SAN ANTONIO RIVER AUTHORITY

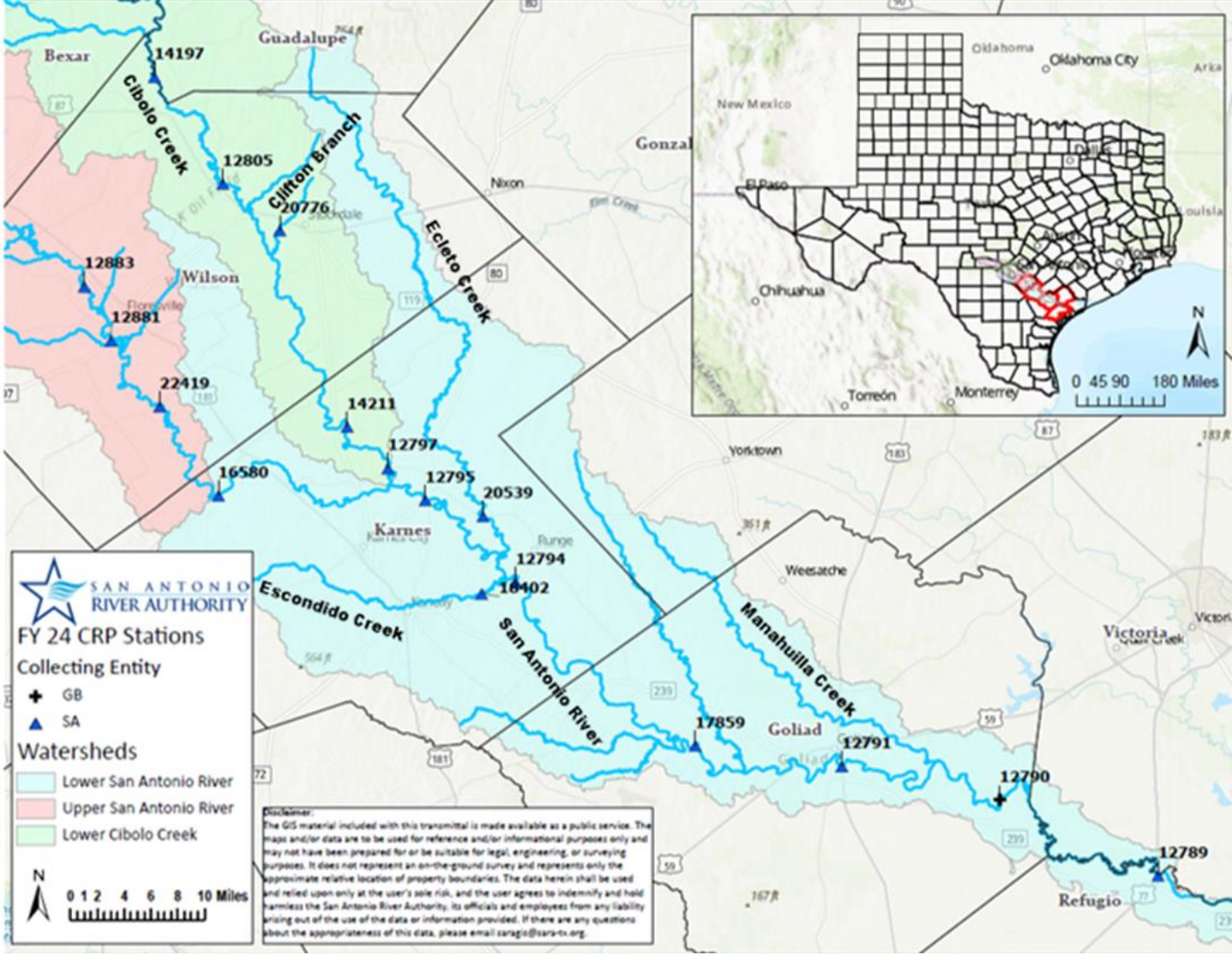
# Water Quality in the Southern Basin of the San Antonio River

June 14, 2024

# 2022 TCEQ Integrated Report Impairments in the Lower Basin

- Bacteria
- Dissolved Oxygen
- Fish Community

# Lower San Antonio River Basin



# Nutrients

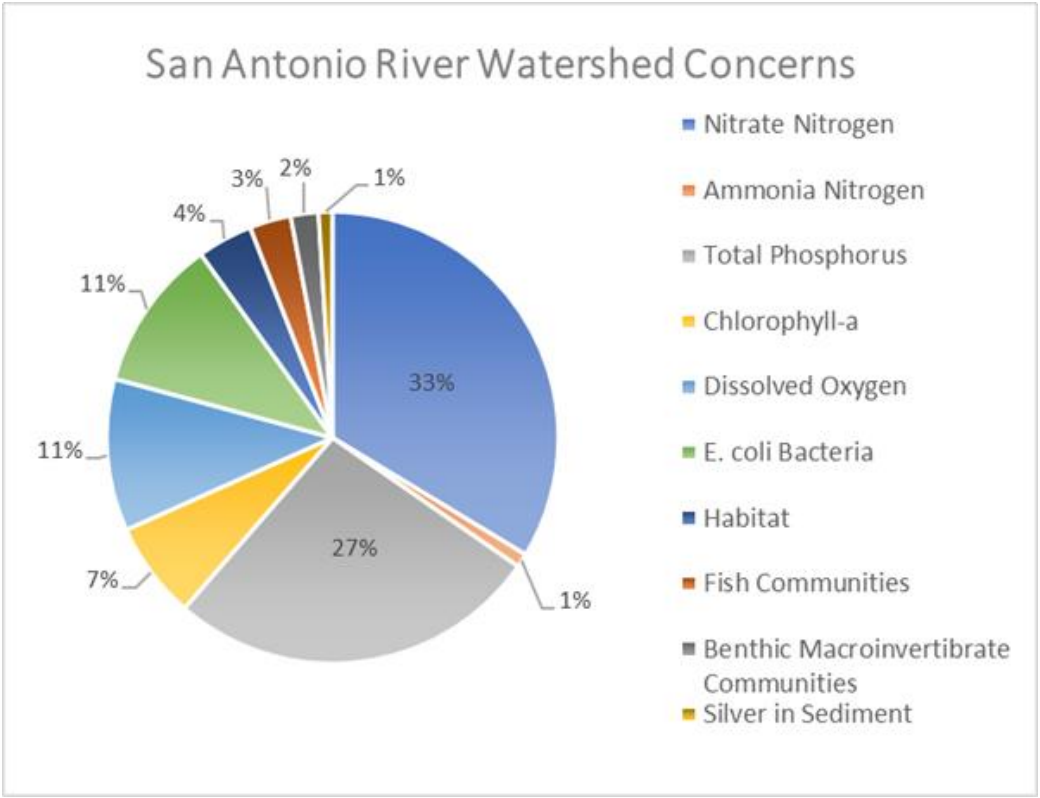
- Nutrients are essential for the growth of algae and aquatic plants which are an important source of food for numerous fish and aquatic bugs.
- The main nutrients of concern in streams are nitrogen and phosphorus.

# Nutrients

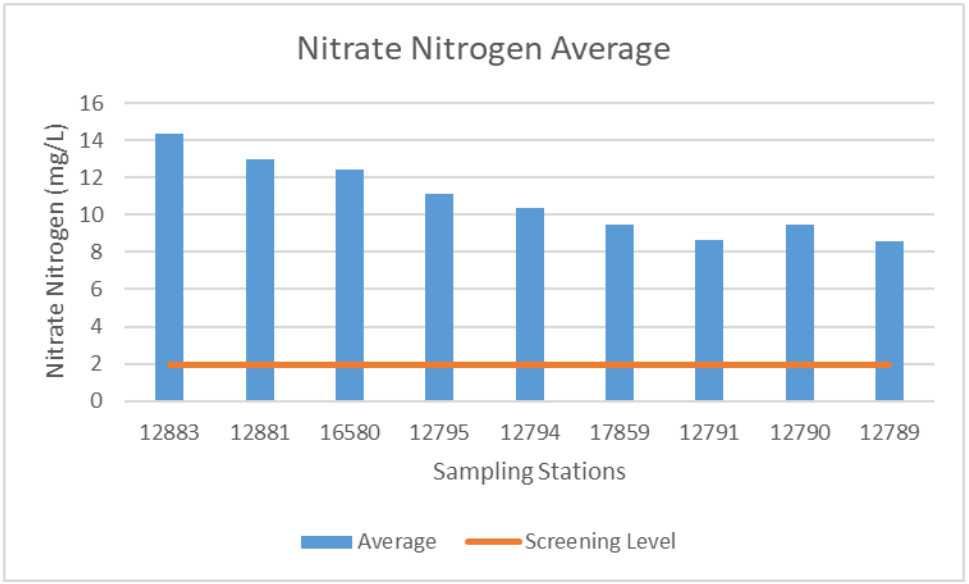
- An excess of nutrients can cause algae blooms and an overgrowth of aquatic plants. This can cause low dissolved oxygen levels in creeks and rivers.
- Blue-green algae (cyanobacteria) can produce toxins that cause illness or death for aquatic organisms, pets, livestock and wildlife. People can become seriously ill.

