

# Programming Toward Soil Health



Steve Glasgow- NRCS  
Shanon Phillips- OCC

OCLWA 24<sup>th</sup> Annual Symposium  
April 8-9, 2015, Stillwater, OK

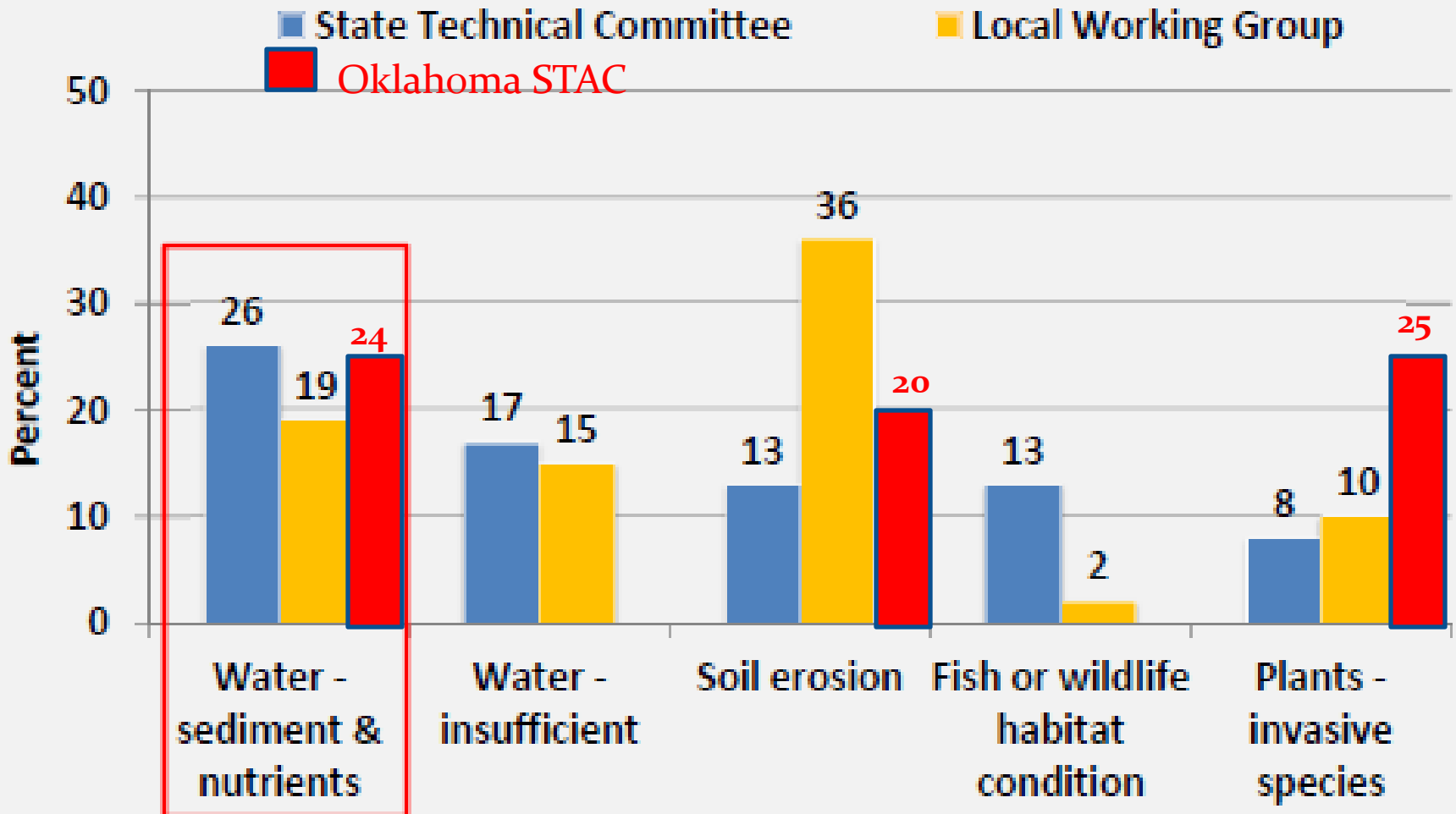


# Conservation Partnership Roles

- **NRCS**- conservation practice design, ID conservation resource needs, training, technical and financial assistance to landowners
- **Conservation Districts**- relationships with and leadership by local agricultural producers, support to state and federal partners, outreach
- **OCC**- water quality monitoring, education and outreach, technical and financial assistance to landowners
- **EPA**- financial assistance to partners, validation of wq monitoring results

