

*Oklahoma's
Nonpoint Source
Management Program*
**Annual Report
2015**



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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: Cloudy Creek in Pushmataha County, Oklahoma (2015)
Back photo: Rock Creek in Pushmataha County, Oklahoma (2015)

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 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 2015:

The OCC implemented its 2015 NPS Management Program efforts with approximately \$3.8 million in U.S. Environmental Protection Agency (USEPA) Clean Water Act Section 319(h) funding, as well as with \$4 million in state funds. The monitoring program is allotted 17% of the budget, the Blue Thumb education program receives 7%, and the remainder is used for technical support and implementation.

Major accomplishments for the NPS Management Program in 2015 were completion of multiple long-term Priority Watershed Projects in the Honey Creek, Eucha/Spavinaw, Illinois River, North Canadian, and Thunderbird Watersheds. Results of these projects are forthcoming and most will be summarized in the 2016 annual report. In addition, new partnerships and projects began in the Little Beaver Creek, New Spiro Lake, Grand Lake, and Elk City Watersheds.

Highlights of Oklahoma's progress in implementing the NPS Management Program during FY2015 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.

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 reflected in the plan was a revised ranking system to determine priority watersheds where improvement is likely if implementation occurs there.

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: <ul style="list-style-type: none">• 147 approved TMDLs for 2015, for an overall total of 812 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.• 48 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 48. 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.	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 2016.
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 36 of the 77 counties of the State, with 61 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 is scheduled for 2016 in several watersheds that ranked as high priority after the new UWA prioritization process.

Oklahoma's NPS Management Program

Implementation:

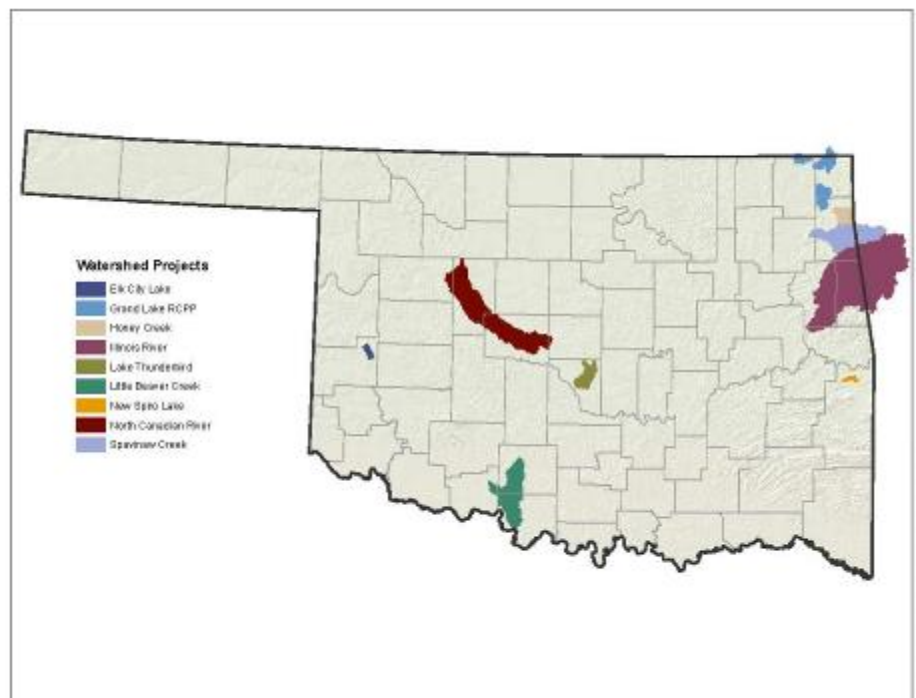
Current OCC **priority watershed implementation projects** are located in two general parts of the state: the east and the west-central. The predominant agricultural practices vary between these two general areas, so the implementation focus is slightly different in each area. In the east, extensive 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 FY2015, over a million dollars in federal \$319 funds, Oklahoma state funds, and private landowner funds were expended for implementation of CPs in nine 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*.





