

OCC Stream Monitoring and Conservation Districts

OKLAHOMA CONSERVATION COMMISSION

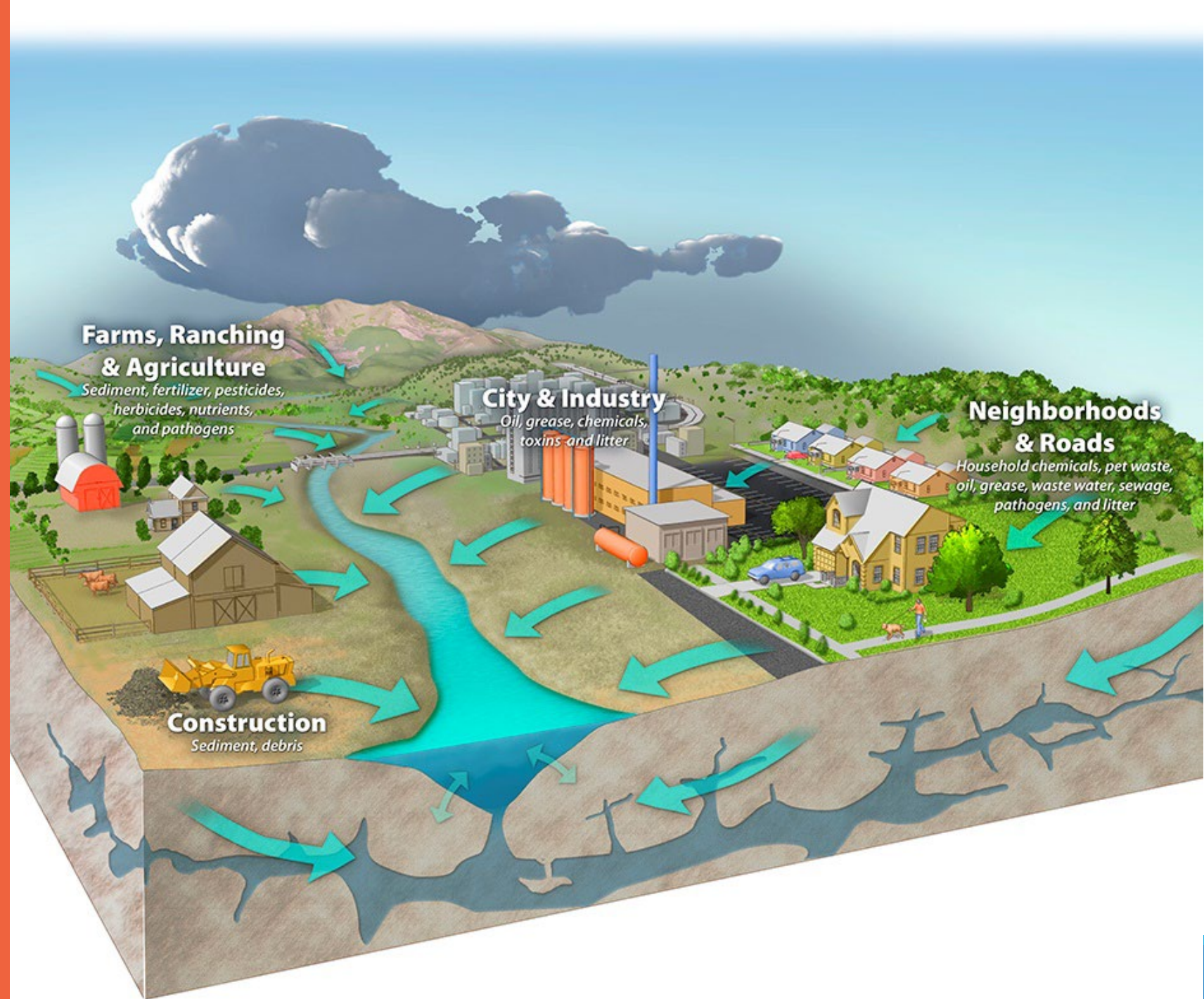


District led and partner conservation practices lead to water quality improvement

OCC's Stream Monitoring Program documents those improvements

Non-Point Source Pollution

- Non-point source pollution is the leading cause of water quality problems nationwide



Surface Water Health

- More than 690 stream segments and 10,000 miles of impaired streams as of 2024
- 141 impaired lakes as of 2024



Stream Impairments

- Stream impairments can represent lost revenue for producers
 - Turbidity in streams is lost topsoil
 - Nutrients in streams are not improving growth of crops or cattle