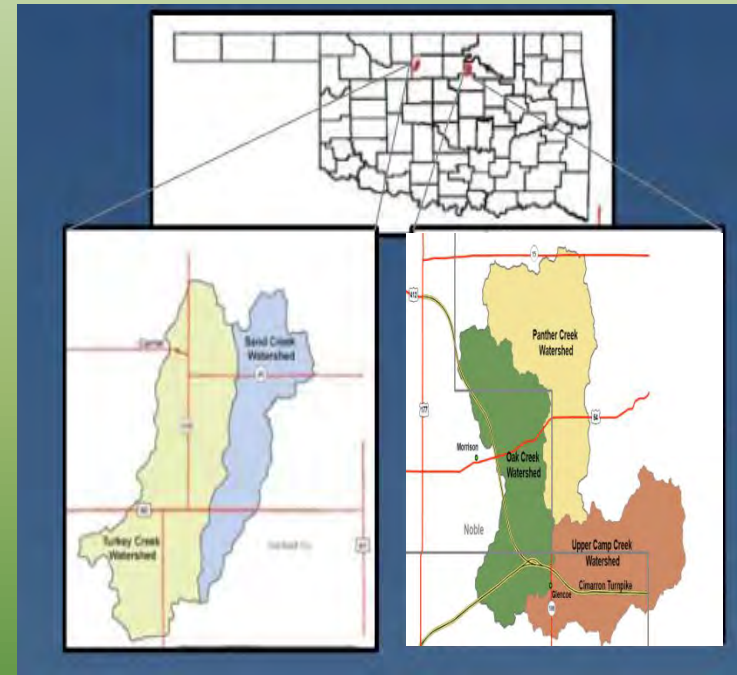


# NRCS – Water as a Resource Concern



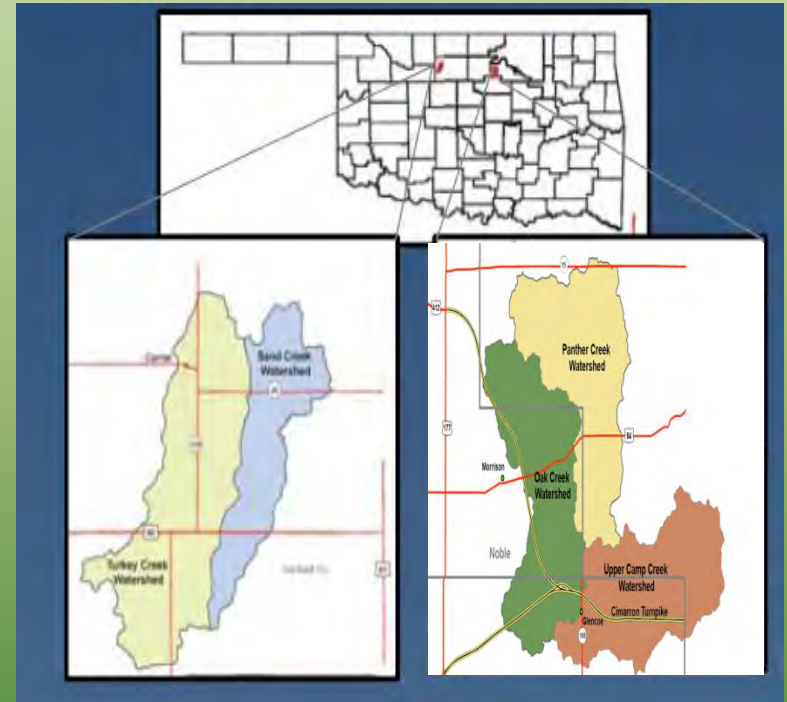
# Targeted Strategies for Water Quality

- Identify areas to target NRCS efforts
  - NWQI, IRWI
  - Work with partners to evaluate and select watersheds base on pollutants and potential for success