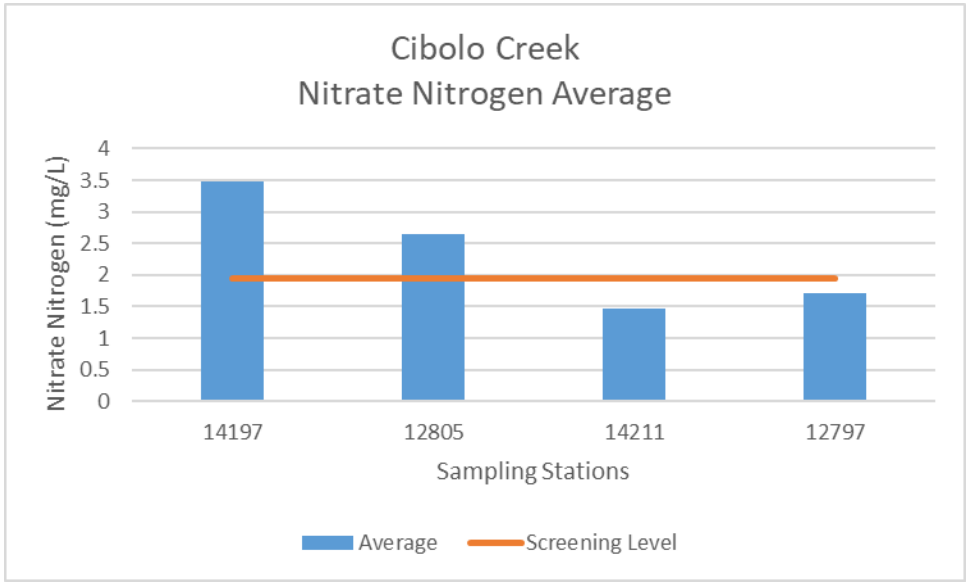
# Nutrients

- Nitrate nitrogen 33% of concerns
- Total phosphorus 27% of concerns

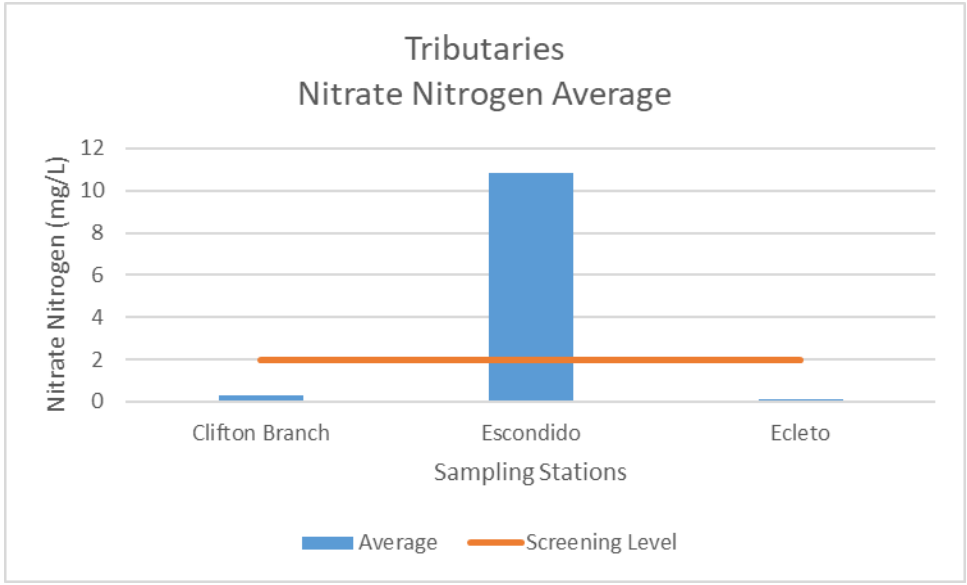


# Nutrients - Nitrate Nitrogen

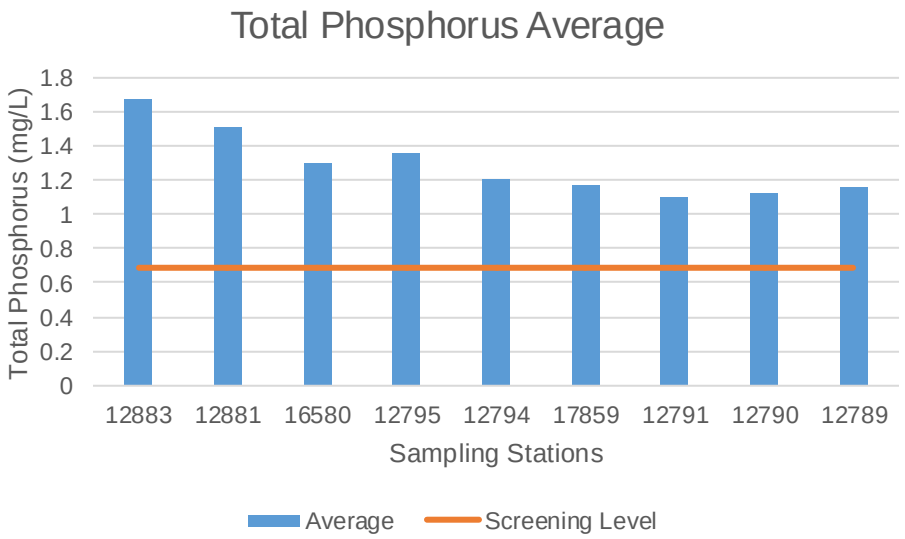


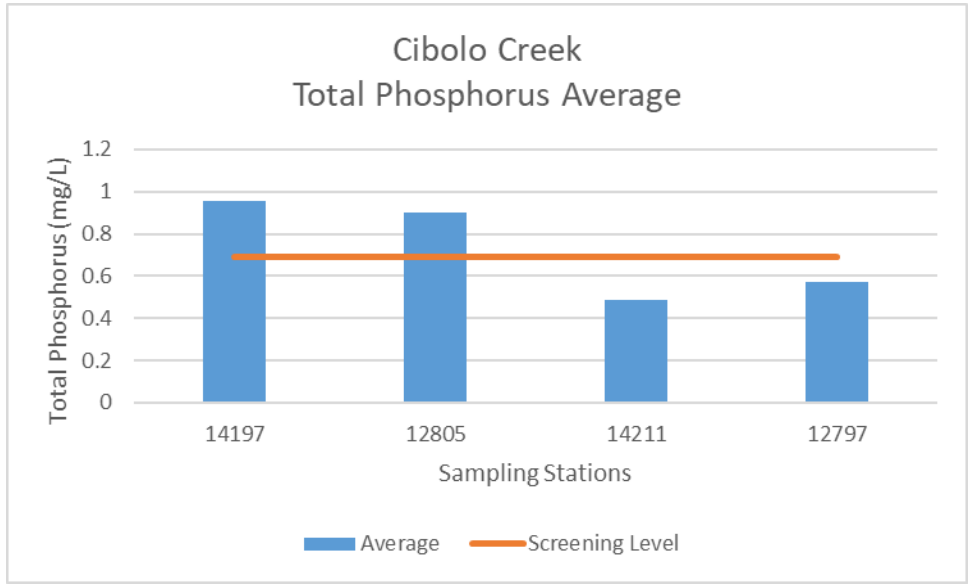



# Nutrients - Nitrate Nitrogen

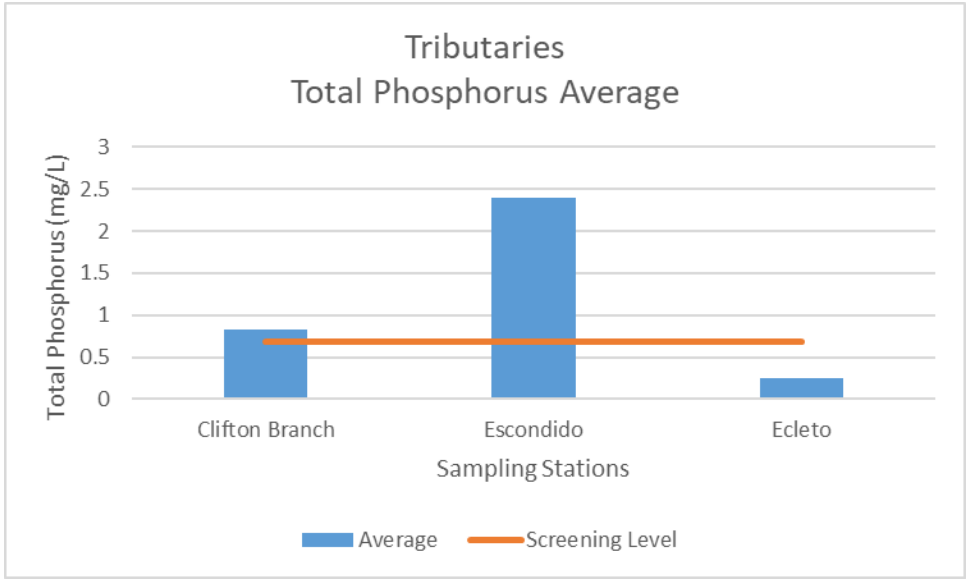


# Nutrients - Phosphorus



# Nutrients - Phosphorus

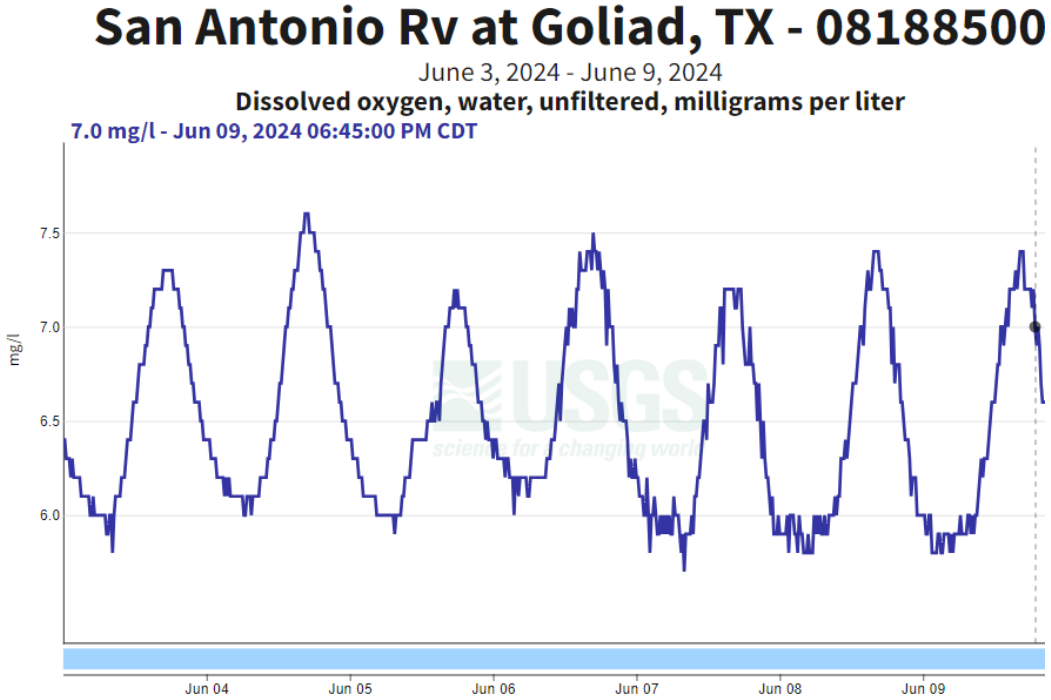


# Dissolved Oxygen

- Oxygen dissolves into water due to aquatic plants algae and contact with the air. It is essential for fish and other aquatic organisms.

# Dissolved Oxygen

- Photosynthesis
  - Takes in carbon dioxide