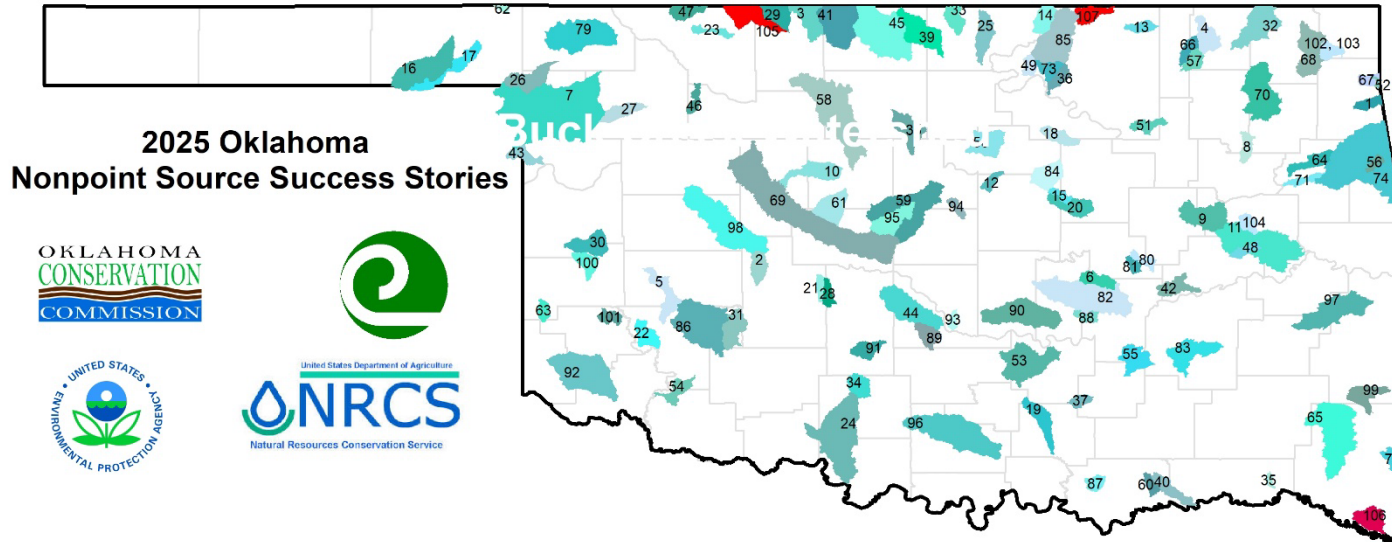
Conservation Practices Improve WQ

- Alternative Water Supply
- Riparian Fencing and Restoration
- Cover crop and no-till
- Grade Stabilization Structures
- Other Erosion Control BMPs



Oklahoma's 2025 Success Stories:

With the submission of the 2025 stories, Oklahoma has 107 streams that are recognized as EPA NPS Success Stories, detailing removal of 179 pollutants. Oklahoma remains first in the nation for documenting NPS pollution reduction through NPS Success Stories.



2025 Oklahoma Nonpoint Source Success Stories



Legend

County Boundaries

Success Story Watersheds

- | | | | | |
|-----------------------------------|---------------------------------------|---|----------------------------------|---------------------------------|
| Alabama Creek (81) | Canadian Sandy Creek (53) | Elk Creek (48) | Main Creek (46) | Salt Creek (Pott. Co.) (90) |
| Bad Creek (80) | Caney Boggy Creek (55) | Euchee Creek (84) | Medicine Lodge River (29) | Sandstone Creek (30) |
| Beaty Creek (1) | Clear Creek (Beaver Co.) (16) | Finn Creek (89) | Mill Creek (42) | Sandy Creek (3) |
| Beaver Creek (Jefferson Co.) (24) | Clear Creek (Harper Co.) (26) | Fish (63) | Mineral Bayou (87) | Stillwater Creek (50) |
| Beaver Creek (Osage Co.) (14) | Cloud Creek (9) | Fourteenmile Creek (64) | Mission Creek (13) | Stinking Creek (Caddo Co.) (21) |
| Big Creek (32) | Commission Creek (43) | Glover River (65) | North Canadian River (69) | Stinking Creek (Kiowa Co.) (31) |
| Big Eagle Creek (99) | Coon Creek (94) | Goose Creek (37) | Norwood Creek (106)- NEW! | Sulphur Creek (60) |
| Bird Creek (35) | Cooper Creek (10) | Gray Horse Creek (36) | Otter Creek (Garfield Co.) (38) | Tepee Creek (22) |
| Bird Creek (Hughes Co.) (88) | Cottonwood Creek (59) | Hogshooter (66) | Otter Creek (Tillman Co.) (54) | Timber Creek (100) |
| Bitter Creek (33) | Cottonwood Creek (59) Deer Creek (95) | Honey Creek (52) | Peaceable Creek (83) | Turkey Creek (58) |
| Bois d'Arc (25) | Crooked Creek (Beaver Co.) (62) | Honey Creek (67) | Peacheater Creek (56) | Turkey Creek (Jackson Co.) (92) |
| Brazil Creek (97) | Crooked Creek (Grant Co.) (41) | Horse and Little Horse Creeks (102-103) | Pennington Creek (19) | Turkey Creek (Woods Co.) (23) |
| Buck Creek (107)- NEW! | Curl Creek (57) | Illinois River (74-78) | Pond Creek (45) | Walnut Creek (44) |
| Buffalo (Harper Co.) (79) | Deer Creek (39) | Indian Creek (27) | Pryor Creek (70) | Wewoka Creek (82) |
| Bull Creek (8) | Deer Creek (98) | Ionine Creek (28) | Rainy Mountain Creek (86) | Whitegrass Creek (40) |
| Butler Creek (104) | Delaware Creek (51) | Lagoon Creek (18) | Ranger Creek (71) | Wildhorse Creek (34) |
| Caddo Creek (96) | Dirty Creek (11) | Lake Creek (2) | Rock Creek (72) | Willow Creek (93) |
| California Creek (4) | Doga Creek (49) | Lake Creek (Greer Co.) (101) | Roaring Creek (91) | Winter Camp Creek (61) |
| Camp Creek (15) | Driftwood Creek (105)- NEW! | Little Cabin Creek (68) | Salt Creek (20) | Wolf Creek (7) |
| | Duckpond Creek (17) | Little Elk Creek (5) | Salt Creek (Osage Co.) (73) | Yellowstone Creek (47) |
| | Dugout Creek (12) | Little Wewoka Creek (6) | Salt Creek (Osage Co.) (73) (85) | |

