

# **FY2013 Basin Highlights Report & FY2014 Coordinated Monitoring**



## **RED RIVER BASIN ADVISORY COMMITTEE MEETING**



**MARCH 26, 2013 – WICHITA FALLS, TEXAS**

**ALLEN M. PAPPAS  
CLEAN RIVERS PROGRAM PROJECT MANAGER**

# Presentation Overview



- What is the Clean Rivers Program
- Surface Water Quality Data
- Water Quality Parameters
- Water Quality Monitoring in the Red River Basin
- FY2014 Monitoring Considerations
- Drought Implications
- Future Goals

# What is the Clean Rivers Program?



- A partnership between the TCEQ and regional water authorities to coordinate and conduct water quality monitoring, assessment, and stakeholder participation to improve the quality of surface water within each river basin in Texas

# Clean Rivers Program Objectives



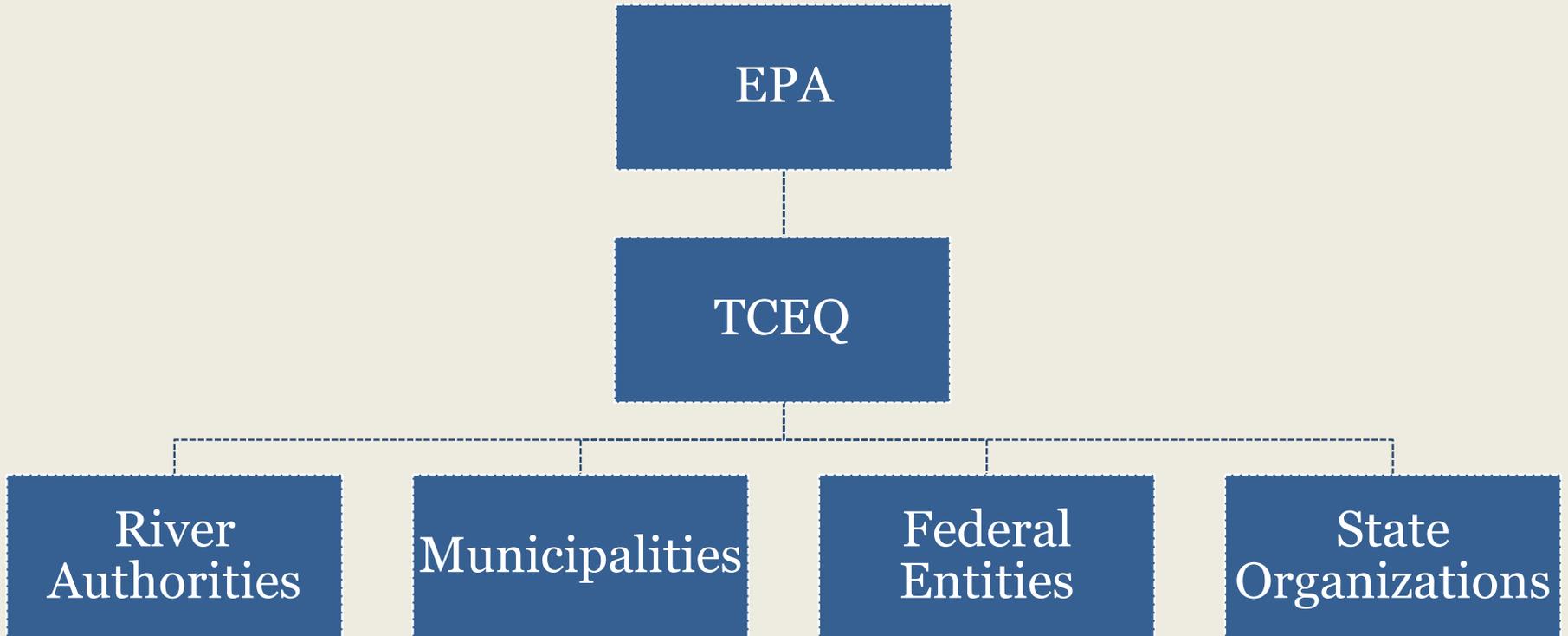
- Provide quality-assured data to the TCEQ for use in decision-making
- Identify and evaluate water quality issues
- Promote cooperative watershed planning
- Recommend management strategies
- Inform and engage stakeholders
- Maintain efficient use of public funds



