

# OKLAHOMA CONSERVATION COMMISSION ROTATING BASIN PROJECT MONITORING FOR SUCCESS

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Water Quality Division



# Oklahoma Conservation Commission Water Quality Division

- Technical lead for NPS pollution assessment and identification in OK
- Small to mid-sized, wadeable streams and rivers
- Started chemical and biological monitoring in 1989
- Started monitoring under Rotating Basin design in 2001

# 4 Stages in Rotating Basin Program:

- Ambient monitoring
- Diagnostic monitoring
- Implementation monitoring
- Success monitoring

# Oklahoma has a lot of water!

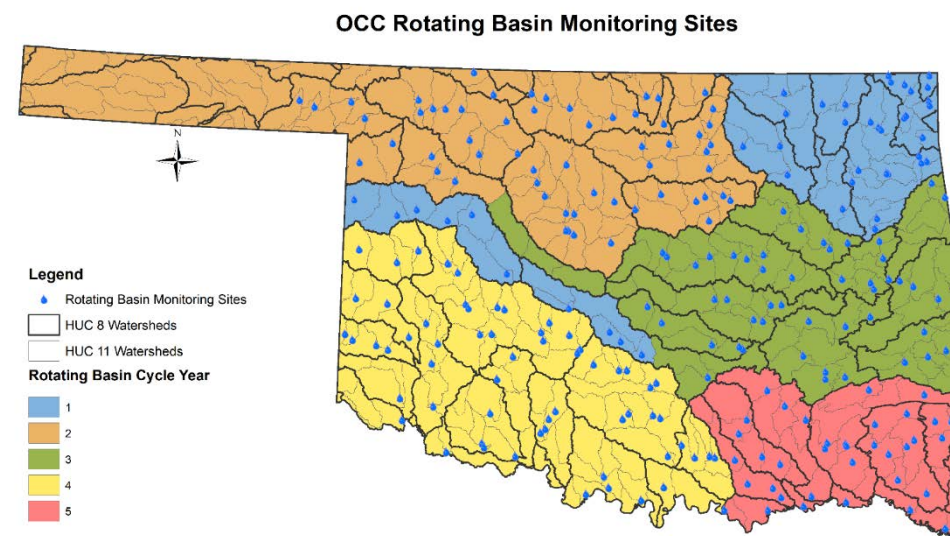
**79,000 miles** of perennial and intermittent streams/rivers





# Monitoring is the Critical Foundation to Success

- Monitor 250 small mostly perennial (3 – 5 order) streams across the state
- Monitor physical, chemical, and biological conditions on each site for 2 of every 5 years
- 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
- Funded significantly with EPA 319



# Monitoring Protocol: Physico-chemical Parameters

Every five weeks (ten times a year)

## ***In-situ*** parameters:

- water temperature
- dissolved oxygen
- pH
- specific conductance
- alkalinity
- hardness
- turbidity
- flow



# Monitoring Protocol: Physico-chemical Parameters

Every five weeks (ten times a year)

Lab parameters:

- nitrate, nitrite,  
total Kjeldahl nitrogen (TKN)
- orthophosphate,  
total phosphorus
- chloride, sulfate, TDS, TSS
- *E. coli* and ammonia  
(only during May through Sept. recreation season)





# Monitoring Protocol: Biological Parameters

## Macroinvertebrates

- Twice a year (once in winter, once in summer)
- All available habitats: riffle, vegetation, woody





# Monitoring Protocol: Biological Parameters

## Fish / Instream Habitat

- Once every cycle (~5 years)
- Electroshock and seine
- 400 meters, total
- 20 meter transects for habitat assessment