Oklahoma

Water Quality Improves in Alabama and Bad Creeks

Waterbody Improved

Alabama and Bad creeks were placed on Oklahoma's Clean Water Act (CWA) section 303(d) list of impaired waters in 2002, 2010, and 2012 for bacteria, salts, and dissolved oxygen (DO). Pollution from grazing lands and historic oil and gas activities contributed to these impairments. Implementing conservation practice systems (CPS) and restoring abandoned petroleum sites decreased chloride, total dissolved solids (TDS) and *Escherichia coli* (*E. coli*) and improved DO levels. As a result, Oklahoma removed the chloride and TDS impairments in 2006 and 2018, *E. coli* impairments in 2014, and the DO impairment in 2018 from its CWA section 303(d) lists. Alabama Creek and Bad Creek now fully support their agricultural (AG) and partially support their primary body contact (PBC) designated beneficial uses. Bad Creek fully supports and Alabama Creek partially supports the warm water aquatic community (WWAC) beneficial use.

Problem

The Alabama and Bad creek watersheds cover 40,924 acres in Okfuskee and Okmulgee counties in Oklahoma (Figure 1). Land use in the watersheds is mainly grasslands (43 percent) and forest (49 percent). Petroleum production peaked in the early 1900s but has since declined, resulting in numerous abandoned wells and salt-scarred areas. In 2002, challenges with grazing land management and historic oil field activities contributed to listing the streams as impaired by chloride when 25 percent of Alabama Creek samples and 14 percent of Bad Creek samples exceeded the chloride standard. A stream is considered impaired by chloride if more than 10 percent of samples exceed the historic yearly mean concentration of area streams (334 milligrams per liter (mg/L)). Also in 2002, 13 percent of Bad Creek DO readings fell below the criteria. Impairment results if more than 10 percent of samples fall below 6.0 mg/L from April 1 through June 15 or below 5.0 mg/L during the remainder of the year. More than 33 percent of TDS samples in Alabama Creek were above the yearly mean standard in 2002. Streams in this area are considered to violate the TDS standard if more than 10 percent exceed the historic yearly average concentration of 1030 mg/L. Concentrations of *E. coli* exceeded allowable limits in 2010 in Alabama Creek and 2012 in Bad Creek when the geometric mean of recreation season samples were 165 and 158 colony forming units per 100 milliliters (CFU/100 mL). A stream is considered

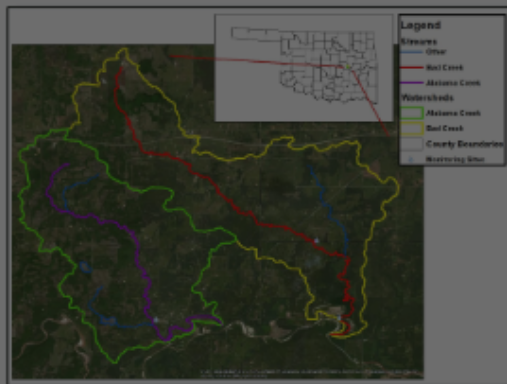


Figure 1. The Alabama and Bad creek watersheds drain to the North Canadian River, approximately 48 river miles upstream of Lake Eufaula.

126 CFU/100 mL. Based on these results, Oklahoma added segments OK520500010200_00 (14.2 miles) and OK520500010170_00 (19.1 miles) to the 2002, 2010, and 2012 CWA section 303(d) lists for nonattainment of the AG, WWAC and PBC designated beneficial uses.

Story Highlights

Landowners in the watershed worked with the Okfuskee and Okmulgee county conservation districts (CCDs), the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), the Oklahoma Conservation Commission (OCC), and the University