  - Gives off oxygen
- Respiration
  - Takes in oxygen
  - Gives off carbon dioxide




https://waterdata.usgs.gov/tx/nwis/current/?type=flow&group_key=basin_cd

# Dissolved Oxygen Plants and Algae

Algae Bloom (not from San Antonio River Basin)

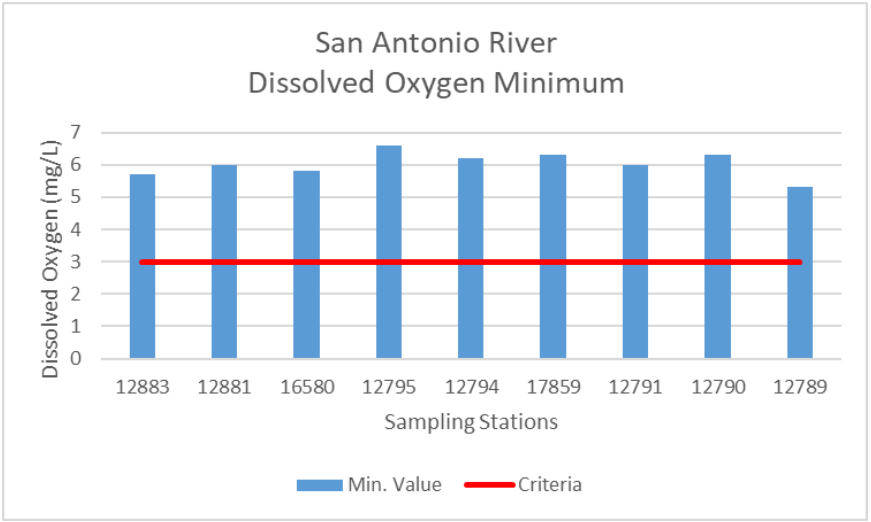
# Dissolved Oxygen
# Stormwater Runoff

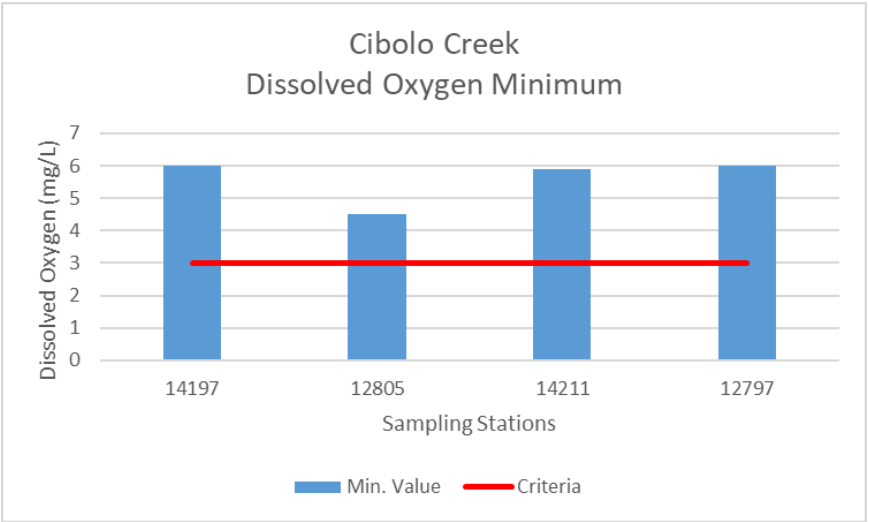
# Dissolved Oxygen Impairments

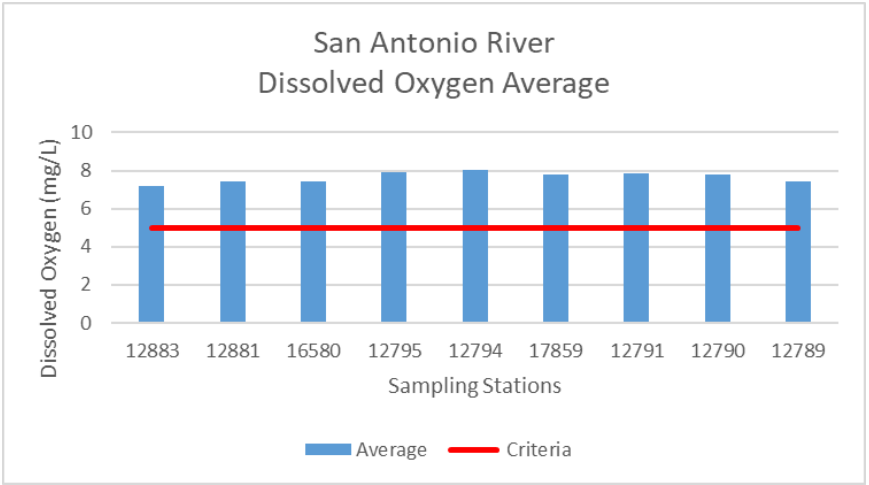
- Ecleto Creek and Picosa Creek (tributaries of the San Antonio River)
- Unnamed tributary of the San Antonio River in Wilson County has a concern for dissolved oxygen
- Clifton Branch (tributary of Cibolo Creek)