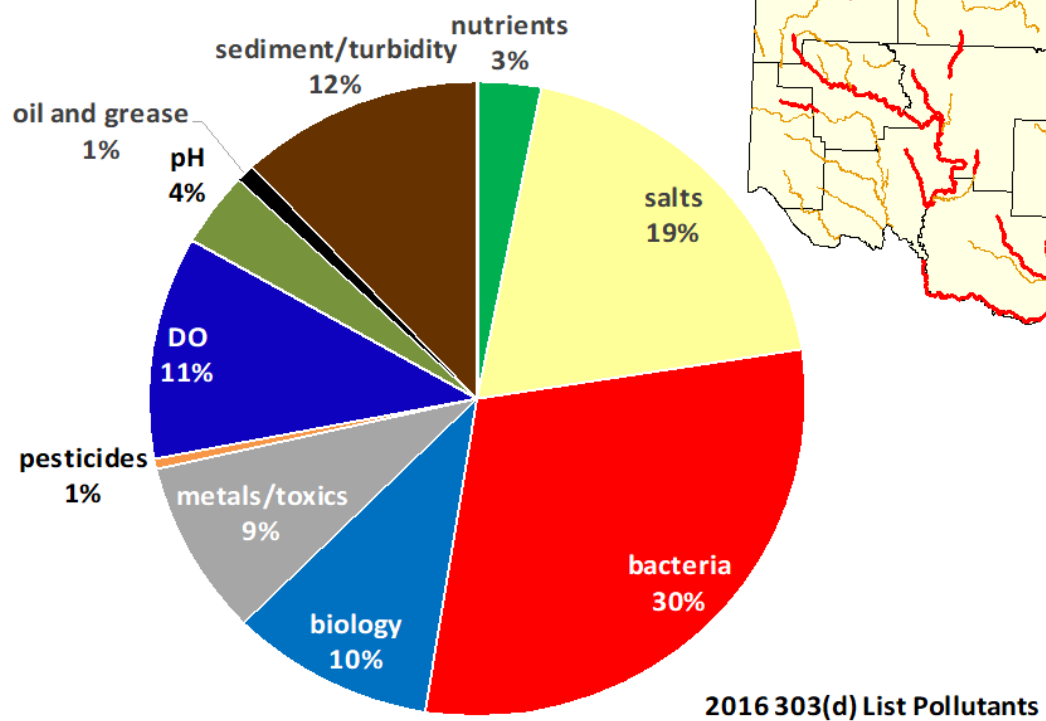