Honey Creek

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

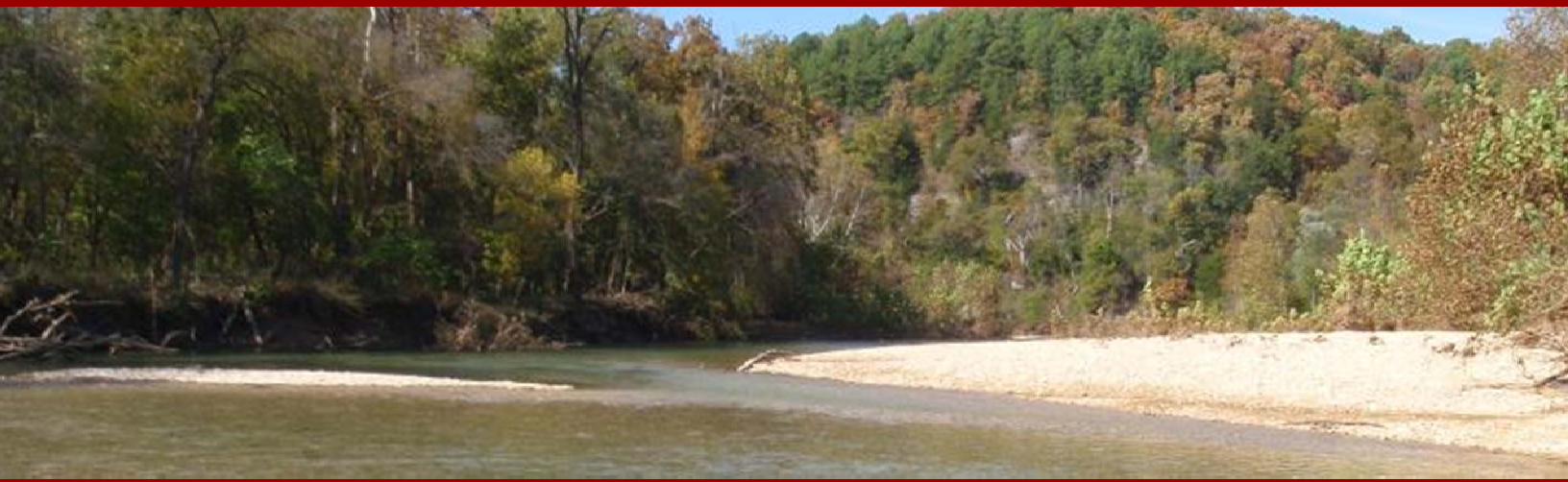
- In 1995, a Clean Lakes Study determined that algae blooms and low dissolved oxygen in Grand Lake were being caused by excess phosphorus. Agricultural practices and residential development were the likely sources. In 2002, Grand Lake and several streams, including Honey Creek, were placed on the State's list of impaired waters due to fecal bacteria and low dissolved oxygen.
- In 2006, the OCC began a §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.
- 112 landowners participated in this project. Nearly \$2 million in federal, state, and landowner funds were spent to install CPs. Final analysis shows that *E. coli* bacteria was reduced by 53% and total phosphorus loading was reduced by 28%. The final report has been submitted to EPA.
- Landowner interest in the §319 program continues, even though this project has concluded. Additional funding has been granted in the Grand Lake Watershed through the NRCS RCPP program. It is expected that with the additional implementation of CPs, water quality in the Honey Creek watershed will continue to improve.



Final Project CP Summary:

- | | | |
|-----------------------------------|---------------------------------------|-----------------------|
| • 267,741 linear ft cross-fence | • 177 alternative water tanks | • 217 heavy use areas |
| • 45,354 linear ft riparian fence | • 25 waste storage/feeding facilities | • 37 ponds |

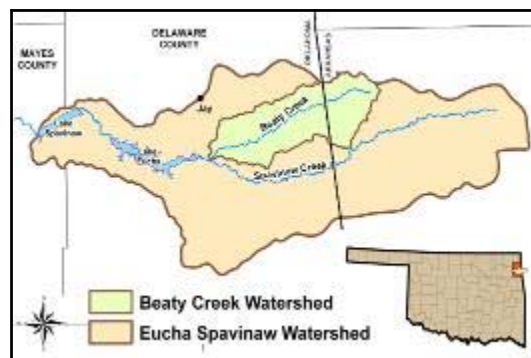




Spavinaw Creek

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.
- Since 2008 three subsequent EPA grants have been obtained by the OCC for this watershed with 182 landowners participating in this project. Over \$3.5 million has been spent to install CPs from 2008-present, and water quality data has indicated significantly reduced levels of bacteria and phosphorus in Spavinaw Creek and its tributaries. The final report for this project will be submitted to EPA in early 2016.



In FY 2015, the following CPs were installed:

- 12,490 linear ft cross-fence
- 91 acres of riparian area management
- 1 pond



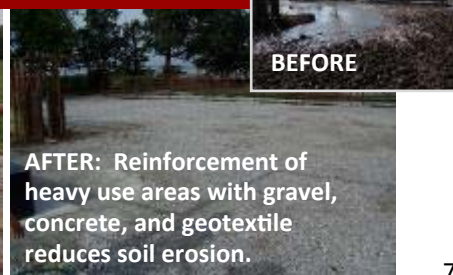
Fencing livestock out of riparian areas allows regrowth of vegetation, which filters pollutants and stabilizes streambanks.