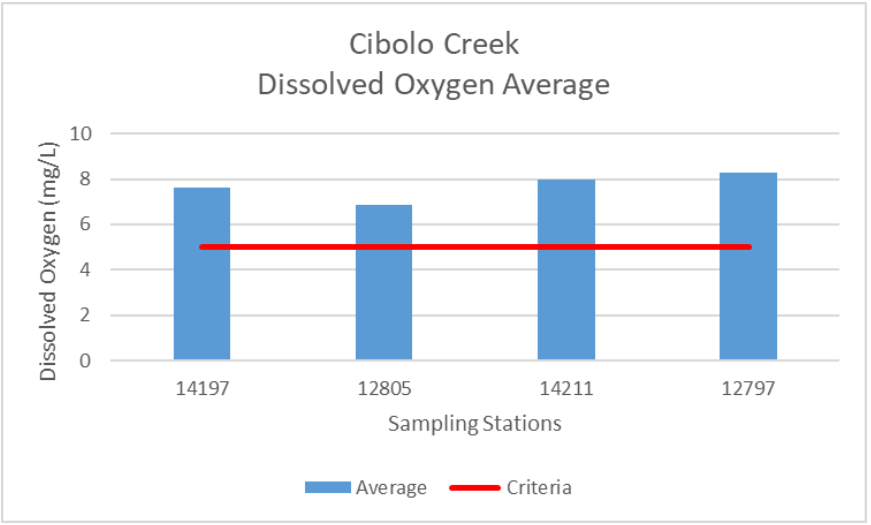
(San Antonio River and Cibolo Creek are currently meeting the standard for dissolved oxygen).

Data from the 2022 TCEQ Integrated Report



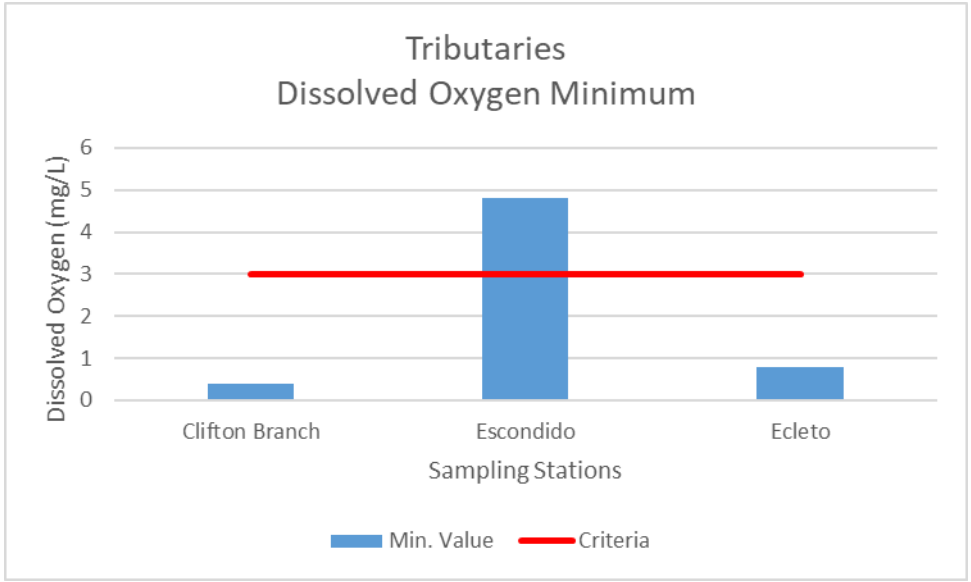



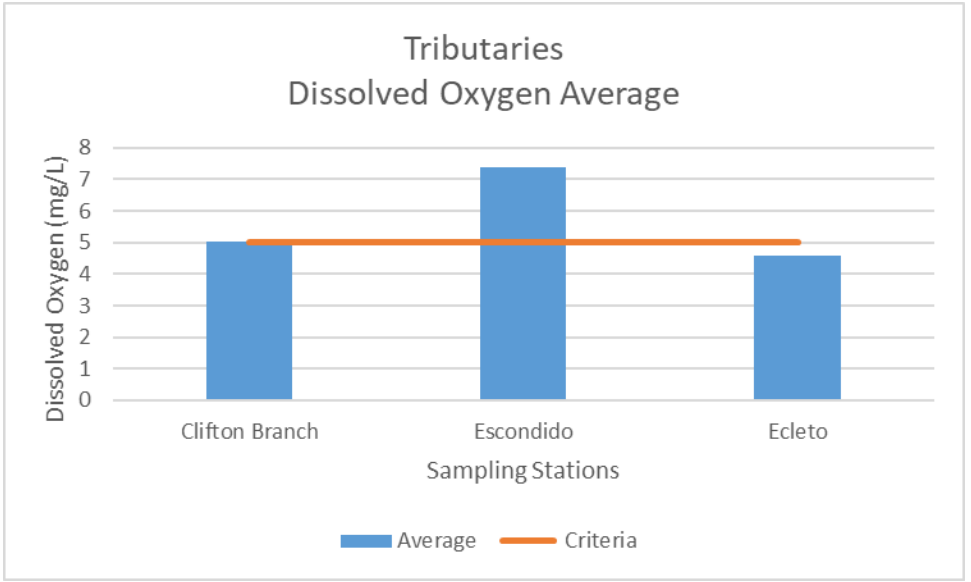




Data from the Clean Rivers Program 2019 - 2024

# Dissolved Oxygen




Data from the Clean Rivers Program 2019 - 2024

# Dissolved Oxygen

- Low dissolved oxygen kills aquatic organisms

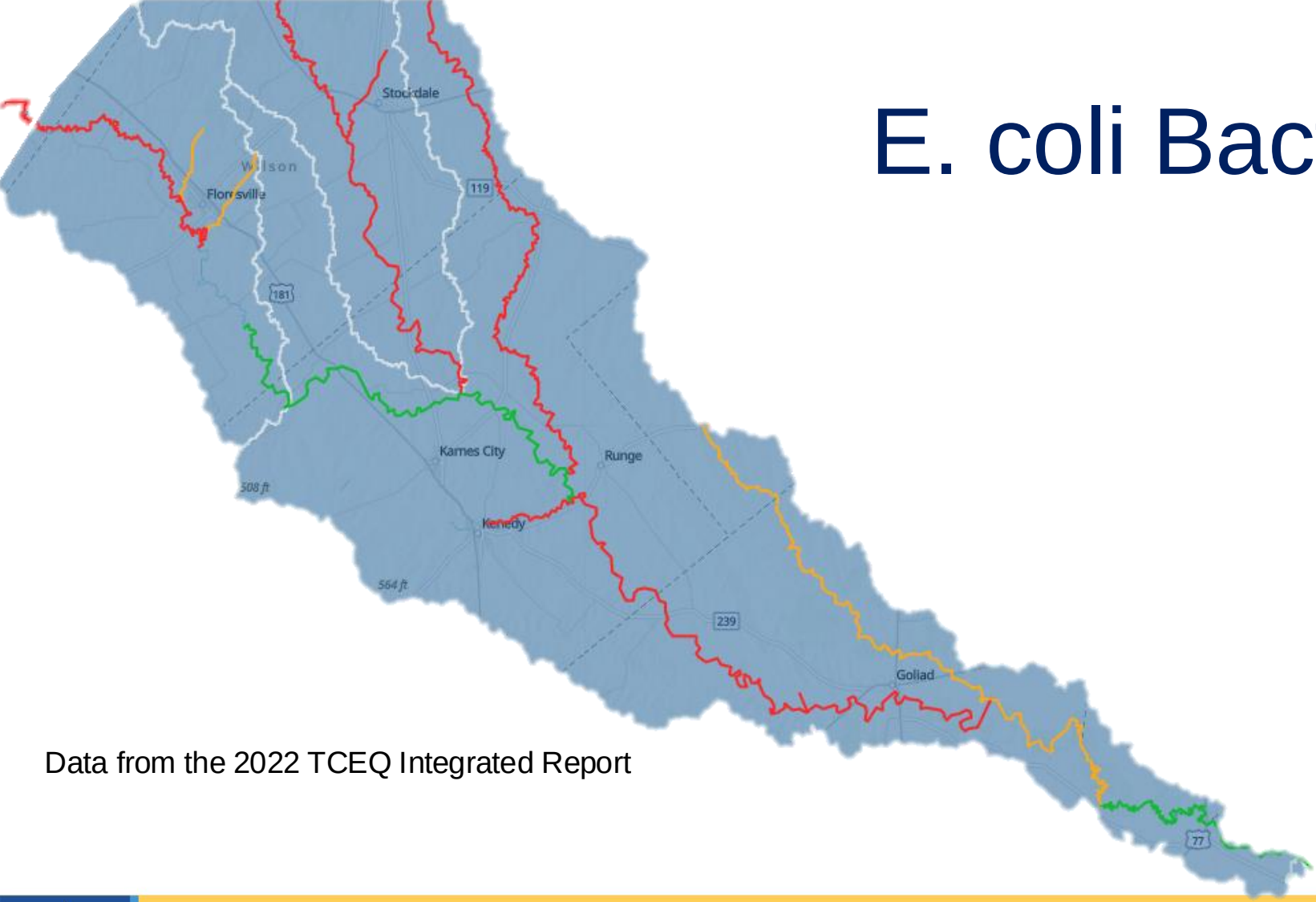
# *E. coli* Bacteria

- Escherichia coli (*E. coli*) naturally occurring bacteria that lives in the gastrointestinal tract of warm-blooded animals. It is commonly found in the feces of humans and animals. Most strains are harmless to humans.
- They are an indicator of recent fecal contamination.