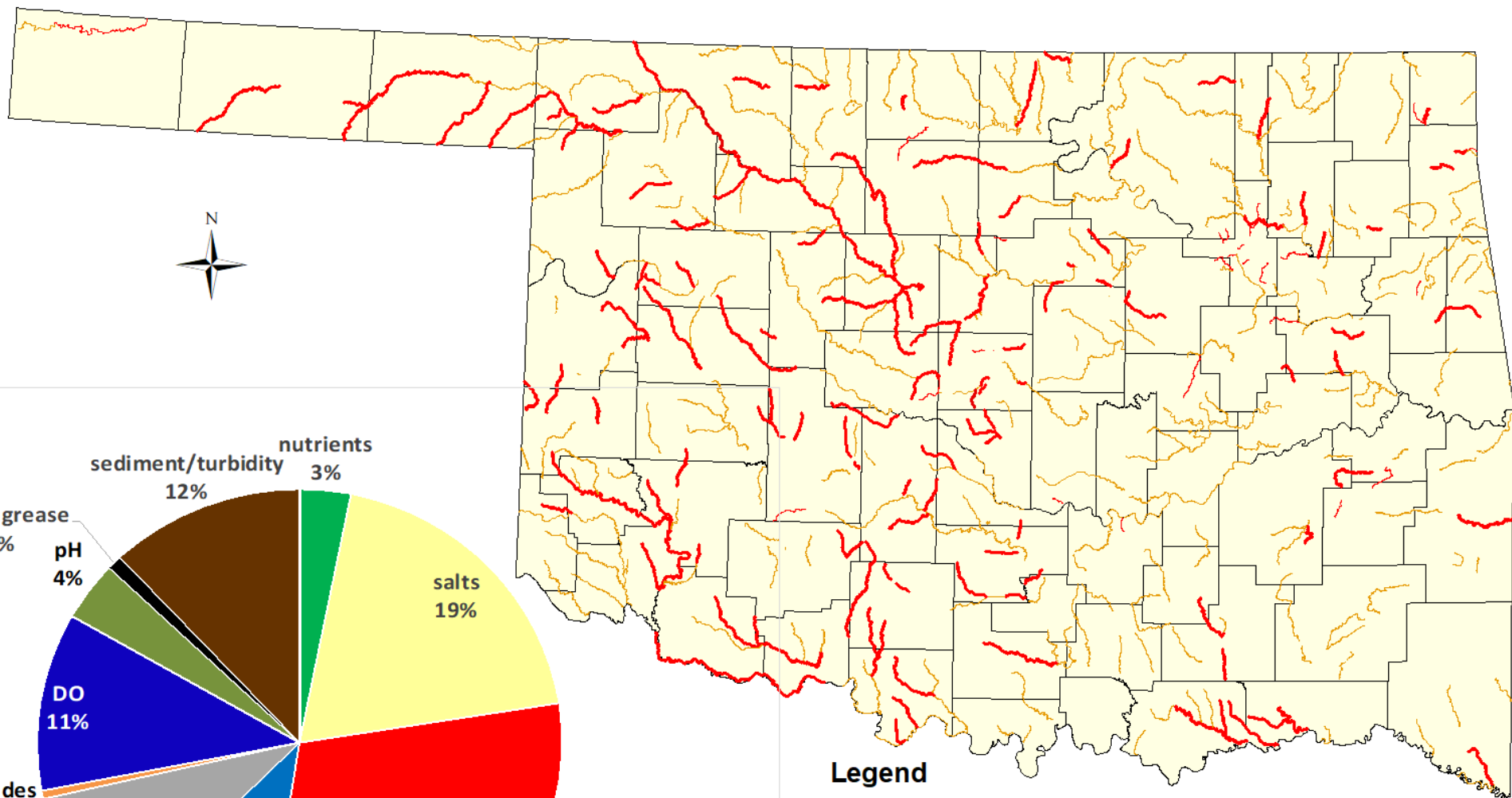