Freeze-proof tanks supply water to livestock fenced out



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

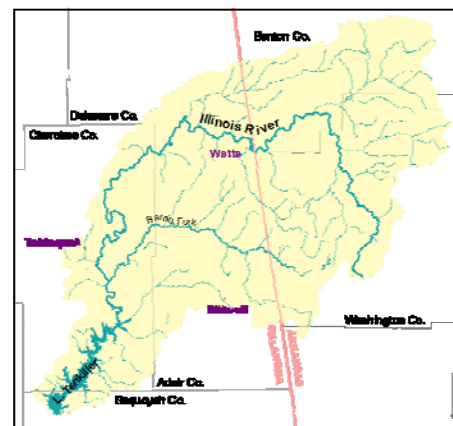
Priority Watershed Implementation Project



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. After conducting a demonstration project in the Peachwater Creek subwatershed which resulted in significant nutrient reductions due to agricultural CP 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 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.
- 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, as well as 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. Data is currently being analyzed and the final report for this project will be submitted to EPA in 2016.



In FY 2015, the following CPs were installed:

- 16,831 linear ft cross-fence
- 17,574 linear ft riparian fence
- 2128 acres of riparian area management
- 1 pond
- 7 septic system replacements
- 11 alternative water tanks
- 11 heavy use protection areas

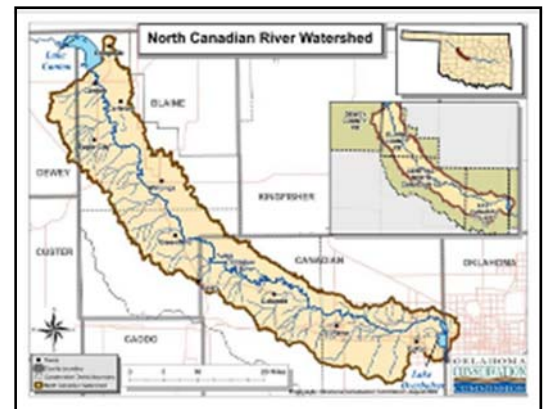




North Canadian River

- 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 \$3 million has been spent to install conservation practices, and data is being collected both upstream and downstream of the project area to assess the effects on water quality.
- Data is currently being analyzed and the final report for this project will be submitted to EPA in early 2016.

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 FY 2015, the following CPs were installed:

- 6,000 linear ft. cross-fence
- 2 alternative water tanks
- 415 acres of riparian management
- 5 acres of grass planting
- 2001 acres of no-till
- 11 acres of grassed waterways



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.



Fencing livestock out of streams allows growth of vegetation, which increases streambank stability and allows filtering of pollutants.



Solar powered pumps fill freeze proof water tanks for livestock fenced out of streams.



Lake Thunderbird LID

- 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 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 water samplers were installed to sample stormwater runoff from each street. OU conducted data collection and analysis.

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.



In FY 2015:

Data collection from the automated samplers determining the efficiency of the LID measures in removing nutrients and sediment from storm runoff is complete. Reporting is wrapping up. Approximately \$91,366 was spent in 2015 on monitoring and reporting.





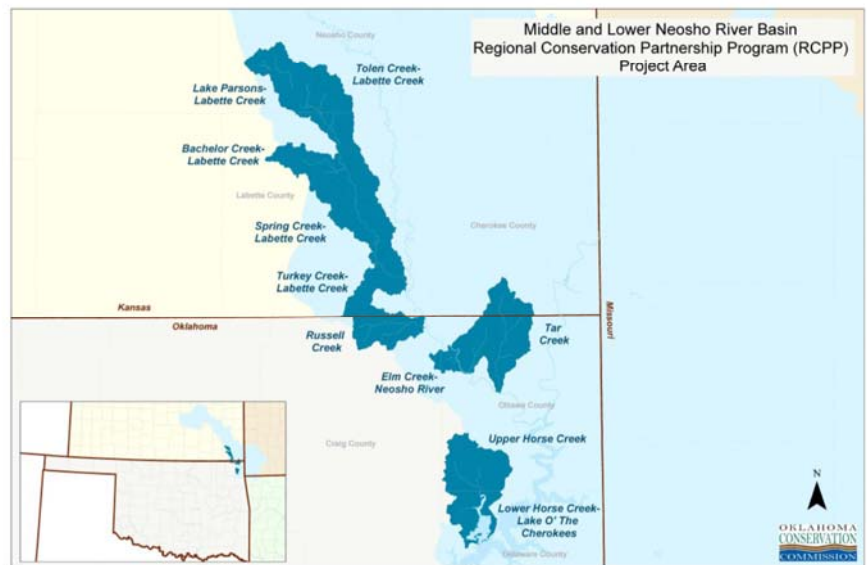
Middle and Lower Neosho River Basin/Grand Lake