# Red and Canadian River Basins Vicinity Map



# Surface Water Quality Data



# Water Quality Parameters



- Solids / Dissolved Solids
  - TSS / VSS / TDS / chloride / sulfate
- Nutrients
  - Ammonia / nitrate / total phosphorus / chlorophyll-*a*
- Bacteria
  - *E. coli* / *Enterococcus*
- Aquatic Health
  - Dissolved oxygen / pH

# Water Quality Monitoring in the Red River Basin



Entity	FY 2011	FY 2012	FY 2013	FY 2014*
RRA	33	52	64	67**
TCEQ	20	19	19	19
USGS	30	34	31	30
City of Sherman	7	7	9	9
North Texas MWD	N/A	8	7	7
<b>Total</b>	<b>90</b>	<b>120</b>	<b>130</b>	<b>132</b>

\* Proposed, CMM is March 27, 2013

\*\* SLOCS have been submitted to TCEQ to create three (3) new monitoring stations

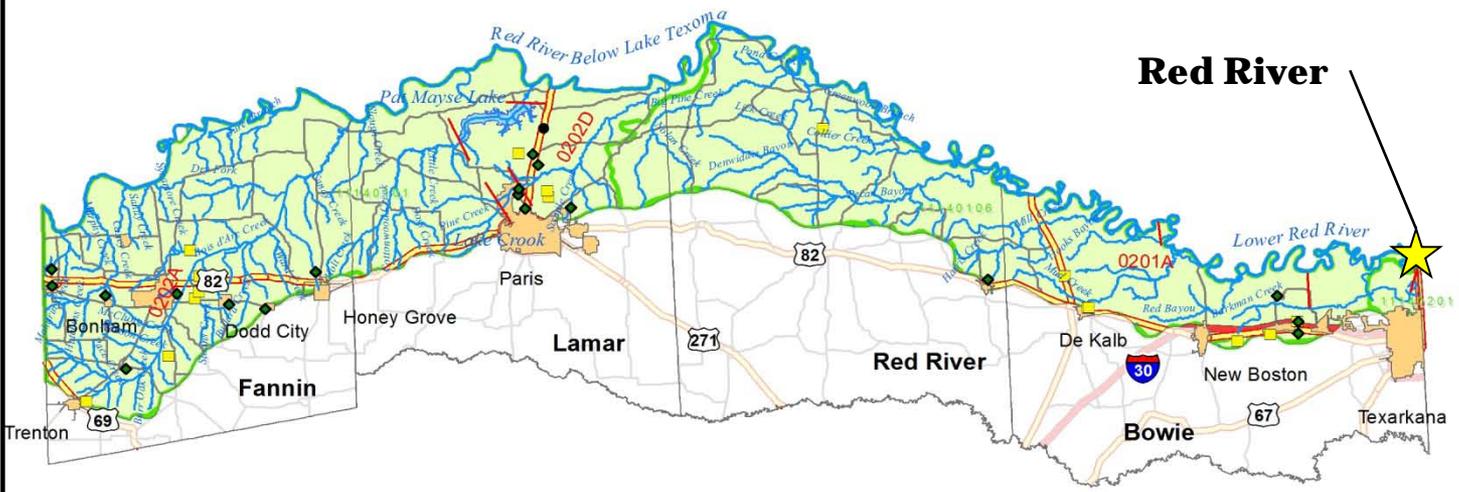
# Red Reach I Lower



- Lower Red River (0201)
  - No impairments
  - Chlorophyll-*a* concern
- Mud Creek (0201A)
- Red River Below Lake Texoma (0202)
- Bois D' Arc Creek (0202A)
- Pecan Bayou (0202C)
- Pine Creek (0202D)
- Smith Creek (0202G)
- Big Pine Creek (0202H)
- Little Pine Creek (0202I)
- Lake Crook (0208)
- Pay Mayse Lake (0209)