Success Stories

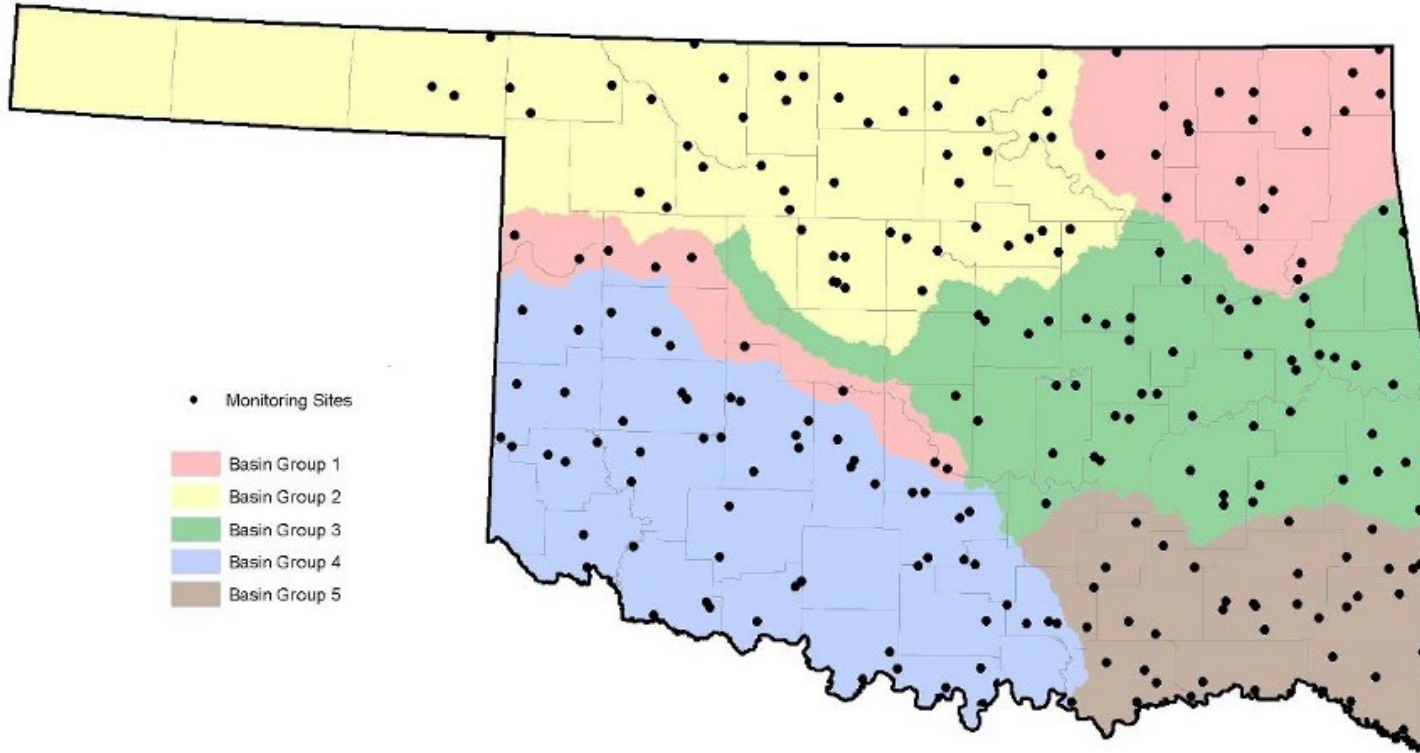
A screenshot of the EPA website's 'Nonpoint Source Success Stories: Oklahoma' page. The page features the EPA logo and navigation menus at the top. The main heading is 'Nonpoint Source Success Stories: Oklahoma'. Below the heading is a list of success stories, each with a thumbnail icon, title, and file size. The stories include Alabama and Bad Creeks, Beaty Creek, Beaver and Doga Creeks, Beaver Creek, Big Creek, Big Creek Update, Big Eagle Creek, Bird Creek, Bird Creek - Hughes County, Bitter Creek, Bitter Creek Update, Bois d'Arc Creek, and Brazil Creek. A sidebar on the left contains a table of contents with links to various sections like 'Basic Information', 'Types of NPS Pollution', '319 Grant Program for States and Territories', etc.

<https://www.epa.gov/nps/nonpoint-source-success-stories-oklahoma>

Estimating Load Reductions

Watershed / Program	2024 Load Reduction Estimates*		
	Nitrogen	Phosphorus	Sediment
Riparian easement (Illinois River and Eucha/Spavinaw watersheds) and RCPP Projects	338,393 lbs/yr	28,934 lbs/yr	3,434 tons/yr
Statewide Locally-Led Cost-Share, Soil Health Program, and Poultry litter transfer	790,264 lbs/yr	421,757 lbs/yr	6,935 tons/yr

- Measure of the reduction of the amount of pollution entering waterways.
- Project efforts include
 - OCC's statewide Locally-Led Cost-Share Program
 - Ongoing riparian easement efforts
 - OCC's Soil Health Program
 - Poultry litter transfer efforts.



Basin 4 is ending in May

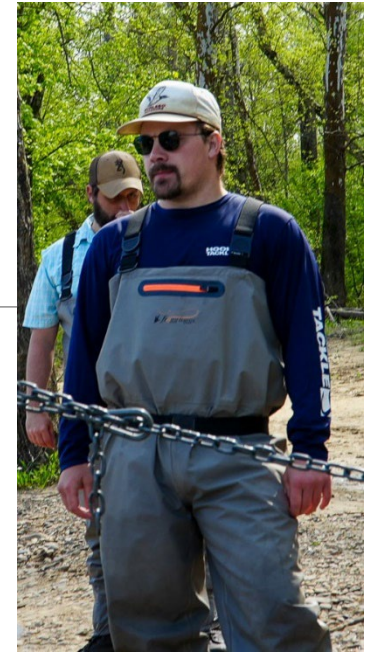
Basin 5 is continuing for another year

Basin 1 is starting in May

Rotating Basin Stream Monitoring Program

- Monitor roughly 250 streams across Oklahoma
- Monitor each stream for 2 out of 5 years
- Started in 2001
- 2026 is the start of the 6th rotation