# What Do We Do With All This Data?

This data is used in concert with data collected by other state agencies, tribes and others in the state's Clean Water Act section 303(d) list (Integrated report)

The integrated report is prepared every other year in Oklahoma. It answers some of these questions:

- Are streams meeting their beneficial use assignments?
- Can we document a load reduction in pollutants?
- Have streams that showed improvement last cycle maintained those positive changes?
- Can the waterbody be delisted for anything new?

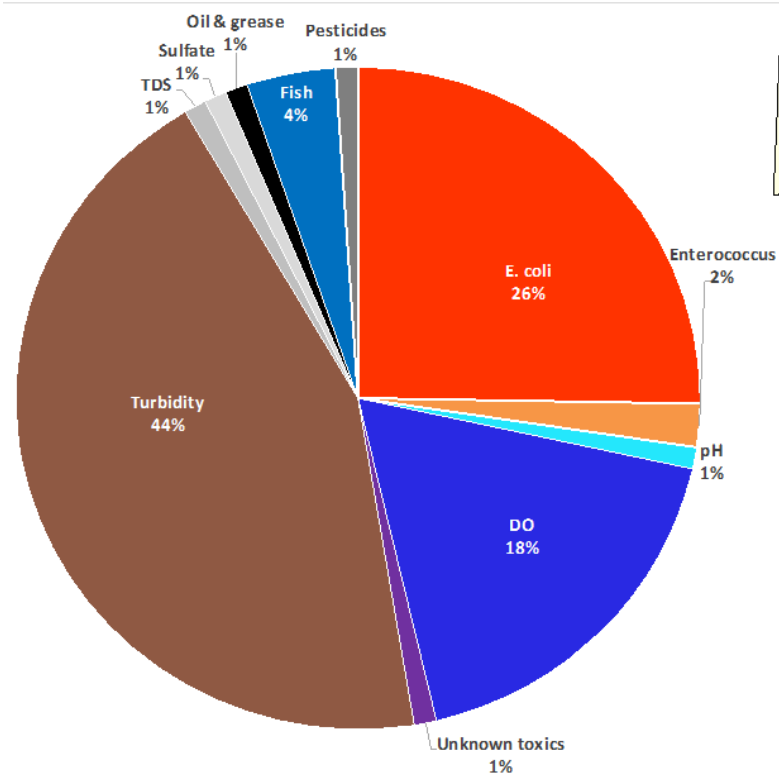
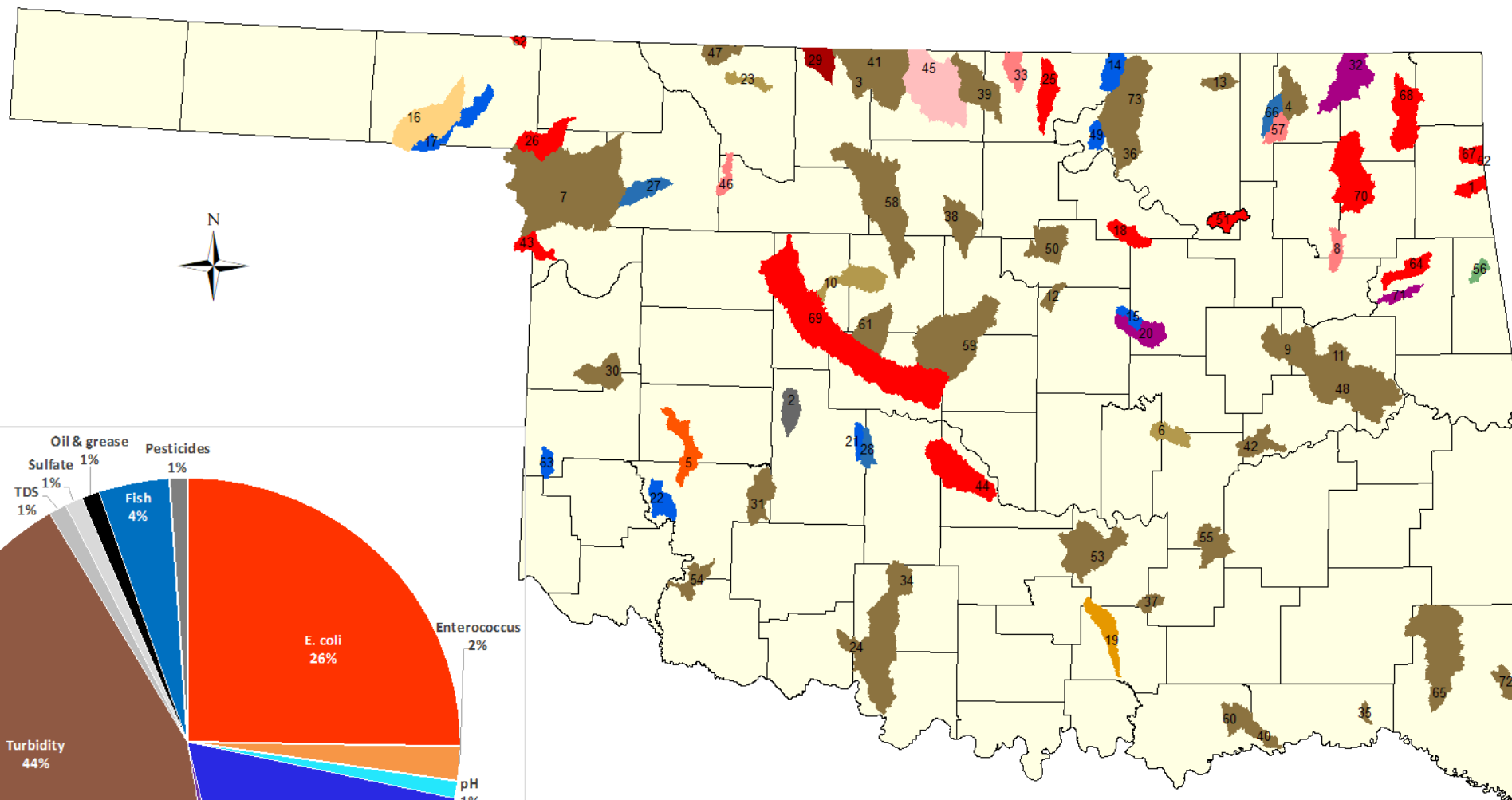