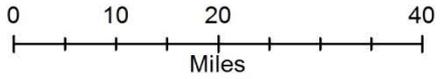
# Red River Basin Lower Reach I



Red River

**Legend**

- MSW / Landfills
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Lower Reach I



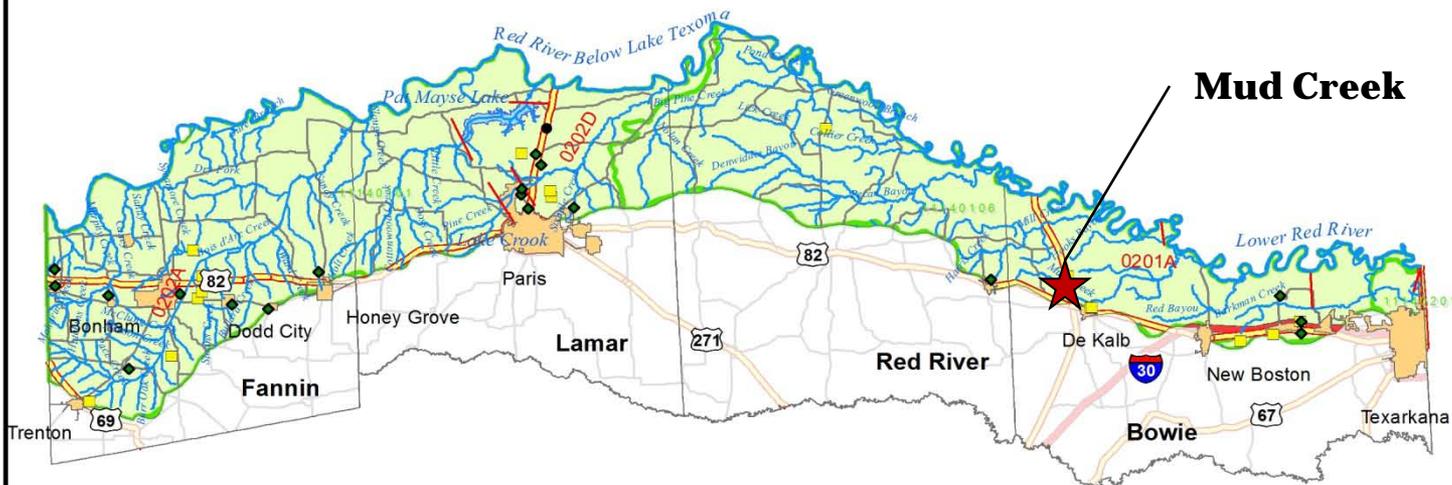
# Red Reach I Lower



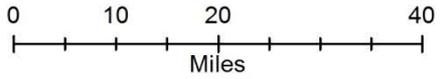
- Lower Red River (0201)
- Mud Creek (0201A)
  - Bacteria and depressed DO impairments
  - Ammonia, chlorophyll-*a* and depressed DO concerns
- Red River Below Lake Texoma (0202)
- Bois D' Arc Creek (0202A)
- Pecan Bayou (0202C)
- Pine Creek (0202D)
- Smith Creek (0202G)
- Big Pine Creek (0202H)
- Little Pine Creek (0202I)
- Lake Crook (0208)
- Pay Mayse Lake (0209)



# Red River Basin Lower Reach I



**Mud Creek**



**Legend**

- MSW / Landfills
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Lower Reach I