Rotating Basin Team

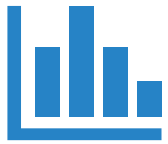




Rotating Basin Monitoring: Methods

- Physico-chemical data: ~20 samples
 - Every 5 weeks
 - ammonia 5/1 – 9/30
- Bacteria: 10 samples
 - Recreational Period (5/1 - 9/30)
- Macroinvertebrates : 4 samples
 - Summer Index (6/1 – 9/15)
 - Winter Index (1/1 – 3/15)
- Fish and Habitat: 1 sample
 - Index Period (5/15 – 10/31)

What do we do with the data?



**Integrated
Reporting every 2
years**

Identify Impaired
Waterbodies



**Internal data
analysis**

Site Summaries

Reporting

Web Applications



**Identify and
report on
improvements**

Targeted
conservation

Success Stories



Technical Team

Integrated Reporting: Every 2 years

Beneficial Uses

- Agriculture
- Primary Body Contact
- Fish and Wildlife Propagation
- Aesthetics

Criteria

- Numeric Thresholds
- Minimum number of required samples

Failure triggers listing on impaired waterbody list

- Requires TMDL or watershed based plan
- Focused conservation

Example Integrated Reporting Scenario

- Turkey Creek is listed as impaired for turbidity on 2022 Integrated Report
 - At least 20 samples collected during the five year period
 - More than 10% of the non-high flow samples exceeded 50 ntu
- Turkey Creek is removed from the 2026 impaired waterbody list
 - At least 20 samples collected during the five year period
 - No samples exceeded the 50 ntu criteria
- This improvement was a result of local conservation efforts
 - Between 2022 and 2026 conservation efforts were initiated in the Watershed
 - NPS Success Story

Beaty Creek

Rotating Basin Site Summary



This leaflet provides an overview of the water quality at Beaty Creek: Lower. The data presented were collected between 2021 and 2023.

To evaluate water quality in streams, Oklahoma Conservation Commission (OCC) collects biological (fish and bugs), chemical (nutrients, salts, and turbidity) and physical (habitat) data in streams throughout Oklahoma. Each of these measurements are compared to data from nearby high-quality streams. Additionally, a relative risk assessment (RRA) was conducted to determine the likely stressors to the area.



Water Chemistry	Fish	Bugs	Habitat	Final	Grade
81	0.92	0.8	0.88	0.85	B

Measurement score ranges from 0 (worst) to 1 (best). The water chemistry score is an average of salts, pH, dissolved oxygen (DO), and turbidity/TSS (total suspended solids) measurements. The final grade is an average of all measurements.

Site Summaries

- Stream Report Card
- Summarizes all the data we collected from last rotation and converts to a letter grade

A stream's score is affected by activities in the upstream area that drains to the creek. OCC interprets monitoring data in order to identify voluntary best-management practices and recommendations for the watershed that can help improve water quality:



- Beaty Creek is not on the 303(d) list of waterbodies for any water chemistry metric. We did not detect reduced OP, TN, available N, or P. The habitat assessment also indicated no deposited fine sediment.
- The site is not on the 303(d) list for any of the biocriteria. According to the OCC biocriteria, the assemblages were also in good condition.
- The disagreement between the 303(d) list and OCC analysis is likely due to either a change in evaluation methods, or the recency of the data to when the 303(d) list was last updated.
- Based on the RRA, low DO is a common problem in the region. Impaired DO is caused by excessive nutrients or low baseflow and high temperatures.
- Riparian zone maintenance through planting native trees, providing alternative water supply for livestock, nutrient management planning will reduce sediment, promote baseflow conditions and shading. All of which should improve stream DO conditions.

For more information about OCC's stream monitoring program visit the [OCC website](#). To learn more about voluntary BMP opportunities contact your local conservation district.

Site Summaries

- Summarizes any water quality issues
- Offers potential conservation options that would improve stream conditions

Cherokee County

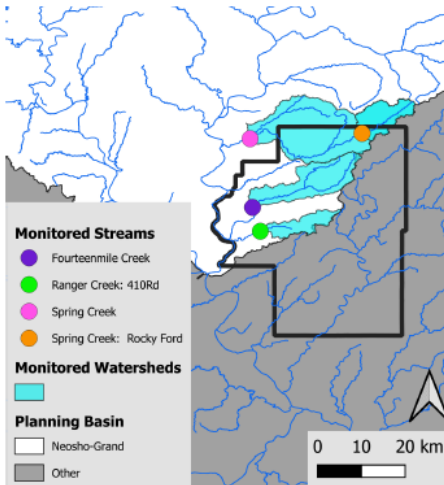
District Summary



The Oklahoma Conservation Commission (OCC) has the statutory responsibility to monitor streams across the state and determine the effects of non-point source pollution (NPS). Unlike point source pollution that is discharged from a specific source, NPS in streams is a result of land-use activities within the watershed. Although many streams across Oklahoma are in good condition, some streams show some level of impairment resulting from NPS affected watersheds. The OCC's "Rotating Basin Monitoring Program" not only identifies NPS affected watersheds but provides the tools to select best-management practices (BMP) necessary for improvement and for the documentation of water-quality improvement following voluntary BMPs.