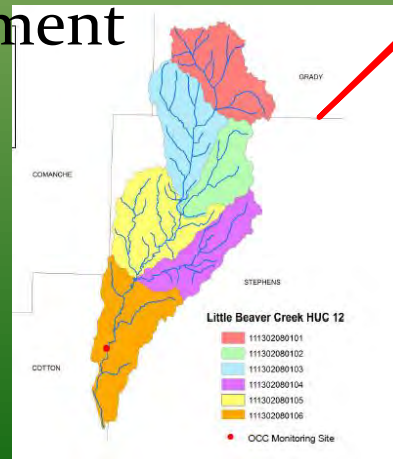
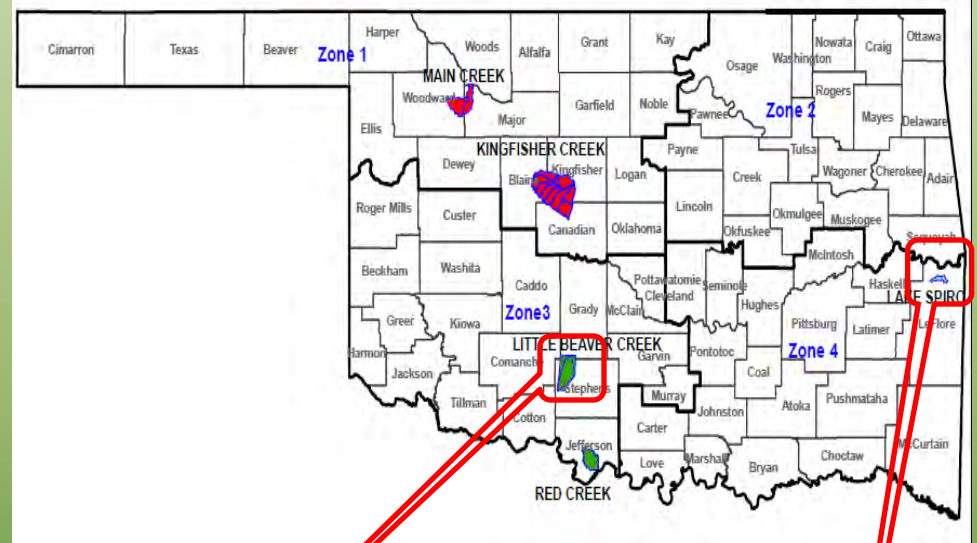
# National Water Quality Initiative

- Goal remove streams from 303d list
  - Nutrients, pesticides, sediments, bacteria
- 2012-14 - 5 watersheds
  - More than \$785,000 and 8,400 acres
- Practices include no-till, grass planting, nutrient and pest management, buffers, brush management



# National Water Quality Initiative

- 2015 - 2020 - 5 watersheds
  - Estimated \$750,000 annually
- Planning emphasis on removal of livestock from streams, grazing systems, soil health, buffers and animal waste management





# Illinois River Watershed Initiative

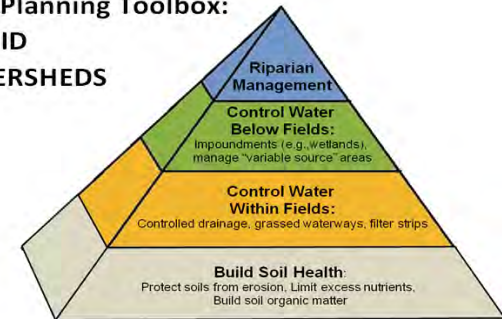
- Goal: Improved water quality
  - Animal Wastes
  - Sediment
  - Livestock use
- Accomplishments
  - Over \$3 million dollars 27,000 acres
- Practices: nutrient and pest management, vegetation establishment, animal waste management and storage, grazing systems, riparian area exclusion



# Improved Water Quality through Improving Soil Health

- Improved technical assistance capability
  - Foster Systems Approach
  - Commitment to adaptive management
- Increased Emphasis on Soil Health
  - Good soil health can provide multiple benefits

Concept for Conservation Planning Toolbox:  
A CONSERVATION PYRAMID  
FOR AGRICULTURAL WATERSHEDS



**FIRST, FOCUS ON SOIL HEALTH TO SUSTAIN/IMPROVE PRODUCTION, LIMIT FLOOD AND DROUGHT IMPACTS, BUILD SOIL CARBON, AND REDUCE NUTRIENT LOSSES**

- PROTECT SOIL (e.g., no-tillage, strip tillage),
- BUILD SOIL (e.g., cover crops, living mulches), and
- LIMIT EXCESS NUTRIENTS (e.g., NMPs, MMPs, 4R PRACTICES)

Soil Health Benefits to Watersheds and Influences on Mainstem River

Increased  
Infiltration of Water  
Water Holding Capacity  
Groundwater Recharge  
Stream Base Flows  
Soil Biota  
Biological Food Base  
Wildlife Population and Health  
Ag Profitability