# Mud Creek at US 259



# Red Reach I Lower



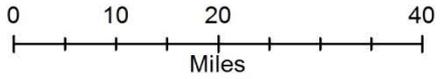
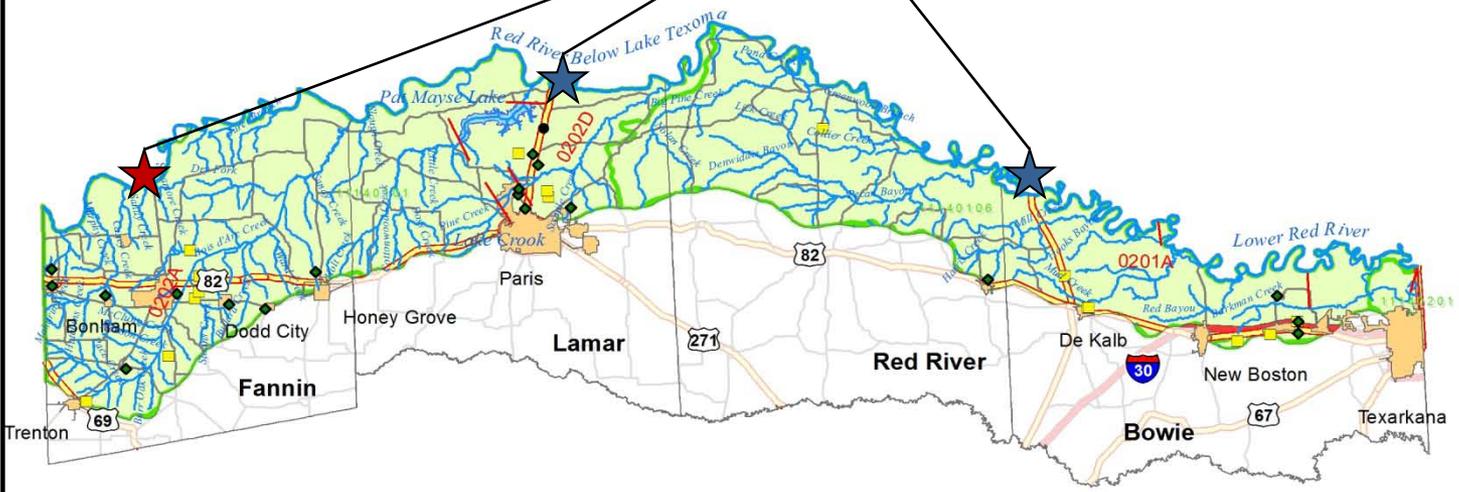
- Lower Red River (0201)
- Mud Creek (0201A)
- Red River Below Lake Texoma (0202)
  - No impairments
  - Chlorophyll-*a* concern
- Bois D' Arc Creek (0202A)
- Pecan Bayou (0202C)
- Pine Creek (0202D)
- Smith Creek (0202G)
- Big Pine Creek (0202H)
- Little Pine Creek (0202I)
- Lake Crook (0208)
- Pay Mayse Lake (0209)



# Red River Basin Lower Reach I



**Red River**



**Legend**

- MSW / Landfills
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Lower Reach I