The Rotating Basin Monitoring Program monitors over 250 streams statewide and is executed by separating the state into 5 major planning basins. Each basin is sampled for 2 years within a 5-year monitoring cycle. This rotational monitoring allows OCC to track improvements in stream quality resulting from implementation in the watershed and helps highlight the benefit of conservation practices.

To evaluate the water quality in streams, OCC collects biological (fish and bugs), chemical (nutrients, salts, and turbidity) and physical (habitat) data in wadeable streams. Stream quality is then compared to the range of measurements at high-quality sites in the same ecoregion. Deviation from regional high-quality sites may indicate a reduction or impairment to a stream's recreational opportunities, contribution to downstream drinking water, or ability to support healthy fish communities.



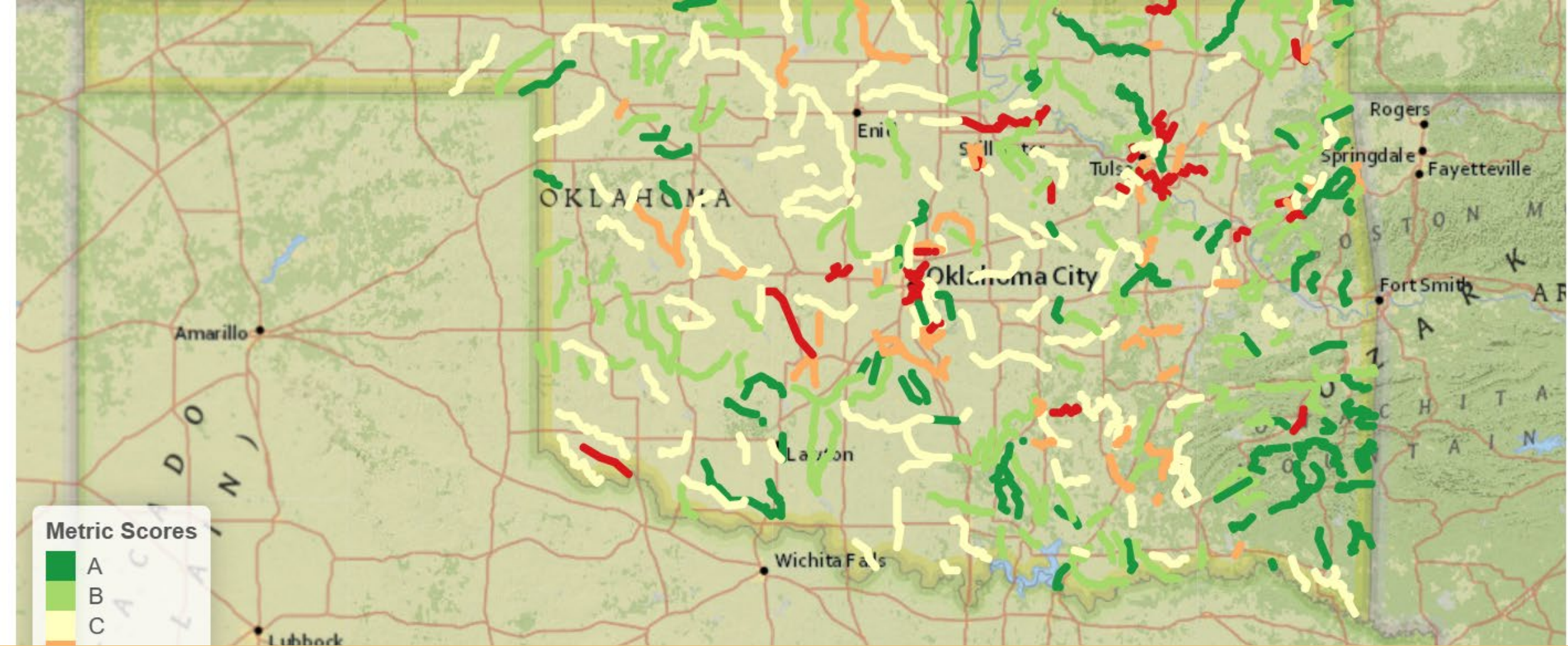
OCC completed the most recent cycle of monitoring of streams in the Neosho-Grand River Basin between 2021 and 2023, with the next round of sampling in this basin scheduled for 2026-2028. Active monitoring sites within the Neosho-Grand River Basin and a significant portion of their watershed within the district boundary include Fourteen Mile, Ranger, and Spring creeks.

The most recent analyses of the streams in the district can be found on the following pages. Please feel free to share these stream summaries with the customers in your district. If you have water quality concerns or believe OCC should be monitoring additional streams in your district, please email: Brooks.Tramell@conservation.ok.gov. For more information about OCC's stream monitoring program visit the OCC website.