Decreased  
Runoff of Water  
Flooding  
Desertification  
Irrigation Water Needs  
Sedimentation from Ag Sources of Water Pollutants  
Commercial Fertilizer Use  
Pesticide Use  
Fuel Use



# NRCS Soil Health Initiative

- Objectives
  - Increased awareness, both internal and external
  - Provide technical and financial assistance to producers wanting to improve soil health.
  - Increase adoption and implementation of **soil health management systems**



# NRCS Efforts Targeted for Soil Health

- Building Partnerships
  - State Soil Health Committee
- Outreach and Education
  - Field Days, workshops
  - Demonstration Farms
- Training
  - NRCS employees
  - Partners



# NRCS Programs Targeted for Soil Health

- Environmental Quality Incentives Program (EQIP)
  - Planning and Implementation of conservation practices and systems that impact soil health





# NRCS Programs Targeted for Soil Health

- Conservation Innovation Grant (CIG) – OSU
  - On farm research and Demonstrations
- RCPPP - Healthy Soils – Statewide
  - Emphasis on soil health demonstration farms
  - 10 – 80 acres farms; 5 regions across state
  - EQIP and state partner funds (agencies, producer groups, seed companies)



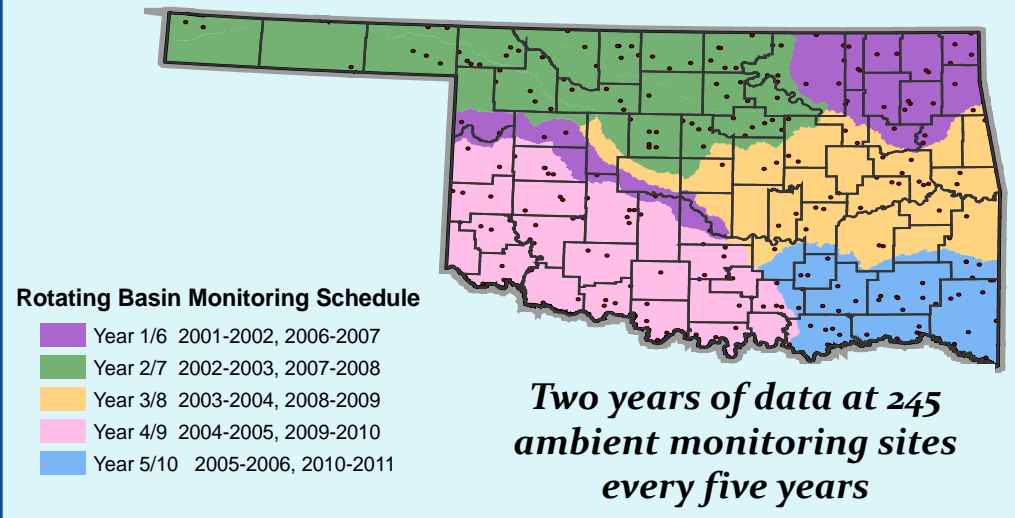
# NRCS Programs Targeted for Water Quality and Soil Health

- Two RCPP Projects
  - Elk City Lake
  - Middle and Lower Neosho (above Grand Lake)
- Improving water quality with secondary focus on soil health
  - EQIP and 319 funds leveraged; two states and multiple partners

# OCC Programs- WQ Monitoring

- Monitor 245 3 – 5 order streams across the state
- Monitor upstream of permitted discharges, reservoirs, confluences, etc. to focus on NPS
- Focus on pollutants for which the state has quantitative water quality standards, also includes nutrients
- Chemical, habitat, and biological monitoring

## Rotating Basin Monitoring Program





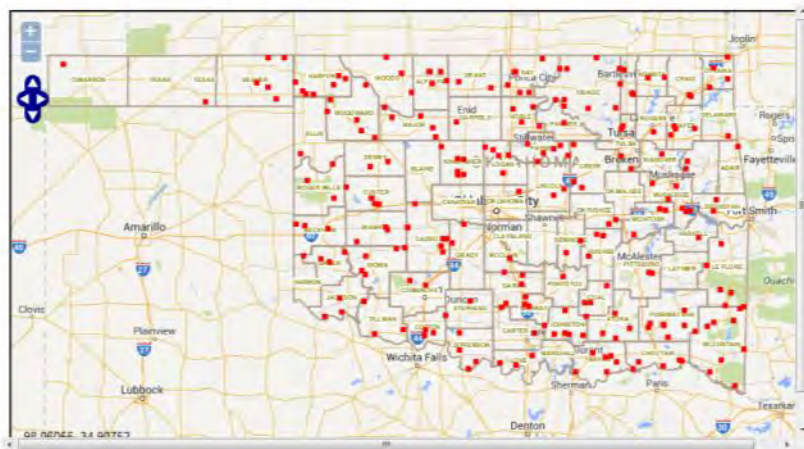
# OCC Programs- WQ Monitoring

- [http://www.ok.gov/conservation/Agency\\_Divisions/Water\\_Quality\\_Division/index.html](http://www.ok.gov/conservation/Agency_Divisions/Water_Quality_Division/index.html)