### Legend

#### 2016 303(d) List Bacteria Impairments

- E. coli
- Enterococcus
- E. coli and Enterococcus
- County Boundaries





### Delisted Parameters

#### Parameter

- DO
- E. coli
- E. coli, DO
- E. coli, DO, Oil and Grease

- E. coli, DO, Turbidity
- E. coli, Fish, Turbidity
- E. coli, Turbidity
- E. coli, pH, TDS, Sulfate
- Enterococcus
- Enterococcus, DO
- Fish
- Pesticides, Unknown toxicity
- Phosphorus
- Turbidity
- Turbidity, DO
- County Boundaries

# What Has Led to These Delistings/Successes?

- Not this:



# And Not This...



**Before we consider whether a delisting qualifies as a success story:**

- Must stay off the list for at least two cycles (generally means  $\geq 10$  years worth of data)- won't consider a story that compares a wet weather listing to a drier weather delisting
- Use current assessment method on listing data to determine whether it should have been listed
- Consider the types and amounts of conservation practices to ascertain whether they were likely sufficient to result in the improvement



# Implementation of Conservation Practices to Reduce Bacteria in Waterbodies

- Conservation practices were primarily designed and installed through USDA NRCS Farm Bill Conservation Programs like EQIP, CSP, etc.
- Average of 14 different practices
- Most common practices cover between 10 and 50% of watershed area but **average 13%**
- Hard-core practices (riparian area, continuous no-till) only happen in less than 1/2 of the watersheds
  - But, 26 of 26 watershed included alternative water sources for livestock and improved vegetative cover
- Project cost ranged from \$195K - \$4.8 million
  - Average cost was \$13.90 per acre



# Implementation of Conservation Practices to Reduce Bacteria in Waterbodies



- Top 5 Most Common Practices
  - Prescribed Grazing/Pasture Management- 26 of 26 watersheds
  - Nutrient Management- 24 of 26 watersheds
  - Forage and Biomass (Grass) Planting- 23 of 26 watersheds
  - Upland Wildlife Habitat Management- 22 of 26 watersheds
  - Conservation Crop Rotation and Watering Facilities (20 of 26 watersheds)
  - Fencing and Brush Management (19 of 26 watersheds)