District Summaries

- Summarizes program activities in the district
- Offers an opportunity for discussion about where the program is monitoring

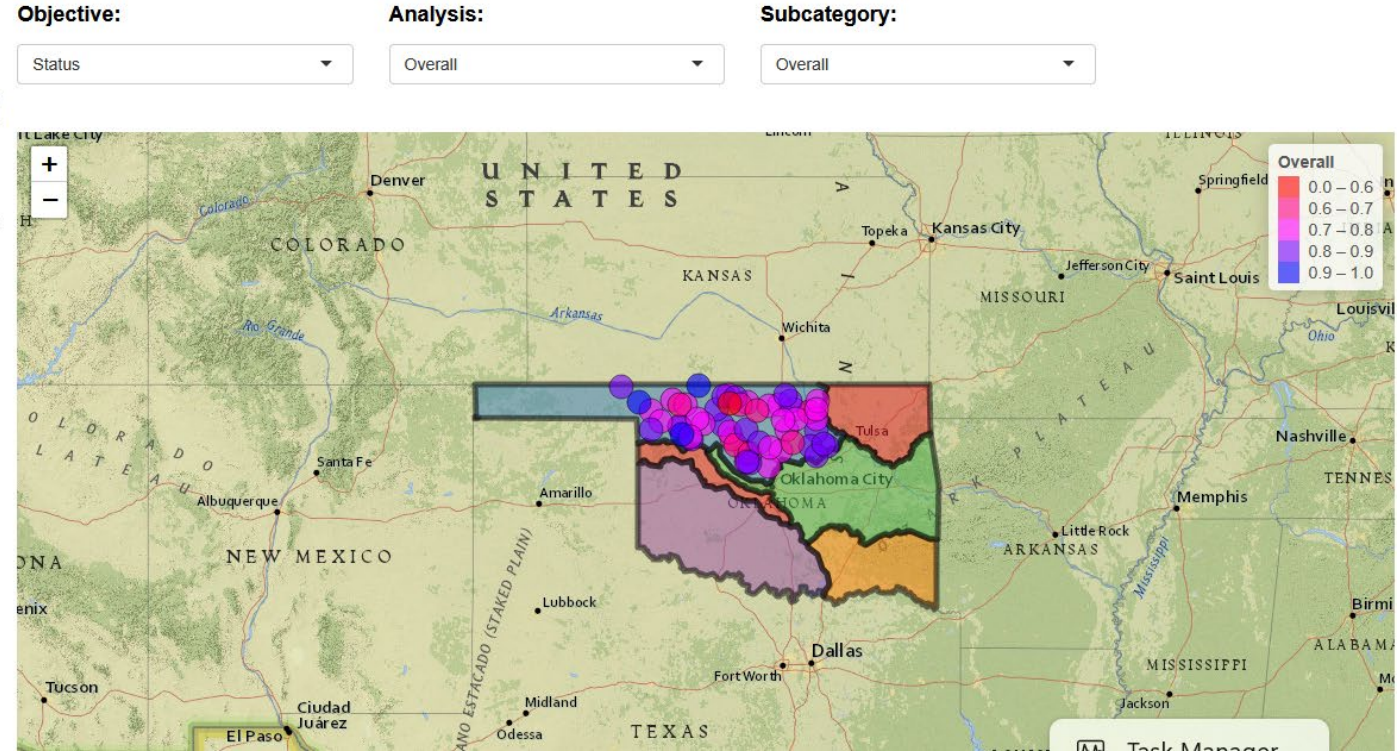
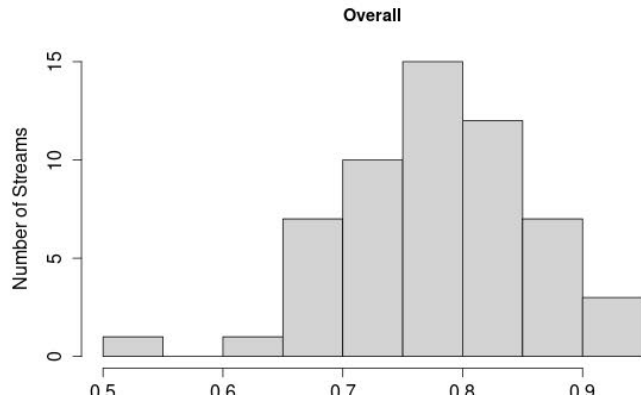


Water Quality Data Portal

OCCWATERQUALITY.SHINYAPPS.IO/OCC-APP23A/

Objective 1: Status Methods

An "Overall Stream Score" is calculated for each stream. Scores range from 0 (worst) to 1 (best), and are an average of 4 component scores, water quality (WQ), habitat, fish and macroinvertebrates. All component scores are determined through comparison to high-quality reference streams in the same ecoregion. The WQ component score is an average of thirteen chemical parameters. Each parameter is scored based on the probability a random sample would fall within the range found at reference streams (1 = likely, 0.5 = possible, 0 = unlikely). 'E.coli' is an additional WQ parameter not included in the overall score and scores as follows: 1 = meets primary body contact standard, 0.5 = meets secondary body contact standard only, or 0 = fails both standards. Fish, macroinvertebrate, and habitat component scores are calculated by dividing the stream score by the mean at regional reference streams. Each of the component scores can be visualized by changing the 'Analysis' dropdown, and individual metric scores can be visualized by changing the 'Subcategory' dropdown.