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

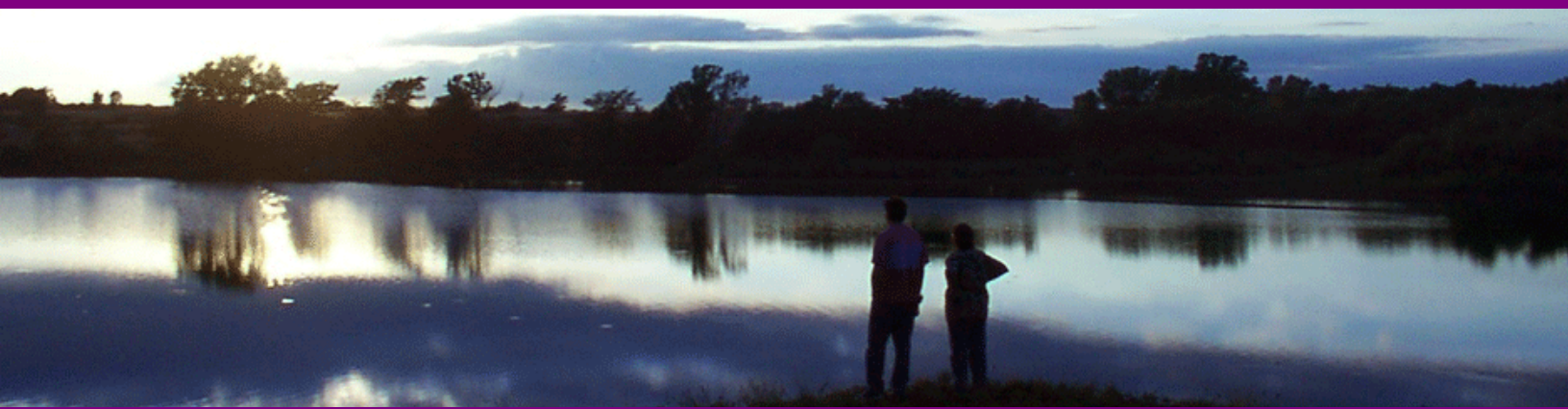


- The Neosho River Watershed is a high priority for both Kansas and Oklahoma and each state has devoted significant effort towards diagnosing and solving water quality degradation in the watershed.
- The Regional Conservation Partnership Program (RCPP), created by the farm bill of 2014, promotes coordination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



In FY 2015:

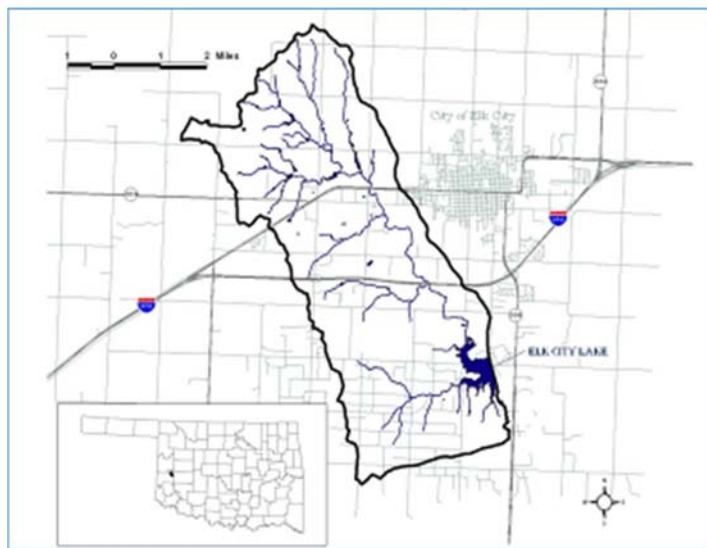
- OCC began water monitoring in five streams on a monthly basis in July 2015.
- Informational packets were mailed to landowners in all counties within the watershed area in late fall to provide information about this project and to enlist voluntary cooperation for conservation practices.



Elk City Lake

- The Elk City Lake watershed 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.
- 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.
- The primary purpose for the project is to restore water quality and protect West Elk Creek, and downstream Elk City Lake from future degradation.

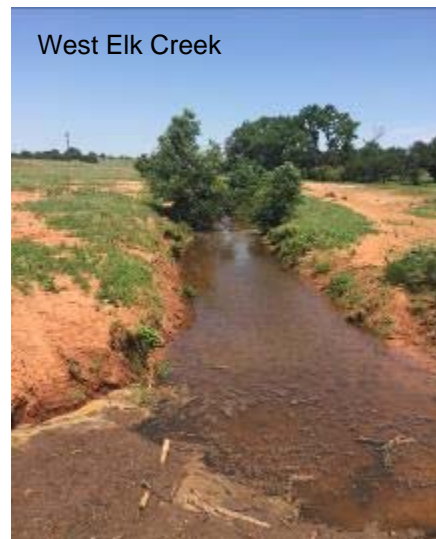
Partners in the Elk City Lake Watershed RCPP will work cooperatively with landowners to install conservation practices on cropland and rangeland in the watershed that contribute to nutrient and sediment related water quality impairments in downstream waterbodies.