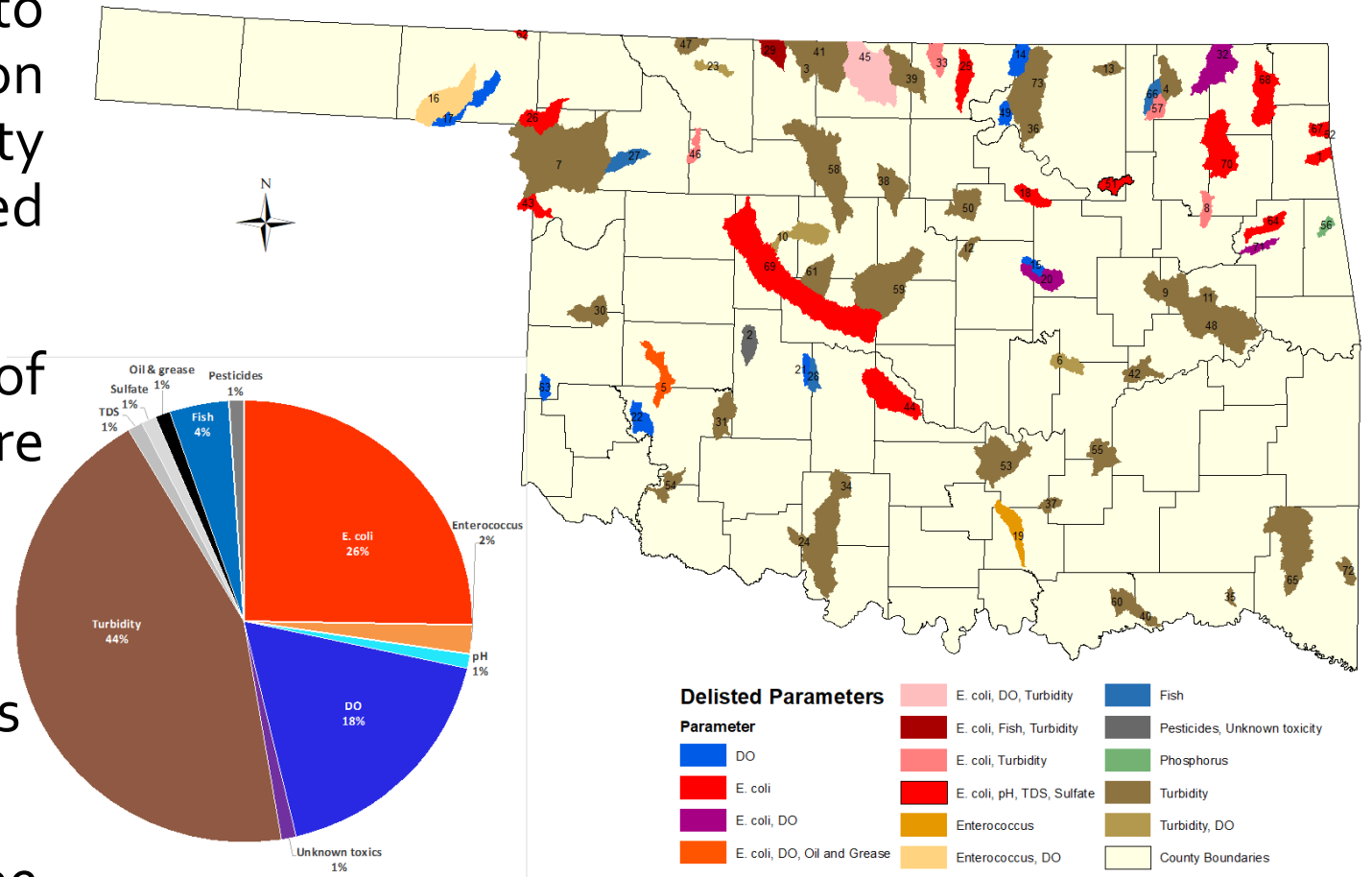
# Education and Community Involvement is a Critical Component of Success












# Impacts of Success Stories

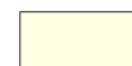
- Gives an opportunity for states to highlight where their restoration efforts have resulted in water quality improvements in NPS-impaired waterbodies
- Allows EPA to track the number of NPS-impaired waterbodies that are partially or fully restored
- New and expanded partnership
- Increase awareness on the WQ issues that we face in the state
- Cleaner water that is more likely to be fishable, swimmable, and drinkable