Rotating Basin Report Application

[HTTPS://OC CWATERQUALITY.SHINYAPPS.IO/ROTATING BASIN REPORT APP/](https://occwaterquality.shinyapps.io/rotating_basin_report_app/)



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November 2024



Unified Watershed Assessment

- Systematic planning tool to prioritize watersheds for NPS remediation and protection
- https://ocwaterquality.shinyapps.io/UWA_app2/

OCC Wetlands Program

Legislatively Appointed to OCC in 1990

Focused on science-based management applications until 2023

2023 Partnership for Oklahoma Wetland Restoration and State Appropriations

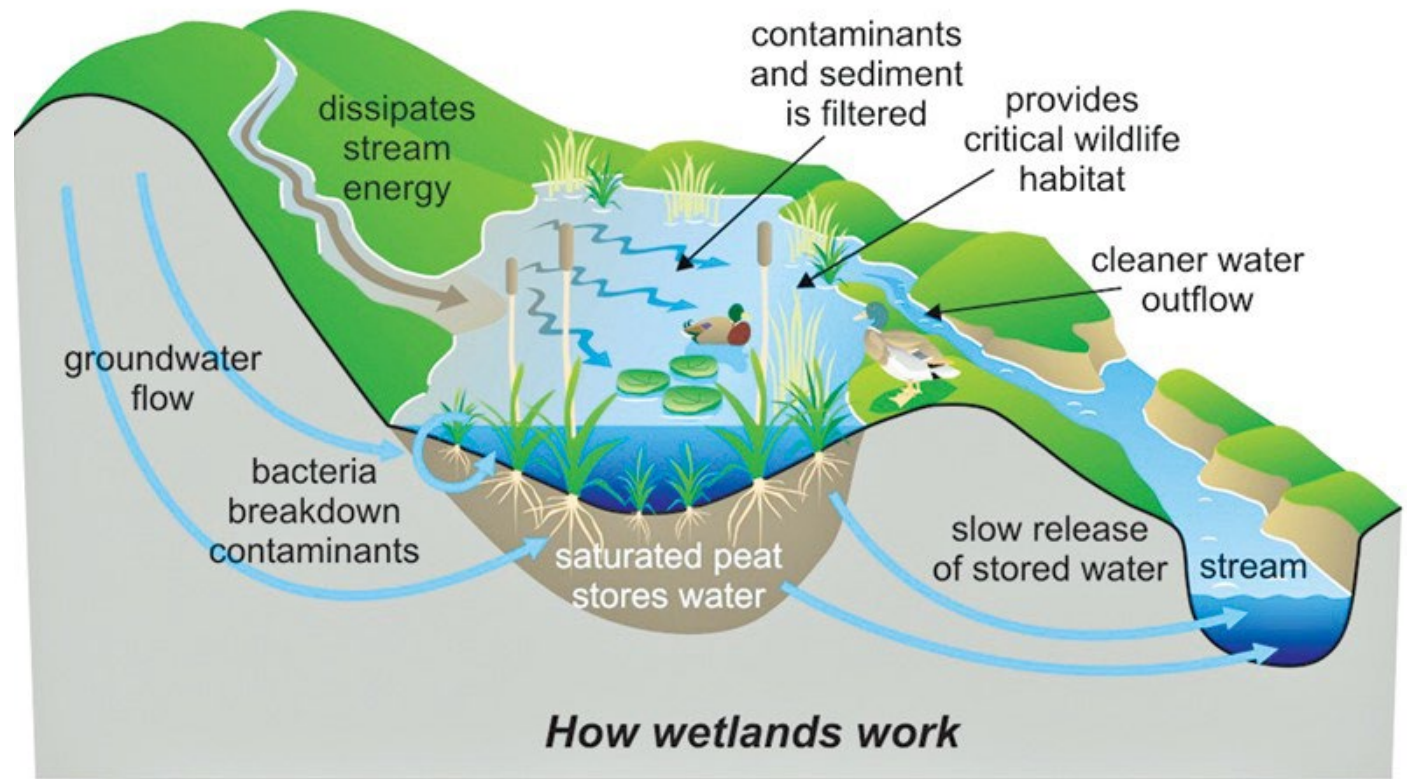
In 2 years acquired approximately 8 million dollars in funding for program administration and implementation



Wetlands Team

Wetlands as Land and Water Conservation

- Flood reduction
- Water Quality Improvement
- Aquifer Recharge
- Wildlife Habitat
- Recreation



2026 Wetlands Cost Share and Beyond

- \$100,000 + for wetland restoration projects statewide
- Over the next 4 years federal, state and private dollars are available for:
 - Depressional wetland restoration
 - Shallow emergent wetland restoration
 - Low-tech process-based restoration
 - Playa Restoration
 - Salt cedar removal
 - Beyond...
- <https://wetlands.ok.gov/>

Rotating Basin and Wetlands are here to support districts

- Attend district board meetings upon request
- Come with us into the field
- Coordinate in watersheds in need of NPS remediation
- Education events

District led conservation practices lead to water quality improvement

OCC's Stream Monitoring Program documents those improvements

Wetlands are another conservation practice available to meet landowner goals and improve water quality

Thanks for your support!!

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Wetlands.ok.gov