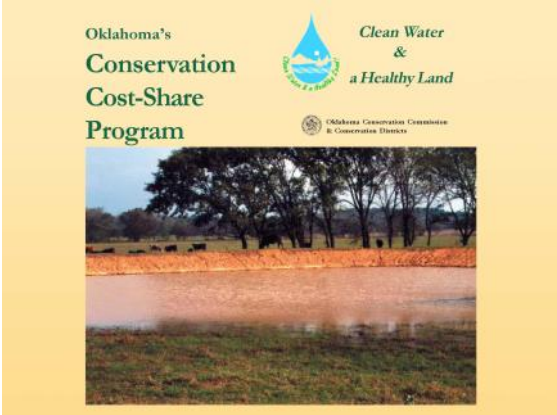
Wetlands Program

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. The program is primarily funded through EPA §104(b)(3) Wetlands Program Development Grants (WPDG) with matching funds from state and local sources. In 2016, approximately $210,000 in non-§319 EPA funds were used to accomplish the activities below:

- 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 non-governmental organizations.
- Participated on the US Army Corps of Engineers Interagency Review Team to approve activities of an in-lieu fee mitigation program and consider a proposed mitigation bank.
- Cooperated with Oklahoma State University and the Oklahoma Water Resources Board to further develop and validate the Oklahoma Rapid Assessment Methodology (OKRAM) for wetlands. Modifications and validation will continue as grant funds are available.
- Continued wetland mapping revisions in Oklahoma, specifically in the Little Deep Fork and Pennington Creek Watersheds. These maps will also be hosted on the Oklahoma Wetlands Program website.
- Continued work on a cooperative project with OSU to use wetland mapping to guide restoration decisions and determine wetland trends in Oklahoma. OSU and OCC will develop a protocol to determine historic wetland gains/losses in priority watersheds using current and historic aerial photography.
- Continued to work on a cooperative project with ODOT to identify current and future ODOT mitigation needs and link those needs with mitigation opportunities at the watershed scale.
- Completed Oklahoma's field survey portion of the National Wetland Condition Assessment.

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 §319 funds. Contracts for FY2016 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 / hay planting
- 151 acres range seeding
- 3 diversions
- 1 terrace
- 14 grassed waterways

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 §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 through a cooperative agreement with the Natural Resources Conservation Services of U.S. Department of Agriculture continuing NPS mitigating projects.

Developing Nutrient Management Plans (NMPs) for poultry feeding operations (PFOs) located in the eastern part of the State, where four scenic river watersheds are situated. Based on soil types 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 Comprehensive Nutrient Management Plans. As the PFOs owners implement these plans, most of the nutrients from the litter is utilized by crops grown on the fields; thus, reducing the amount of nutrient built-up in the soil. These practices eventually reduce and eliminate the likelihood of nutrients being carried out to the priority watersheds of scenic rivers. Other notable achievements include:

- Technical assistance opportunities performed with producers (cattle/swine/poultry)
- Collected soil and water samples for nutrient analysis

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. USGS provides approximately $95,600 annually for costs of stream gaging and water quality monitoring in this basin.

In addition, USGS works collaboratively with the Grand River Dam Authority (GRDA) and the Army Corps of Engineers (COE) to conduct streamflow gaging and periodic water quality sampling for physical parameters, nutrients, sediment, and fecal indicator bacteria counts at 7 stream sites along the Illinois River Basin. Support for this long-term project includes $72,750 from Oklahoma Scenic Rivers Commission and its partners, $105,000 from USGS, and $19,600 from COE.

USGS works in cooperation with the city of Oklahoma City to measure streamflow and water quality at 22 sites in the North Canadian River and Atoka Basins to evaluate effects of upstream land uses on water quality. Water Quality analyses include: physical parameters, nutrients, fecal-indicator bacteria, major ions, metals and selected pesticides. The USGS also samples one of those sites for the USGS National Water Quality Assessment (NAWQA) program for dissolved carbon and a larger suite of pesticides (250). Support for these long term projects includes $318,000 from Oklahoma City, $126,000 from USGS and $31,600 from the NAWQA program.