In FY 2015:

- Assembled the practices, rates, and priorities for a cost-share program to landowners/managers to install conservation practices through EQUIP and §319 with a goal of reaching 150 producers and 9300 acres of watershed.
- This program will also include education and outreach to watershed citizens related to water quality concerns, benefits of conservation, and the role of citizens in protecting water quality.
- Began monitoring on West Elk Creek in July 2015, collecting monthly grab samples and also collecting runoff samples after rain events. Results of monitoring will be included in final report at the end of the project.

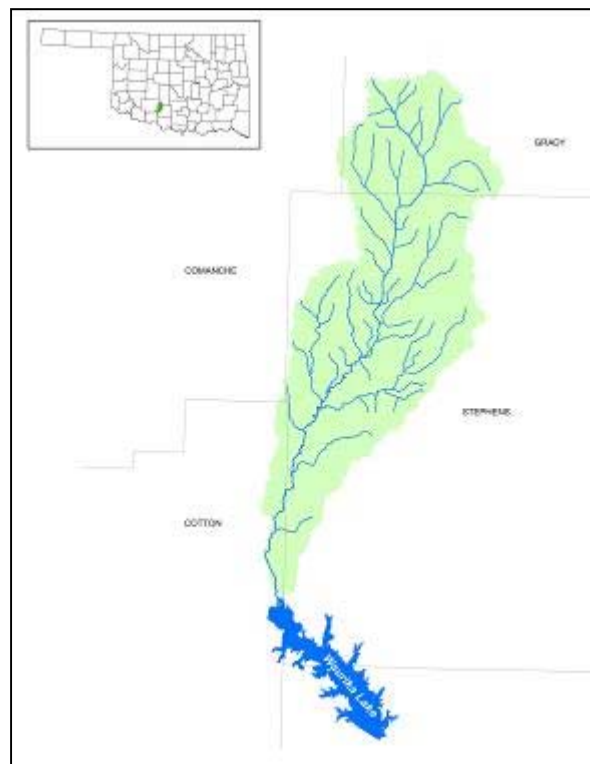
West Elk Creek





Little Beaver Creek

- In 2015, the four middle sub-watersheds of the Little Beaver Watershed were chosen as NRCS National Water Quality Initiative (NWQI) watersheds. NRCS worked closely with federal and state partners to select priority watersheds in each state where on-farm conservation investments will deliver the greatest water quality improvements benefits. NRCS provides technical and financial assistance to help farmers and ranchers to determine which conservation practices will provide the best results to improve water quality on their land.
- 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 is designated as a public and private water supply and primary body contact recreation waterbody. The stream also has a sensitive water supply designation.
- Little Beaver Creek was listed as impaired on Oklahoma's 2012 Integrated Report for high levels of *E. coli* bacteria so it is not currently meeting its beneficial use designations as a public and private water supply for primary body contact recreation. Waurika Lake is listed as impaired for chlorophyll *-a* and turbidity.
- In 2011, the NRCS established a "Little Water" local emphasis area (LEA) in eastern Cotton and western Stephens and Jefferson counties that includes the lower half of the Little Beaver Creek watershed. This program has provided extra funding to install practices which specifically protect water quality and quantity. Emphasis was given to adoption of renewable energy resources and exclusion of livestock from streams, as well as 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.



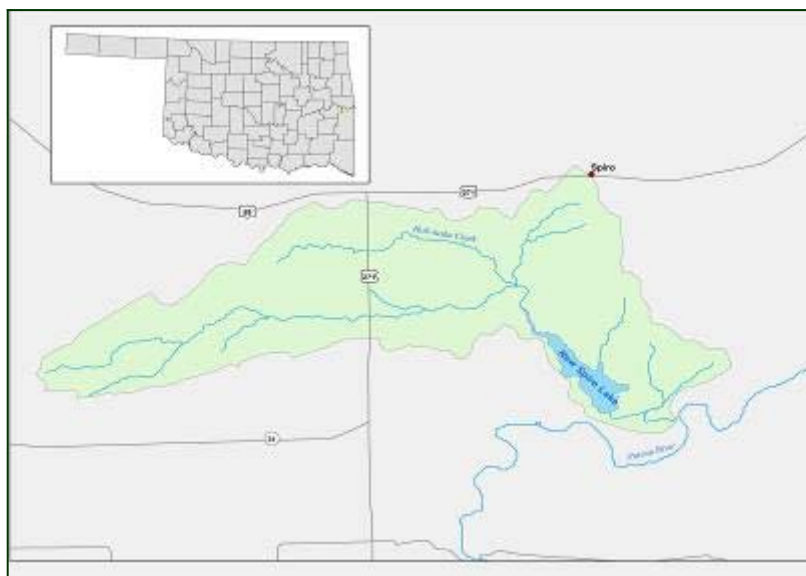
In FY 2015:

- Water monitoring began on Little Beaver Creek in March 2015. Three sites are sampled approximately once per month.