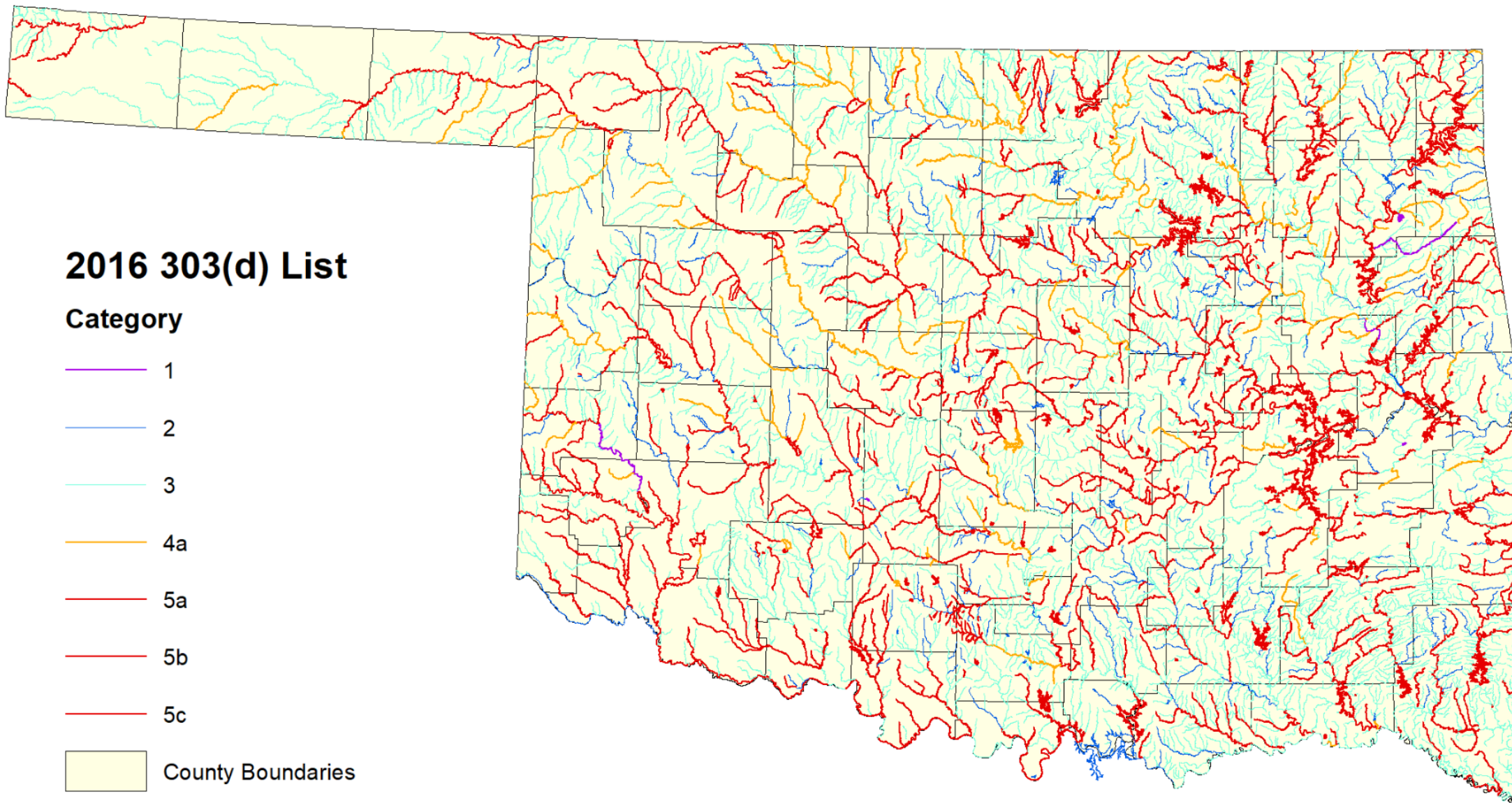


## 2016 303(d) List

### Category

-  1
-  2
-  3
-  4a
-  5a
-  5b
-  5c

 County Boundaries



# Acknowledging Some of Our Partners

- US Environmental Protection Agency (EPA)
- Funding through Clean Water Act §319 (US EPA) enables water quality monitoring within these areas.
- USDA - Natural Resources Conservation Service (NRCS).
- Local Conservation Districts.
- Our cooperating landowners.
- Along with our sister state agencies and tribal partners.



# Questions?



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