NPS Program Partner Activities

City of Oklahoma City

The purpose of the Oklahoma City Storm Water Quality Division (SWQ) is to provide inspections, water quality assessments, household hazardous waste services, and public outreach to residents, businesses, and government agencies. In 2016, SWQ reached out to millions of people through press releases, newspaper articles, interviews and presentations. Through the floatable debris program, over 580,000 pounds of debris was removed from the Oklahoma River and properly disposed. Over 9,329 residents delivered 651,310 pounds of waste to the Household Hazardous Waste Collection Facility which included paint, used oil, pesticides, pool chemicals and other types of harmful waste. Additionally, 37,933 pounds of household hazardous waste was collected, separated and released to the public for reuse. SWQ inspectors completed 9,096 construction site and industrial facility inspections. Environmental Technicians also responded, investigated and resolved 729 pollution and hazmat requests.

City of Tulsa

The City of Tulsa's Stormwater Quality Program includes monitoring, enforcement, and education programs, all aimed at keeping Tulsa's waterways pollutant free. Tulsa has recently stepped up its outreach campaign to include more facets of media such as billboards, radio, and internet advertising. The goal of this campaign is to simply make Tulsans more aware of stormwater issues and help them to realize how everyone has an impact on our watersheds and streams.

FY 2016 NPS pollution mitigation activities include the creation of permanent riparian conservation easements and monitoring the easement conditions to effectively document progress – all in an effort to protect water quality, large stands of Ozark forest (including federally listed endangered bats, caves, springs, streams, recharge areas, and neotropical migratory songbird and other wildlife habitat). The result is an ecosystem approach to protecting a variety of resources dependent on an interior Ozark forest.

City of Norman

The City of Norman's Environmental Services Division oversees many environmental programs including the Industrial Pretreatment Program; Fats, Oils and Grease (FOG) Program; the annual household hazardous waste (HHW) collection event; Earth Day; and is the City of Norman's staff liaison for the Environmental Control Advisory Board (a volunteer board appointed by the Mayor of Norman). In 2016 over 100,000 pounds of chemicals were collected at the HHW Event and 235,000 gallons of grease were kept out of the sanitary collection system through the Fog Program helping to prevent sanitary sewer overflows. Educational materials and activities were provided at Earth Day for several thousand citizens. In addition, year-round collection for oil, antifreeze, oil filters, kitchen grease and tires was provided at no charge to citizens at Norman's transfer station.

The Environmental Control Advisory Board held many activities which included a "Water's Worth It" poster contest for elementary age children; an Art Show; the distribution of 12,000 door hangers and recycling stickers with information on recycling and water conservation; hosted a rainbarrel workshop and give-away; awarded four Water's Worth It Landscape awards; presented a Water's Worth It Proclamation to City Council; participated in a Lake Thunderbird Cleanup; participated in a city wide panel on water quality in Norman; had a member on the Norman Comprehensive Plan ad-hoc committee; and established a social media presence on environmental issues.

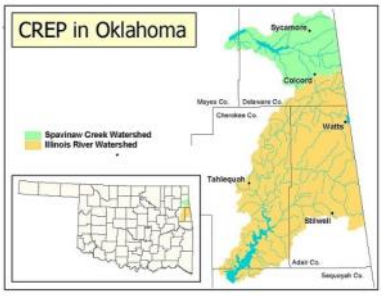
NPS Program Partner Activities

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 2016, expenditures totaled $73,838 in federal CREP funding, $314,489 in state funds, and $5,595 in landowner matching funds. The following Conservations Practices have been installed through the CREP and are currently active:

- 673 acres of riparian exclusion
- 14 alternative water supplies
- 13 water wells
- 6 heavy use area protection



Quapaw Tribe of Oklahoma

The Quapaw Tribe Environmental Department was awarded an $8,000 §319 NPS pollution grant to build a community garden. The funds were used to build raised beds, flower beds, benches, and a picnic table in the area west of the Quapaw Tribe Title VI building. There are various herbs, vegetables, and plants that will be enjoyed by Elders and various community members through the Quapaw Tribe Title VI program. The community garden will be utilized by the Environmental Department, Tribal Elder Program, and community schools to facilitate nonpoint source education and outreach.

Kickapoo Tribe of Oklahoma

The Kickapoo Tribe of Oklahoma replaced five failing septic systems and produced/distributed a pamphlet for tribal members regarding the proper operation and maintenance of aerobic septic systems.