# Red River at US 259



# Red River at US 271



# Red River at SH 78



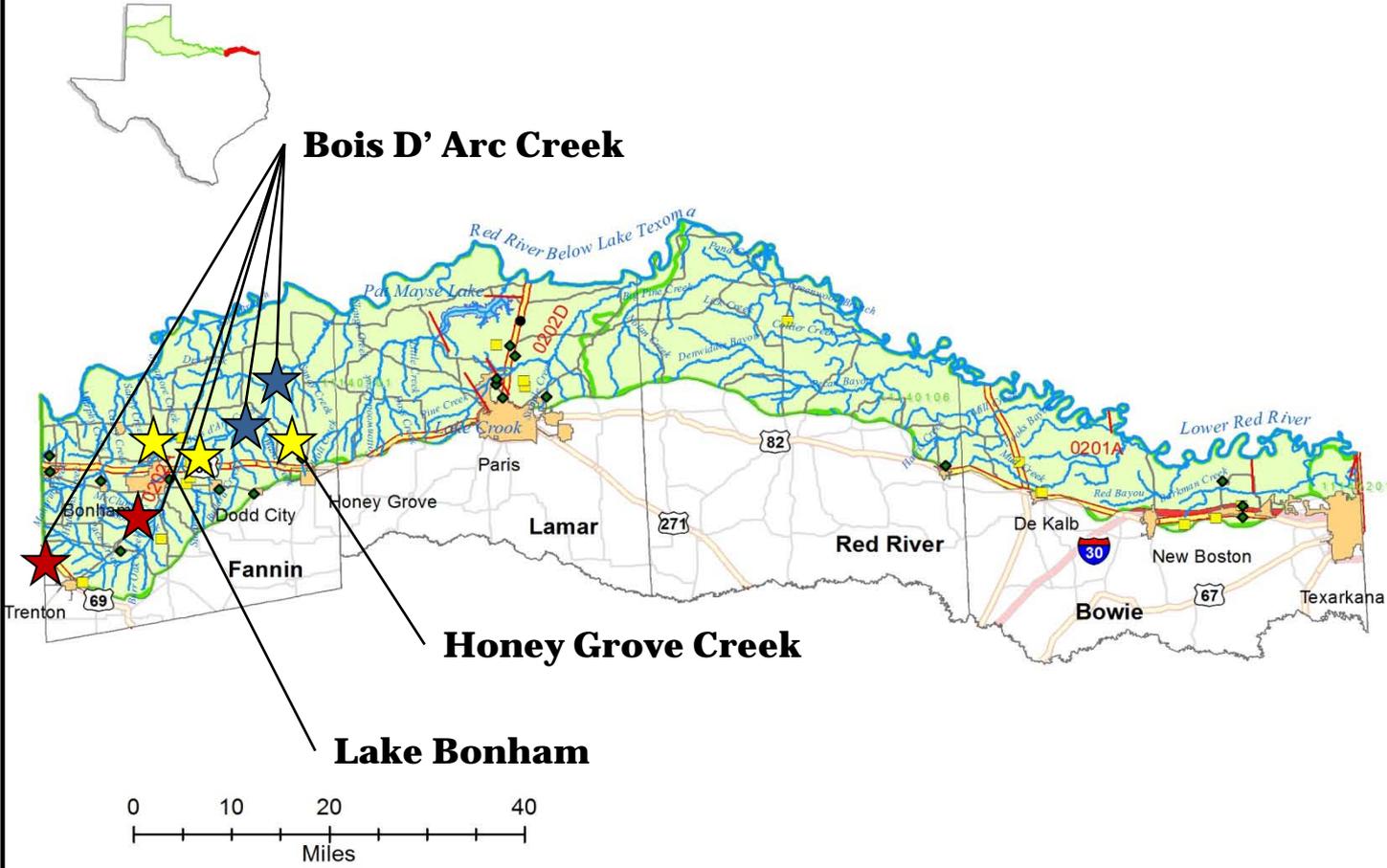
# Red Reach I Lower



- Lower Red River (0201)
- Mud Creek (0201A)
- Red River Below Lake Texoma (0202)
- Bois D' Arc Creek (0202A)
  - Bacteria impairment
  - No concerns
- Pecan Bayou (0202C)
- Pine Creek (0202D)
- Smith Creek (0202G)
- Big Pine Creek (0202H)
- Little Pine Creek (0202I)
- Lake Crook (0208)
- Pay Mayse Lake (0209)



# Red River Basin Lower Reach I



**Legend**

- MSW / Landfills
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Lower Reach I