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 will provide 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.



In FY 2015:

- A small number of CPs have been implemented by the City of Spiro and the Oklahoma Rural Water Association. New fencing has been installed around the lake to restrict off-road vehicle access, thus reducing soil erosion and sediment runoff into the lake. More intensive CP implementation will be accomplished through NRCS NWQI from 2015-2020.
- An automated water sampler was installed on Holi-Tuska creek that will collect flow-weighted samples.

Blue Thumb Education Program



The Blue Thumb Education Program is the education arm of OCC's Water Quality Division. In 2015, approximately 400 active volunteers participated in regular monthly water quality monitoring of 61 stream sites across the state. More than 6,500 volunteer hours were logged in 2015.

Blue Thumb staff and volunteers completed the following:

- Held six training sessions for new volunteers;
- Conducted 7 Blue Thumb mini-academies for students of teachers who have attended Blue Thumb training sessions;
- Conducted over 45 quality assurance sessions throughout the state;
- Completed 155 macroinvertebrate collections;
- Conducted 26 fish collections;
- Hosted and participated in numerous educational events for youth and the general public;
- Conducted 3 groundwater screenings in conjunction with the local Conservation District offices.



Blue Thumb acquired 2 new education tools; the stream trailer and the tabletop rainfall simulator. This stream trailer provides a mobile example of a functional stream and provides the opportunity to demonstrate the affects of erosion. The tabletop rainfall simulator demonstrates how rain carries pollutants to streams from different types of surfaces (from bare soil to pavement).



Blue Thumb conducted their first summer day camp called "A Grand Adventure". This camp was also sponsored by the Grand River Dam Authority and allowed 29 children and youth to learn about lake management, stream ecology, runoff, safety, water quality testing, and more.



The Blue Thumb Program started 2 new citizen-managed watershed coalitions, one for Pennington Creek (Johnston County) and one for Crow Creek (Tulsa County). These coalitions bring together interested citizens/volunteers to work towards a common goal. The "Friends of Pennington Creek" are focusing on maintaining the existing good water quality whereas the main goal of the "Crow Creek Community" is to bring a healthy fish population back to an urban stream.



Blue Thumb has updated their website to include an interactive (clickable) map that allows people to view a data summary from creeks throughout the state. These data summaries are written by volunteers.



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.

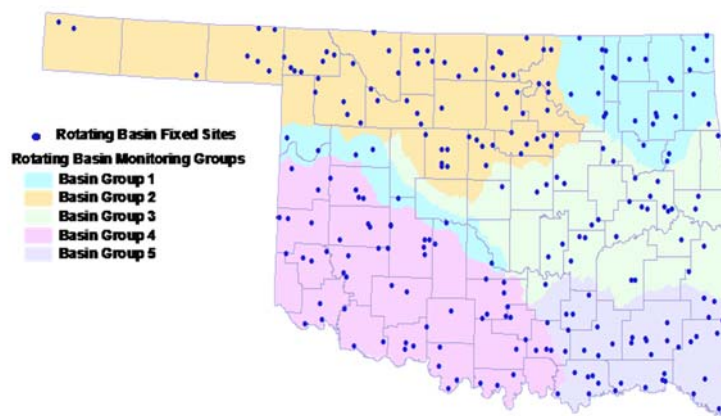
Implementation Monitoring Program:

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. During 2015, **eight** streams were being monitored with automated samplers to collect continuous flow-weighted measurements, which allowed determination of changes in critical NPS pollutants following installation of CPs. These sites included: Spavinaw Creek, Beaty Creek, Saline Creek, Little Saline Creek, Baron Fork River, Flint Creek, North Canadian River and Holi-Tuska Creek. Final reports will be submitted in 2016 for Spavinaw Creek (including Beaty Creek), the Illinois River (including Saline, Little Saline, Baron Fork and Flint Creeks) and the North Canadian River. Holi-Tuska Creek data is currently being collected.



Rotating Basin Monitoring Program:

The Rotating Basin 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 key NPS pollutants following implementation of CPs by NRCS or local conservation districts, and the use of data by ODEQ to create TMDLs 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. 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 2015, the OCC finished the third cycle of monitoring in Basin Group 3, continued the second year of the third cycle of Basin Group 4 and began the third cycle of Basin Group 5.

The continued, persistent drought, especially in the western part of the state, finally ended in May with historic rainfall records.