# *E. coli* Bacteria Impairments

- Sections of the San Antonio River
- Picosa Creek
- Escondido Creek
- Cabeza Creek
- Ecleto Creek
- All of Cibolo Creek
- Clifton Branch

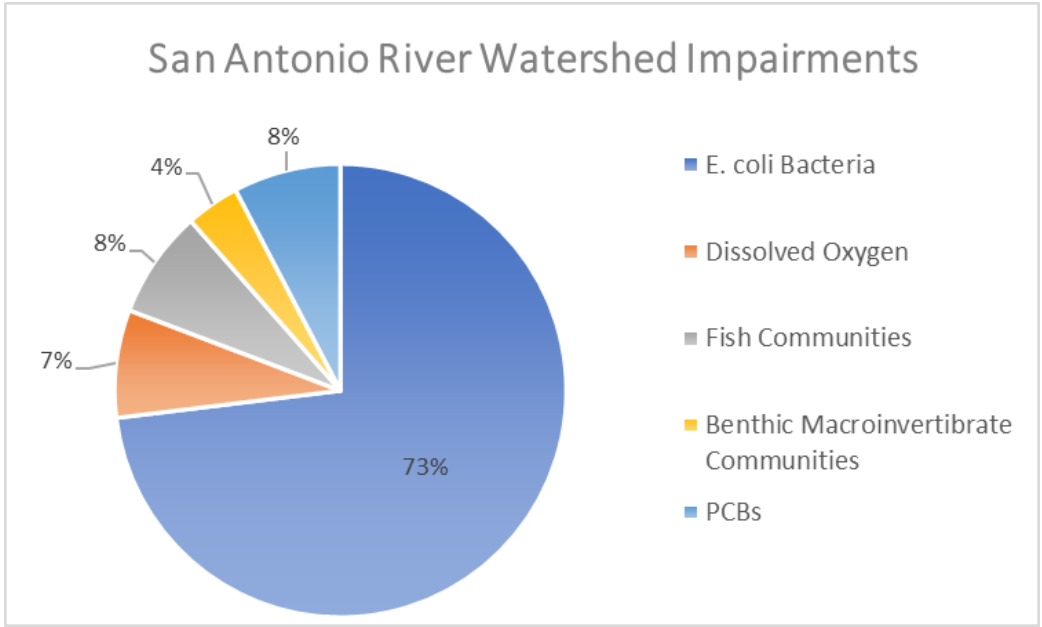
# E. coli Bacteria




Data from the 2022 TCEQ Integrated Report

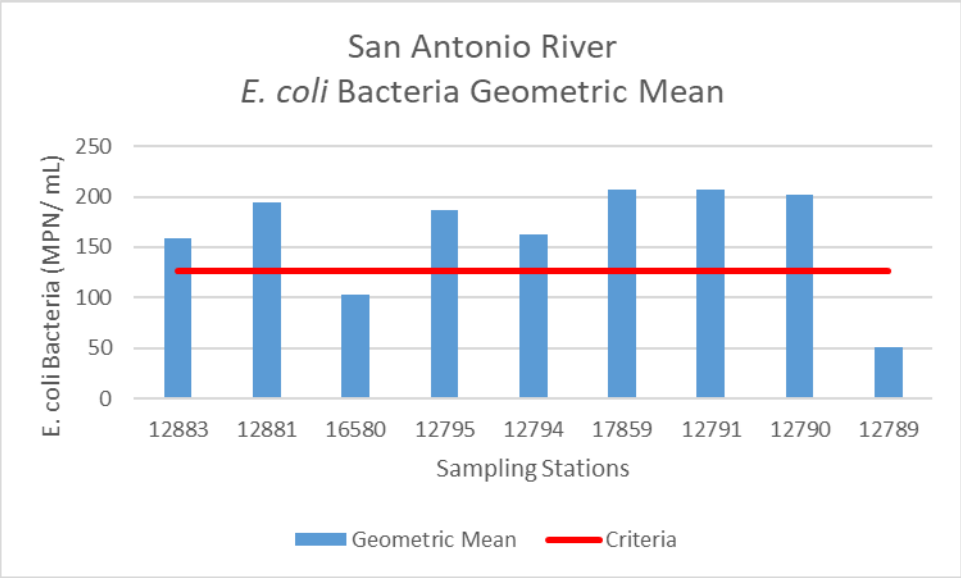
# *E. coli* Impairments

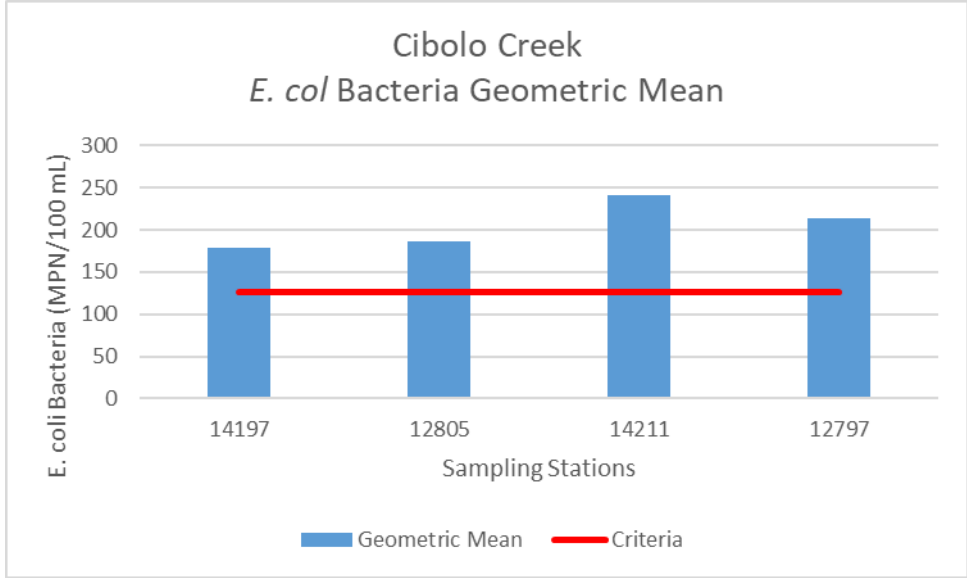
*E. coli* bacteria is the most common impairment in the San Antonio River basin