# Bois D' Arc Creek at FM 898



# Bois D' Arc Creek at SH 78



# Bois D' Arc Creek at US 82



# Bois D' Arc Creek at FM 1396



# Bois D' Arc Creek at FM 409



# Honey Grove Creek at FM 277



# Red Reach I Lower



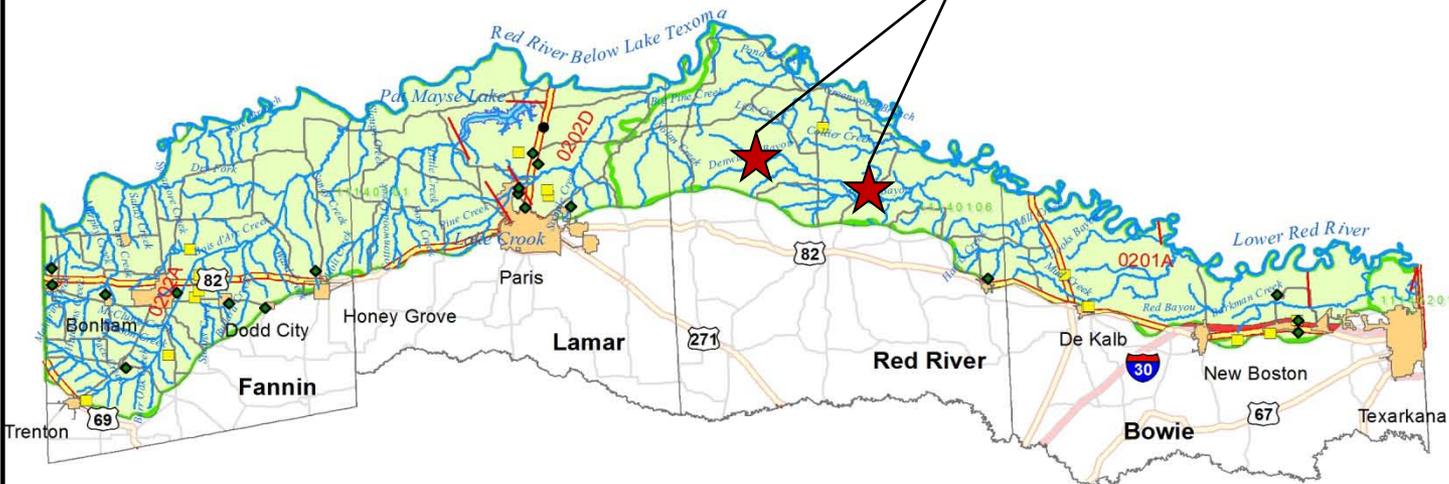
- Lower Red River (0201)
- Mud Creek (0201A)
- Red River Below Lake Texoma (0202)
- Bois D' Arc Creek (0202A)
- Pecan Bayou (0202C)
  - No impairments
  - Depressed DO concern
- Pine Creek (0202D)
- Smith Creek (0202G)
- Big Pine Creek (0202H)
- Little Pine Creek (0202I)
- Lake Crook (0208)
- Pay Mayse Lake (0209)



# Red River Basin Lower Reach I



**Pecan Bayou**



**Legend**

- MSW / Landfills
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Lower Reach I

# Pecan Bayou at FM 1159



# Pecan Bayou North of the City of Bagwell



# Red Reach I Lower



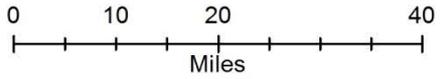
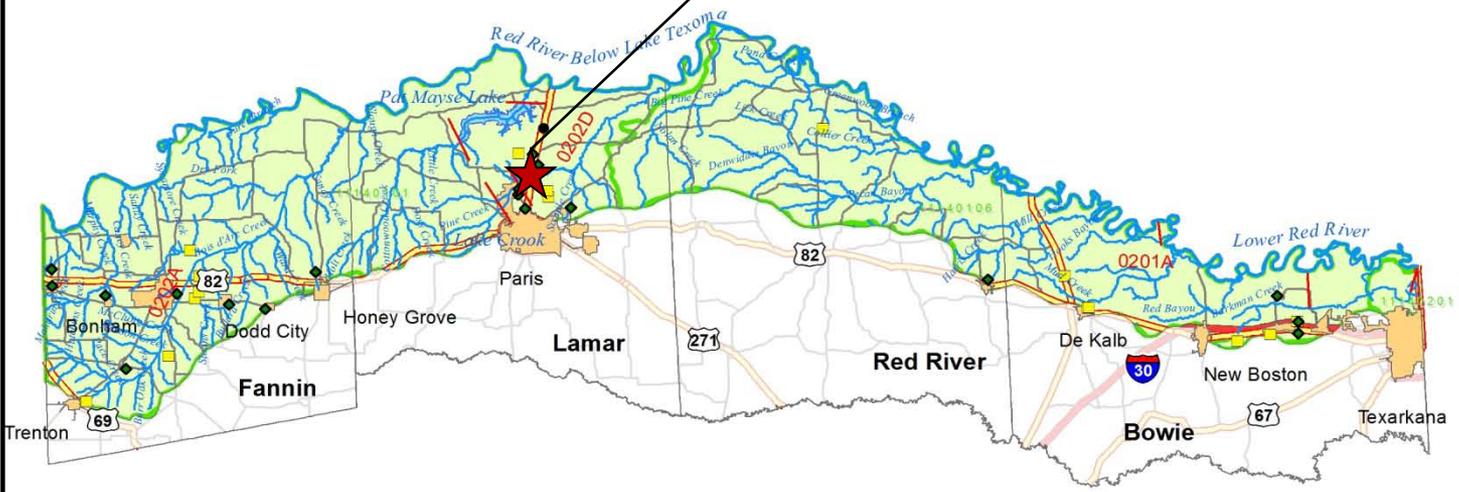
- Lower Red River (0201)
- Mud Creek (0201A)
- Red River Below Lake Texoma (0202)
- Bois D' Arc Creek (0202A)
- Pecan Bayou (0202C)
- Pine Creek (0202D)
  - No impairments or concerns
- Smith Creek (0202G)
- Big Pine Creek (0202H)
- Little Pine Creek (0202I)
- Lake Crook (0208)
- Pay Mayse Lake (0209)