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

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	2015 Load Reduction Estimates*		
	Nitrogen	Phosphorus	Sediment
Illinois River	238,449 lbs/yr	19,778 lbs/yr	2,902 tons/yr
North Canadian	75,894 lbs/yr	6,875 lbs/yr	742 tons/yr
Spavinaw Creek	29,262 lbs/yr	2,541 lbs/yr	350 tons/yr
Statewide Locally-Led Cost-Share	67,866 lbs/yr	6,506 lbs/yr	675 tons/yr

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

Documenting Success

The OCC Water Quality Division submitted three NPS success stories to EPA in 2015. 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 improved turbidity. Funding for the implementation of these practices came from NRCS programs (nearly \$6.5 million since 2005 in these watersheds), local cost-share (over \$200,000 in state funds since 2005 in these watersheds), EPA (\$500,000 per year for monitoring), and from the landowners themselves.

Site	Parameter Delisted	County	Story Year
Commission Creek	<i>E. coli</i>	Ellis	2015
Pond Creek	Turbidity, <i>E. coli</i> , and dissolved oxygen	Grant	2015
Walnut Creek	<i>E. coli</i>	McClain	2015

Oklahoma's 2015 Success Stories:

With the submission of the 2015 stories, Oklahoma has 48 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 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 CWA §104(b)(3) Wetlands Program Development Grants (WPDG) with matching funds from state and local sources. In 2015, approximately \$129,000 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 NGOs.
- Completed the development of a database for 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 approve an in-lieu fee mitigation program and began consideration of 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.
- Completed wetland mapping revisions in the Pleistocene Sand Dunes Ecoregions adjacent to the North Canadian River, Salt Fork of the Arkansas River and Kingfisher Creek in central Oklahoma for submittal to the US Fish and Wildlife Service for incorporation into the National Wetland Inventory maps. These maps will also be hosted on the Oklahoma Wetlands Program website.
- Secured a grant and began work on a cooperative project with OSU to use wetland mapping to guide restoration decisions and determine wetland trends in Oklahoma. OSU will be the lead in updating wetland maps in 2-3 priority watersheds and in developing a protocol to determine historic wetland gains/losses in priority watersheds using current and historic aerial photography.
- Secured a grant and began 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.



Soil Health Education Program

2015 Annual Report

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 by teaching easy-to-use techniques for understanding, assessing, and restoring soil health. Staff also represent the agency on soil health projects with partners exploring and promoting the use of cover crops on more than five demonstration farms across the state. The goal is to increase the use of cover crops by agricultural producers to reduce wind and water erosion from agricultural lands.



Soil Health Trainings

Using soil health tool buckets, we partnered with NRCS to provide 13 hands on soil health trainings to over 270 conservation district employees and directors, and NRCS employees.



“Soil & Water: Our wildLIFE Depends on it”

Our interactive exhibit at the 2015 Oklahoma Wildlife Expo offered soil health education to attendees who learned about the benefits of worms, the impact of soil erosion on water quality, and the value of compost. We also demonstrated the full size rainfall simulator six times over two days. More than 30,000 people attend the Expo each year. Our partners included Rogers County Conservation District and NRCS.



Soil Health Education Also Provided To:

- Eight conservation district outdoor classrooms, soil health field days, and annual meetings
- Three major farm shows with over 50,000 attendees
- Introductory soil science class at Langston University
- Students at Rogers State University
- H2Oklahoma festival
- Four NRCS Soil Health 201 trainings for over 300 NRCS, conservation district, and agency staff
- OK Soil Health Facebook page visitors
- OK Soil and Water Conservation Society annual conference
- 11 Legislators and staff at six stream days across Oklahoma
- No-Till on the Plains Whirlwind Expo, Apache, OK
- Two South Central Climate Initiative meetings in OK and TX
- NACD South Central Region Meeting, Catoosa, OK
- Society of Environment Journalists conference, Norman, OK

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 §319 funds. Contracts for FY2015 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 §319 funds in a timely manner. Oklahoma competed and received funding for several projects both in 2011 and 2012. The USEPA Region 6 awarded Oklahoma \$4.5 million in §319 special funding in FY 2011 and \$2 million in FY 2012 to pursue several small projects. In both years, the OCC received funding to supplement CP implementation in the watershed projects which have already been discussed in this report (approximately \$4 million in 2011 and \$432,000 in 2012). Two grant projects which received §319 special funding in 2012 were still underway in 2015, one from Land Legacy / City of Tulsa and one from Oklahoma State University. All projects were 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. In FY15, the project created over 944 acres of permanent conservation easements encompassing 2.5 linear miles. **Since 2006 over 4,347 acres encompassing over 7 riparian linear miles have been protected!** In FY15, approximately 1.4 million dollars was spent on this project, with approximately 4.3 million spent over the duration of the project (2006-2015).