## Water Quality Division

The Oklahoma Conservation Commission's Water Quality Division is responsible for identifying waters impaired by nonpoint source pollution, which is pollution that comes from multiple sources, such as pesticides, fertilizers, sediment, and animal waste. Once problems are identified, we work to prioritize and implement projects to reduce the pollutants and improve water quality. The map below shows the locations of streams we monitor. Click on a square on the map for a summary of the information collected on that particular stream. Visit our [monitoring page](#) to learn more about how and why we do stream assessments, and the types of data we collect.



**OKLAHOMA CONSERVATION COMMISSION**  
**Know Your Stream: Rotating Basin Site Summary**  
 Central Great Plains Level 3 Ecoregion  
 Caddo, Grady, McClain, and Garvin Counties

The Oklahoma Conservation Commission (OCC) has the primary responsibility of monitoring streams across the state in order to identify healthy streams as well as those which may be impaired by non-point source (NPS) pollution. NPS pollution is pollution which runs off the land from diffuse sources rather than being discharged from a specific source. If a stream is found to be impaired by NPS pollution, the OCC may be able to implement a voluntary cost-share program to address the identified problems; however, streams must be assessed in order to select best management practices necessary for improvement. The OCC's Rotating Basin Monitoring Program provides the tools to assess and then restore water quality in Oklahoma.

This leaflet gives a brief summary of the assessment results for the first cycle of the monitoring program for streams in Caddo, Grady, McClain, and Garvin Counties. The full report can be accessed online at [http://www.ok.gov/occp/oklahoma\\_water\\_quality/rotating\\_basin/2004/assessment\\_report](http://www.ok.gov/occp/oklahoma_water_quality/rotating_basin/2004/assessment_report) or by calling (800) 521-4500 and requesting a copy of the "Rotating Basin Year 1 Final Report."

OCC Rotating Basin monitoring sites within Caddo, Grady, McClain, and Garvin Counties (Central Great Plains ecoregion).

Through the Rotating Basin Program, two streams in Caddo Co., one stream in Grady Co., one stream in McClain Co., and two streams in Garvin Co. were sampled approximately every five weeks from June 2004-June 2006. Nineteen water quality parameters were measured or analyzed at each site visit. In addition, OCC staff conducted one fish and habitat assessment and up to four macroinvertebrate collections during this time. Summer samples were also analyzed for 2, nit and Enterococcus bacteria. Each site was compared to "high quality" streams in the ecoregion, streams known to have high quality fish populations, benthic macroinvertebrate populations, nitrate and nitrite bacteria, and water quality. All of the data collected has been distilled into a few key components in order to produce an index score of general overall stream health, shown on the next page.

Summary of general stream health as determined by comparison to high quality streams in the Central Great Plains ecoregion and by assessment using Oklahoma State Water Quality Standards\*.

	Good			Moderate			Poor
	Rank Creek	Fremont Creek	Finn Creek	Cobb Creek	Washington Creek	Isoline Creek	
<b>Overall Stream Health</b>	40	48	38	38	32	26	
Phosphorus	3	3	3	3	3	3	5
Nitrogen	3	3	3	3	3	3	3
Ammonia	3	3	3	3	3	3	3
Dissolved Oxygen	3	3	3	3	3	3	3
pH	3	3	3	3	3	3	3
Turbidity	3	3	3	3	3	3	3
Salts (nitrate, sulfate, TDS)	3	3	3	3	3	3	3
Fish	3	3	3	3	3	3	3
Macroinvertebrates	3	3	3	3	3	3	3
Stream Benthic Habitat	3	3	3	3	3	3	3
Bacteria	3	3	3	3	3	3	3

*Scale of 1-5 with 1 being the best*

KEY: 1=manifestly lower than high quality sites  
 2=not as good as high quality sites but not impaired  
 3=equal to or better than high quality sites in the area  
 4=impaired by one standard  
 5=impaired by two standards

**Cobb Creek (OK31083-06-0050):** This stream is on the state's 303(d) list\* as impaired for ammonia and bacteria. The macroinvertebrate community is slightly impaired relative to high quality streams in the area. All other values were good.