# Red River Basin Lower Reach I



**Pine Creek**



**Legend**

- MSW / Landfills
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Lower Reach I

# Pine Creek at US 271



# Red Reach I Lower



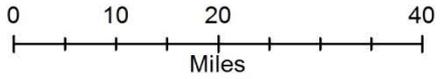
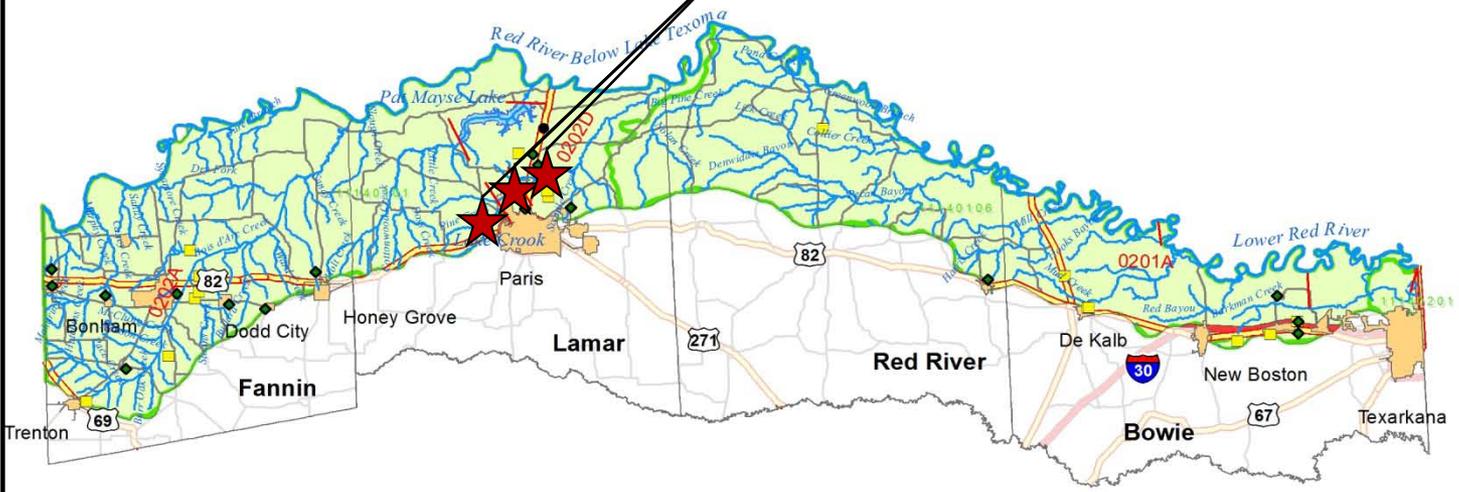
- Lower Red River (0201)
- Mud Creek (0201A)
- Red River Below Lake Texoma (0202)
- Bois D' Arc Creek (0202A)
- Pecan Bayou (0202C)
- Pine Creek (0202D)
- **Smith Creek (0202G)**
  - **Bacteria Impairment**
  - **Ammonia and ortho/total phosphorus concerns**
- Big Pine Creek (0202H)
- Little Pine Creek (0202I)
- Lake Crook (0208)
- Pay Mayse Lake (0209)