Oklahoma State University (OSU)

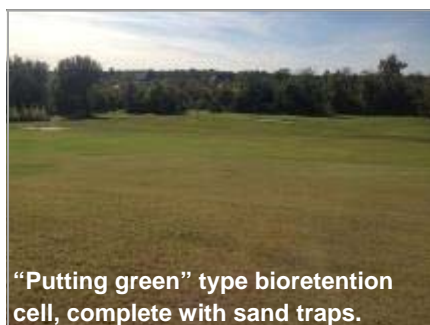


OSU was awarded \$811,084 in FY12 §319(h) Special Project funding to study bioretention cells in urban watersheds. In conjunction with the Oklahoma Conservation Commission and Geographica, LLC, this project has been undertaken at two locations—Grove and Oklahoma City, Oklahoma. At the Grove site, researchers 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 (BRCs) 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. The overall goal of the project was to document the potential of BRCs for load reduction of phosphorus and sediment, which would result in delisting of Hog Creek from the 303(d) list.

Preliminary results indicate that fly ash amended sand is confirmed to be a promising filter media in BRCs for phosphorus absorption. BRCs have a varying capacity to manage different pollutants. Concentration reduction of total Phosphorus ranged from 67% removal to 75% removal. Concentration reduction of Total Suspended Solids ranged from 59% to 70%. Concentration reduction of E. coli ranged from 52% removal to 94% removal. The final report for this project is currently in draft form and will be submitted in 2016.



Oklahoma City Bioretention Cells



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 continued one NPS mitigating project:

Developing Comprehensive Nutrient Management Plans (CNMPs) 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 CNMPs. Under this agreement, ODAFF developed 18 CNMPs in 2015, and this program will continue in 2016. 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): 2098
- Collected 713 soil samples for nutrient analysis
- Prepared a total of 168 Comprehensive Nutrient Management Plans (18 under NRCS agreement) and 10 Animal Waste Management Plans written.

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. 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 Oklahoma Scenic Rivers Commission (OSRC) 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 OSRC 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.



NPS Program Partner Activities

City of Oklahoma City, Storm Water Quality Management Division



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 2014, SWQ reached out to 1.7 million people through press releases, newspaper articles, interviews and presentations. Through the floatable debris program, over 578,000 pounds of debris was removed from the Oklahoma River and properly disposed. Over 8,800

residents delivered 625,649 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, 26,079 pounds of household hazardous waste was collected, separated and released to the public for reuse. SWQ inspectors completed 8,166 construction site and industrial facility inspections. Environmental Technicians also responded, investigated and resolved 561 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.

Tulsa also has added more personnel to its Stormwater Program which will enable it to conduct more inspections of construction and industrial sites, as well as follow-up on illicit discharges more quickly.

Finally, Tulsa's Watershed Characterization Program is winding down its rotating basin monitoring efforts which will have sampled all the major watersheds within the City limits of Tulsa by 2016. A comprehensive analysis of this program will be available after this date.



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 2015, expenditures totaled \$121,839 in federal CREP funding, \$327,304 in state funds, and \$101,954 in landowner matching funds. A total of 62 acres of riparian buffer were fully enrolled in CREP in Adair and Cherokee Counties.

The following CPs have been installed through the CREP and are currently active:

- 712 acres of riparian exclusion
- 14 alternative water supplies: 22 water tanks and 2 ponds
- 13 water wells
- 6 heavy use area protection



NPS Program Partner Activities

Oklahoma Farm Bureau (OKFB)



Oklahoma Farm Bureau (OKFB), a general farm organization with about 100,000 member families, is the voice of agriculture in Oklahoma. OKFB represents farmers and ranchers with operations of all sizes and who raise a wide variety of crops and livestock. OKFB is a true grassroots organization, with members in all of Oklahoma's 77 counties. OKFB derives its policy positions directly from its members.

OKFB's goal is protecting farmers and ranchers' private property rights. OKFB's mission is one of monitoring land use issues including implementation of voluntary conservation practices to counteract NPS pollution, educating the members about NPS issues, and taking action to protect the rights of landowners.

OKFB doesn't directly have programs to control NPS. However, many of OKFB's members serve on their local conservation district boards. OKFB can be an information source regarding NPS to its members through the Perspective newsletter, OKFB website and twitter. Also, OKFB is a source of information at county, district and statewide membership meetings.



Peoria Tribe of Oklahoma

The Peoria Tribe completed its FY15 NPS project on Tribal Lands by constructing three filtering and settling ponds at the Tribe's Golf Course. The golf course sits in a valley and is subject to flash floods and erosion. The pond acts as a catch basin to slow water flow and prevent erosion. Due to the nature of application practices used on golf course lands to keep them manageable for their purpose, large amounts of fertilizer, herbicides and pesticides are used. There is a creek that runs through the Peoria land that receives runoff from the golf course. The Tribe constructed these ponds to filter contaminants and runoff before it enters the water shed and eventually to Grand Lake. The Tribe feels this successful project was necessary to preserve a healthy natural habitat.





Through extensive partnerships, education programs,