**Finn Creek (OK310819-02-0020):** This stream is on the state's 303(d) list\* as impaired due to low dissolved oxygen and high bacteria levels. The phosphorus levels were higher than high quality sites in the ecoregion but not significantly so. All other values were good.

**Fremont Creek (OK310830-06-0080):** This stream is on the state's 303(d) list\* as impaired for bacteria. The fish community is not as robust as high quality streams in the area but is not impaired. All other values were good.

**Isoline Creek (OK310829-01-0100):** This stream is on the state's 303(d) list\* as impaired for sulfate, an indicator of high mineral content. In addition, the fish community does not meet state standards. The macroinvertebrate community is significantly different from high quality sites in the area. The stream has bacteria levels which are not impaired but are elevated.

**Rank Creek (OK310818-05-0010):** This stream is not impaired and is comparable to high quality sites in the ecoregion for all parameters except bacteria. While not impaired, the bacteria levels are elevated.

**Washington Creek (OK310810-01-0100):** This stream is on the state's 303(d) list\* as impaired for turbidity. The fish community was poor relative to high quality sites in the ecoregion, and the stream habitat was of moderate quality. The phosphorus and bacteria levels were higher than high quality sites in the ecoregion but not significantly so.

\* The state of Oklahoma (State Water Quality Standards) lists certain streams and, in 2003, results were described in the DEQ's 2003 Impaired Rivers, accessible online at [http://www.deq.state.ok.us/water/0303\\_2003\\_impaired\\_rivers\\_report\\_state\\_summary.pdf](http://www.deq.state.ok.us/water/0303_2003_impaired_rivers_report_state_summary.pdf)

**OKLAHOMA CONSERVATION COMMISSION**

**Medicine Creek**  
 County: Comanche  
 Waterbody ID: OK311300-04-0060H

Date Sampled: June 14, 2005

Fish Common Name	Total
Black bullhead catfish	3
Blacktail shiner	20
Bluegill sunfish	4
Central stoneroller	134
Golden redbreast	7
Green sunfish	1
Largemouth bass	7
Longear sunfish	35
Orangethroat darter	49
Sand shiner	74

Wichita

- **Type:** sitesumfishlist (id: sitesumfishlist.143):
  - sitename: Medicine Creek
  - wbid: OK311300-04-0060H
  - county: Comanche
  - latitude: 34.772
  - longitude: -98.58
  - sitesummar: <http://204.62.18.181/cgi/WQ/SiteSummaries/SiteSumComanche.pdf>
  - [Click Here for Site Summary](#)
  - fishlistpa: <http://204.62.18.181/cgi/WQ/FishLists/MedicineCreek.pdf>
  - [Click Here for Fish List](#)
  - basin\_cycl: 4\_1

# OCC Programs- Outreach



- NPS-focused WQ education for all ages
- Volunteer monitoring
  - Chemical, habitat, and biological monitoring
  - Monitors approx. 75 streams statewide
- Support for stakeholder groups
- Groundwater Screenings





# OCC Programs- Outreach



- Soil Health Education and outreach for Producers, Conservation Districts, etc.



- Field Days
- Demonstration Farms
- Demonstration Tools



# Implementation Projects: Locally-Led Cost-share Program

- Funding from Infrastructure Revolving Fund
- Statewide
- Each Conservation District receives an allocation based on:
  - demonstrated need
  - past performance
- Between \$1,000,000 and \$1,500,000 per year.
  - Districts receive av. \$11-\$17K /yr
- Focus primarily on water supply, brush management, pasture/range planting





# Implementation Projects: Priority

## Watershed Projects

- Funding from EPA CWA 319 and Infrastructure Revolving Fund
- Focused in Priority Watersheds
- Between \$1,500,000 and \$20,00,000 per project.
  - Participants receive ave. \$10,000 - \$20,000/contract
- Primary practices are conversion to no-till, riparian area protection, alternative water supplies, rotational grazing, and septic system replacement



# Questions?

- Steve Glasgow
- [Steven.glasgow@ok.usda.gov](mailto:Steven.glasgow@ok.usda.gov)
- 405-742-1235
- Shanon Phillips
- [Shanon.phillips@conservation.ok.gov](mailto:Shanon.phillips@conservation.ok.gov)
- 405-522-4728