Data from the 2022 TCEQ Integrated Report

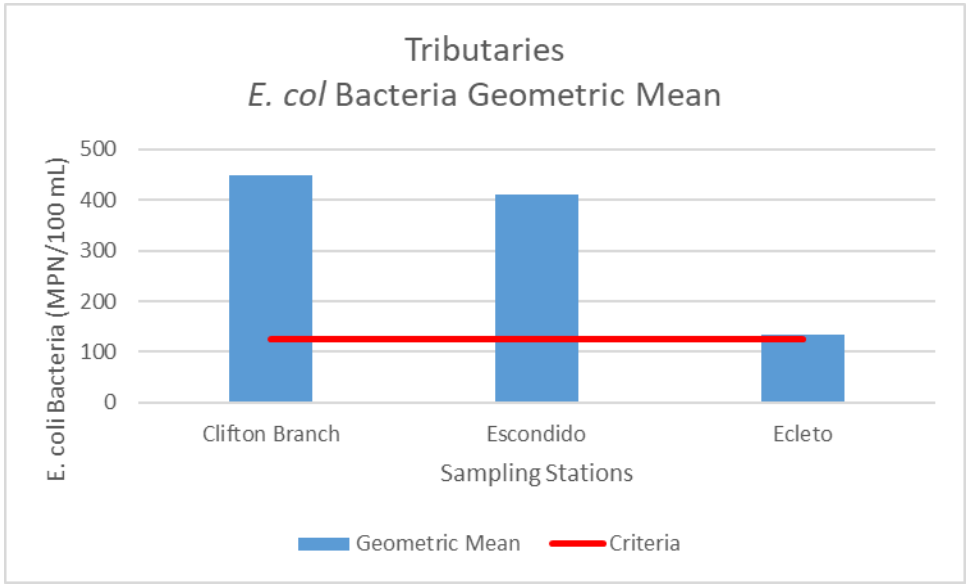
# *E. coli* Bacteria




Data from the Clean Rivers Program 2019 - 2024

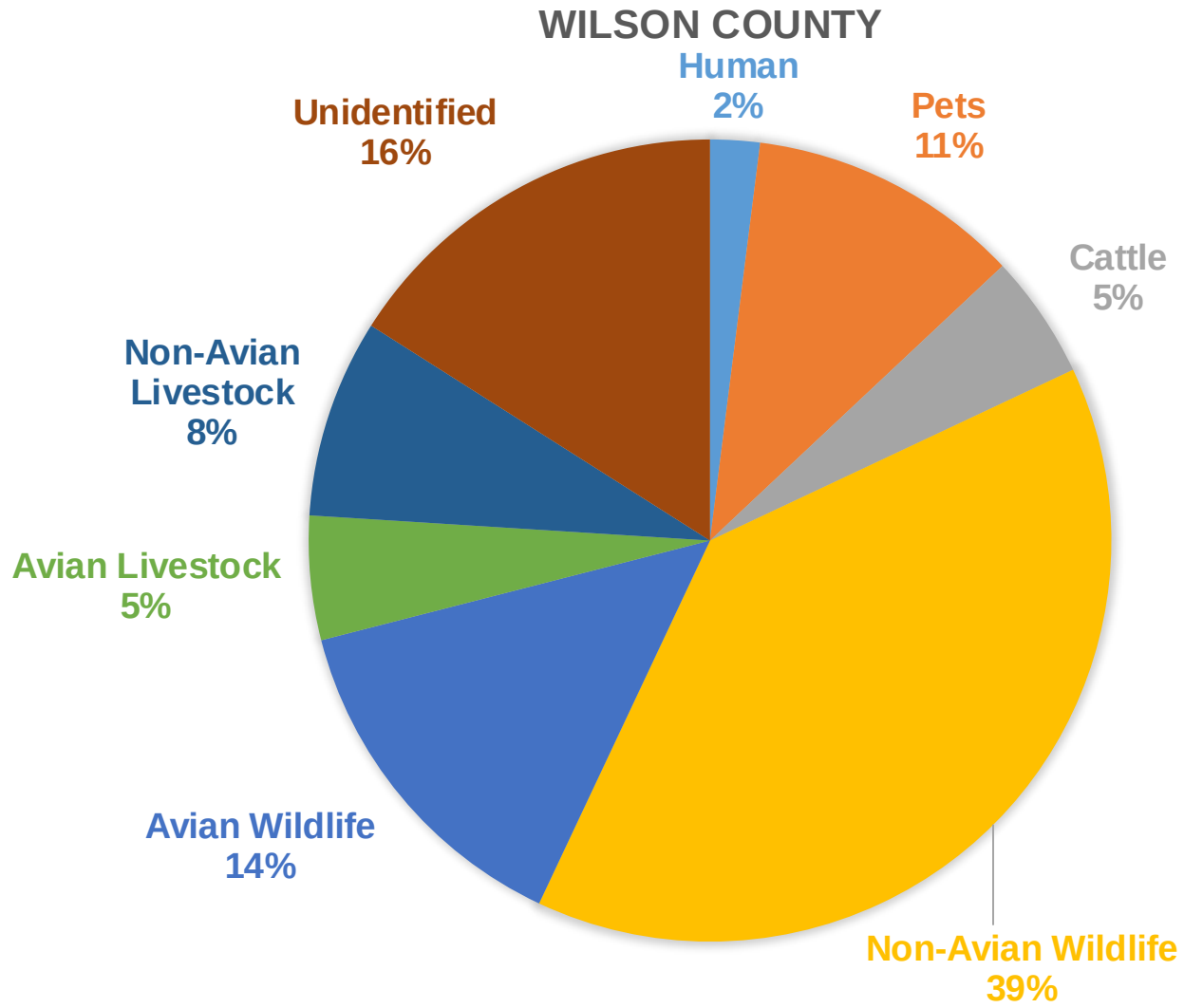
# *E. coli* Bacteria




Data from the Clean Rivers Program 2019 - 2024

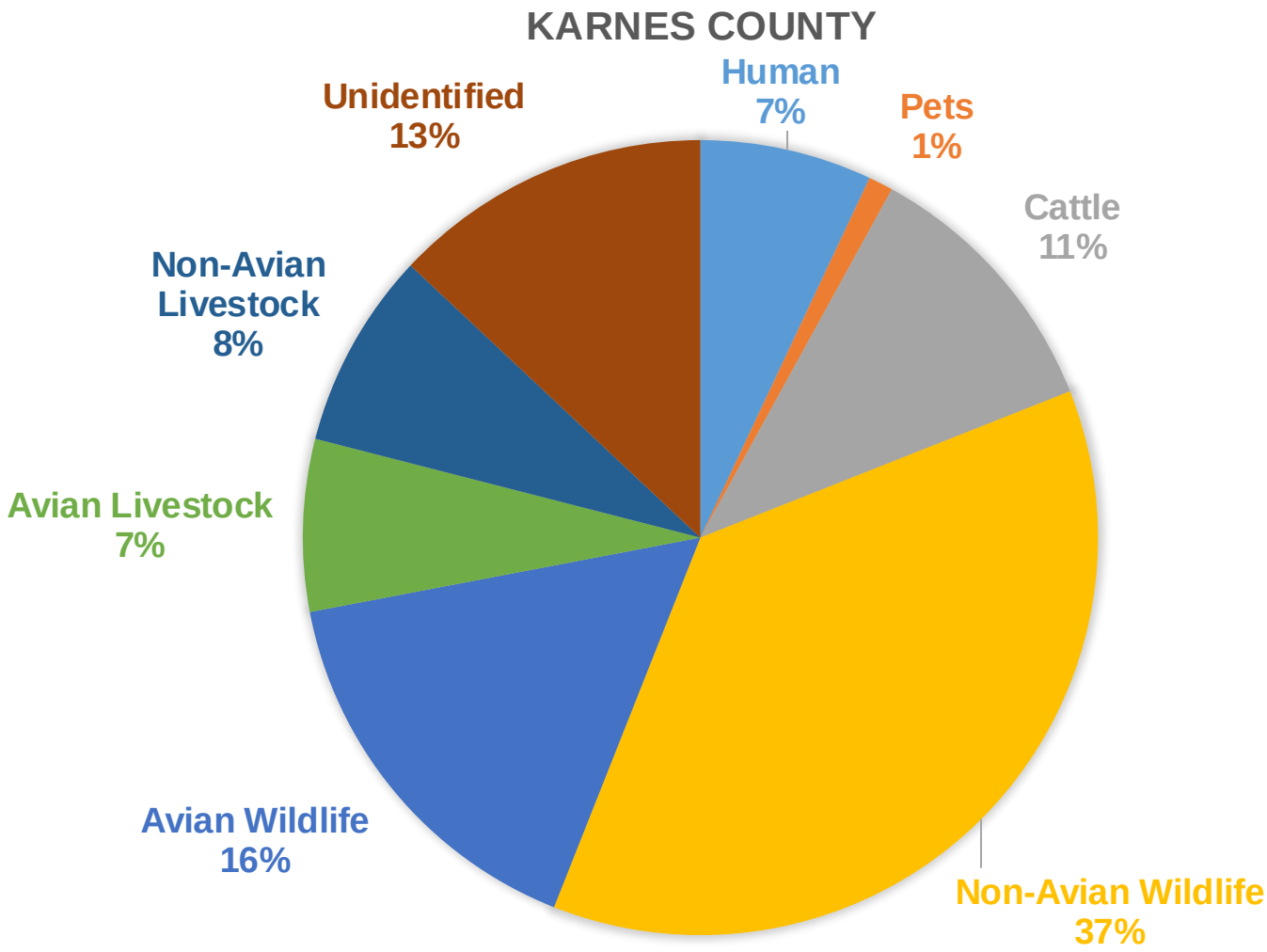
# Bacteria Source Tracking

53%
is wildlife



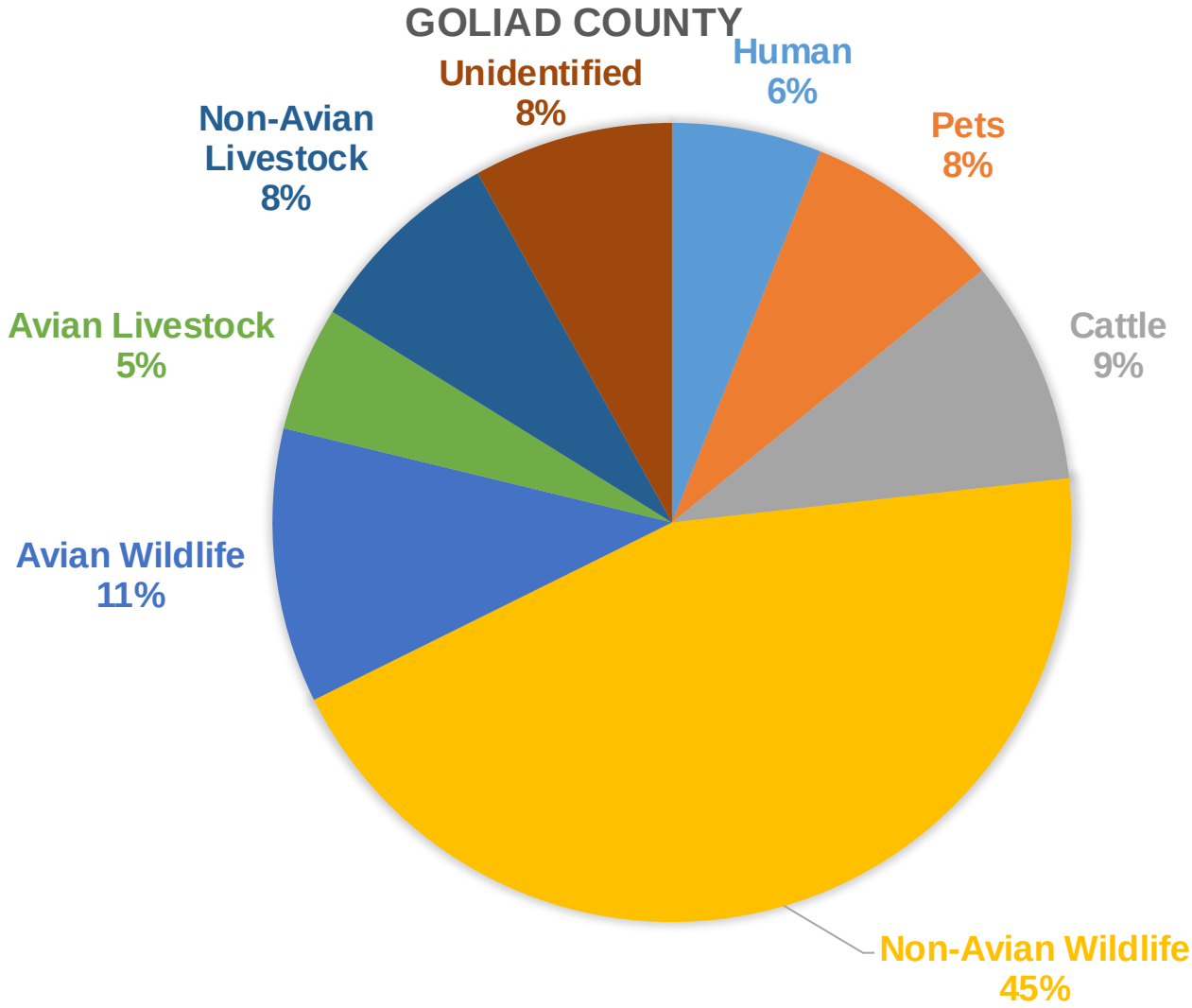
# Bacteria Source Tracking

53%
is wildlife



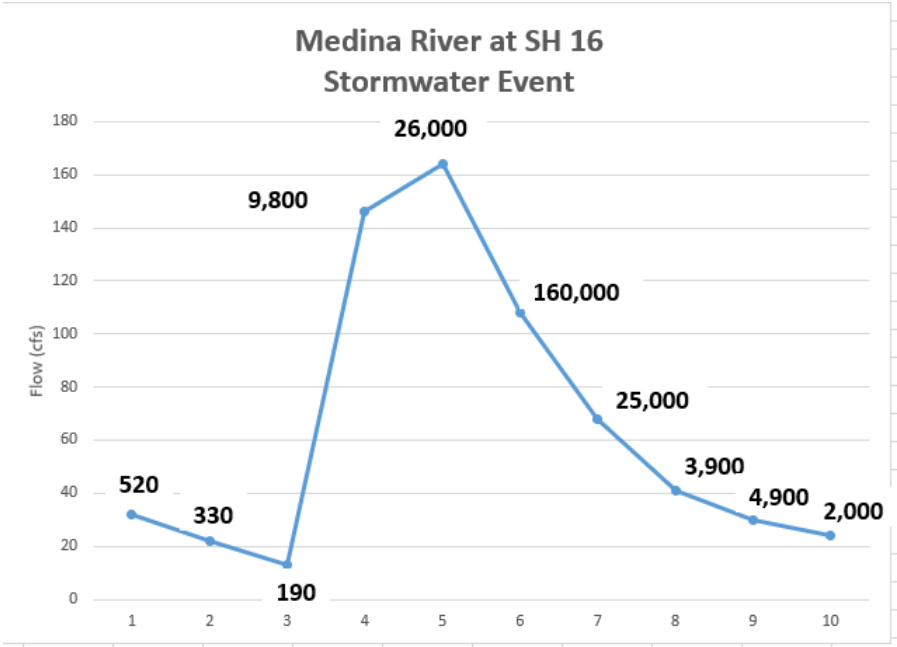
# Bacteria Source Tracking

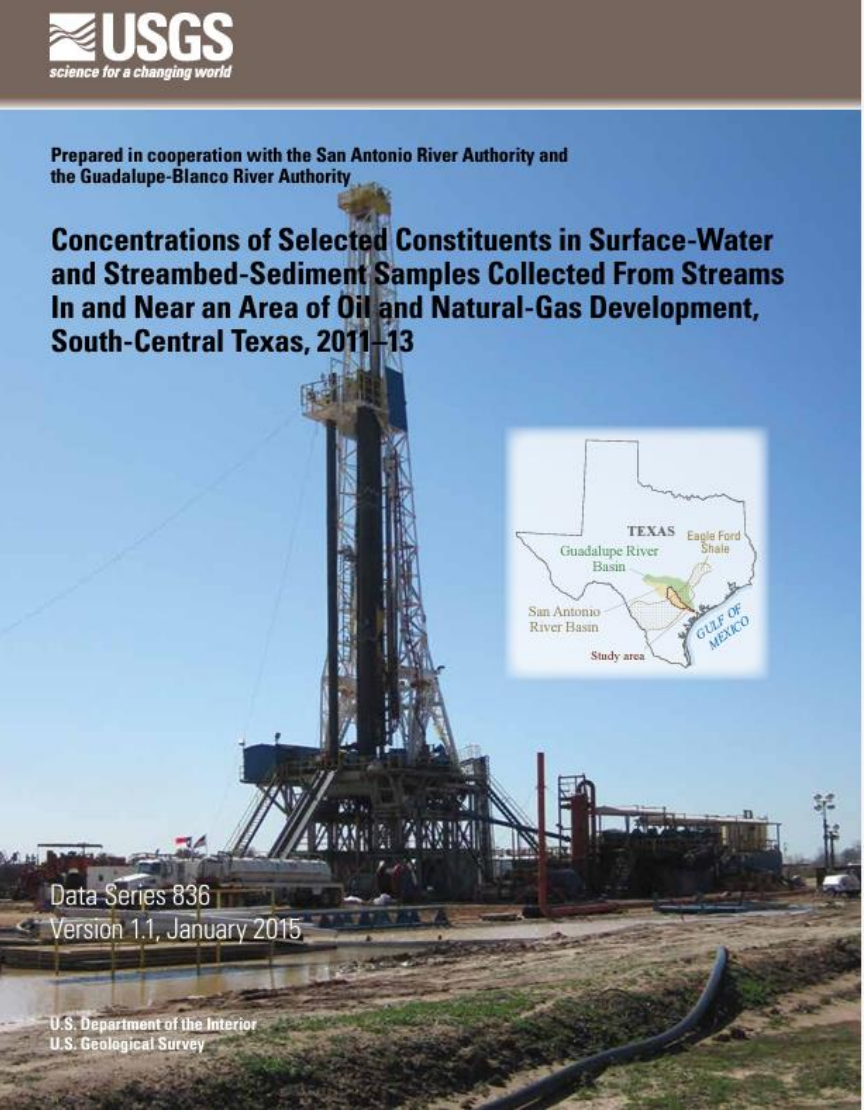
56%
is wildlife



# *E. coli* Impairments

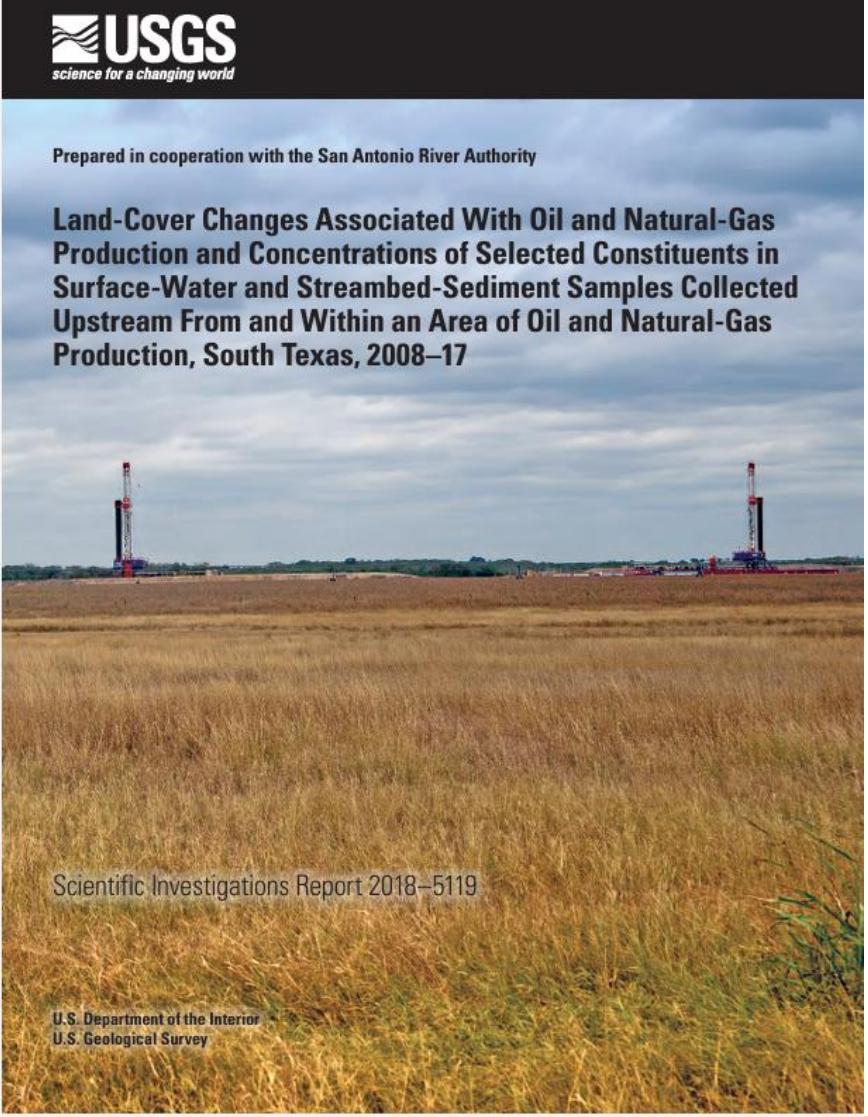
- Swimming related illnesses include diarrhea, skin rashes, swimmer's ear, pneumonia or flu-like illnesses.