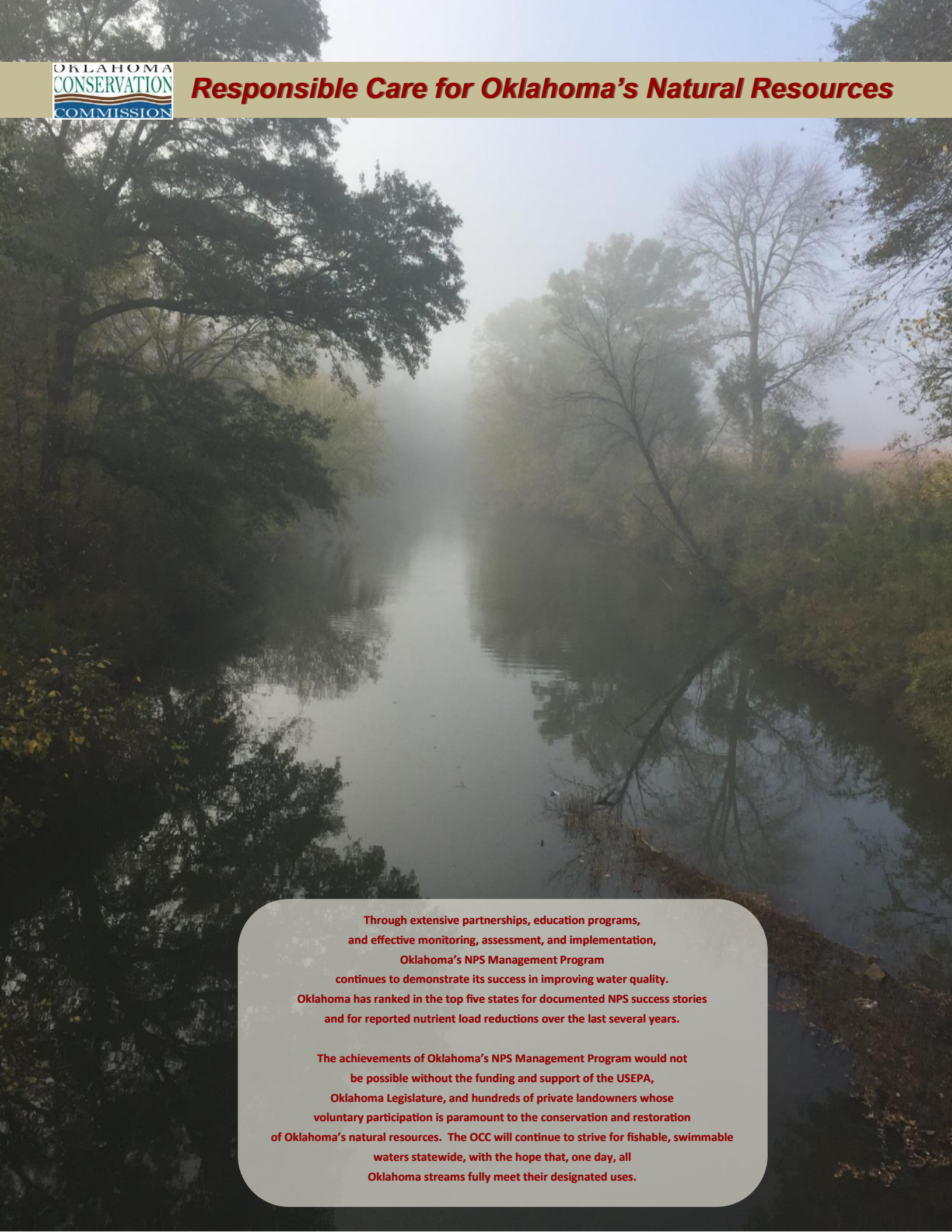
The tribe began hosting watershed meetings for stakeholders interested in NPS pollution issues within the Lower North Canadian River watershed.

Wyandotte Tribe of Oklahoma

The Wyandotte Nation Environmental Department hosted four NPS education classes, with a total of 65 participants. Each participant household received a rain barrel.

The tribe conducted eight private owner tribal and non-tribal septic assessments. These assessments were performed within the Grand Lake Watershed. There were two failing systems that were removed and replaced with new systems.

A storm water retention retaining wall was installed to address storm water run-off and erosion on the hillside that leads down to Lost Creek. Perennial plants and grasses were planted within the wall.



Responsible Care for Oklahoma's Natural Resources

Through extensive partnerships, education programs, 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.

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.