- Don't swim if you think the water is under the influence of stormwater runoff.






# USGS Report

- Published in 2014
- Sponsored by SARA and GBRA
- https://pubs.usgs.gov/ds/836/




# USGS Report

- Published in 2018
- Sponsored by SARA
- https://pubs.usgs.gov/publication/sir20185119

# USGS Report 2018

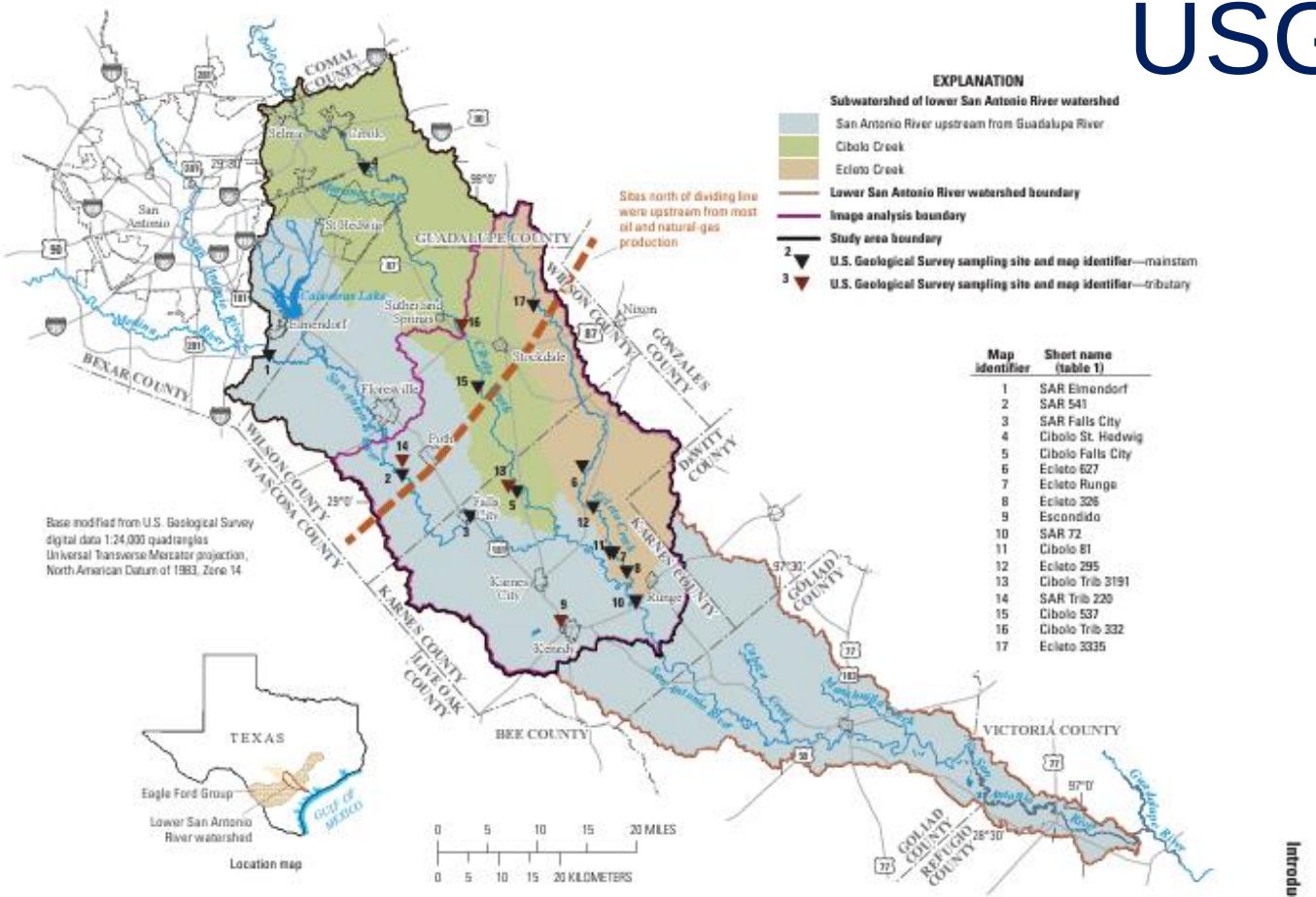



**Figure 1.** Location of surface-water and streambed-sediment sampling sites in the lower San Antonio River watershed, Texas, 2015–17.

# USGS Report 2018

- Impervious cover from well pads, oil and gas related features or roads increased from 201 to 5,390 acres from 2008 to 2015.

# USGS Report 2018

- All major elements, trace elements, semi-volatile organic compounds (SVOC) and volatile organic compounds (VOC) measured in surface water samples were detected at concentrations less that the EPA water quality standards.

# USGS Report 2018

- In general, the greatest SVOC and VOC values were found upstream of oil and gas production and downstream of urban areas.
- Glycols, are found in hydraulic fracking fluids were detected in one sample from Ecleto Creek, but glycols are used in other products not associated with oil and gas production.

# USGS Report 2018

- Ecleto Creek also had an elevated arsenic sample, but it was collected upstream of active oil and gas production.
- Polycyclic aromatic hydrocarbons (PAH) concentrations typically were greater in areas collected upstream of active oil and gas production.

# Questions?

Rebecca Reeves
rreeves@sara-tx.org