# Red River Basin Lower Reach I



**Smith Creek**



**Legend**

- MSW / Landfills
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Lower Reach I

# Smith Creek at US 271



# Smith Creek at CR 31700



# Smith Creek at Loop 286



# Red Reach I Lower



- Lower Red River (0201)
- Mud Creek (0201A)
- Red River Below Lake Texoma (0202)
- Bois D' Arc Creek (0202A)
- Pecan Bayou (0202C)
- Pine Creek (0202D)
- Smith Creek (0202G)
- Big Pine Creek (0202H)
  - No impairments or concerns
- Little Pine Creek (0202I)
  - No impairments
  - Chlorophyll-*a* and depressed DO concerns
- Lake Crook (0208)
  - No impairments or concerns
- Pay Mayse Lake (0209)
  - No impairments
  - Chlorophyll-*a* and manganese in sediment concerns



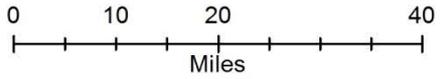
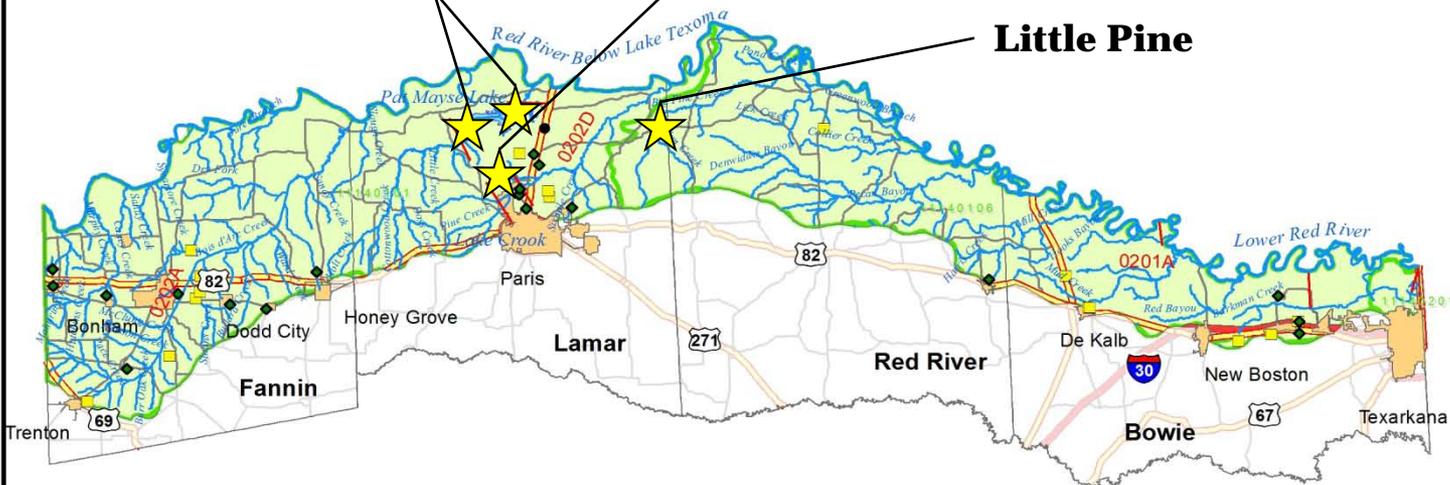
# Red River Basin Lower Reach I



**Pat Mayse Lake**

**Lake Crook**

**Little Pine**



**Legend**

- MSW / Landfills
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Lower Reach I

# Red Reach I Upper



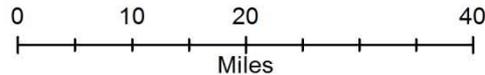
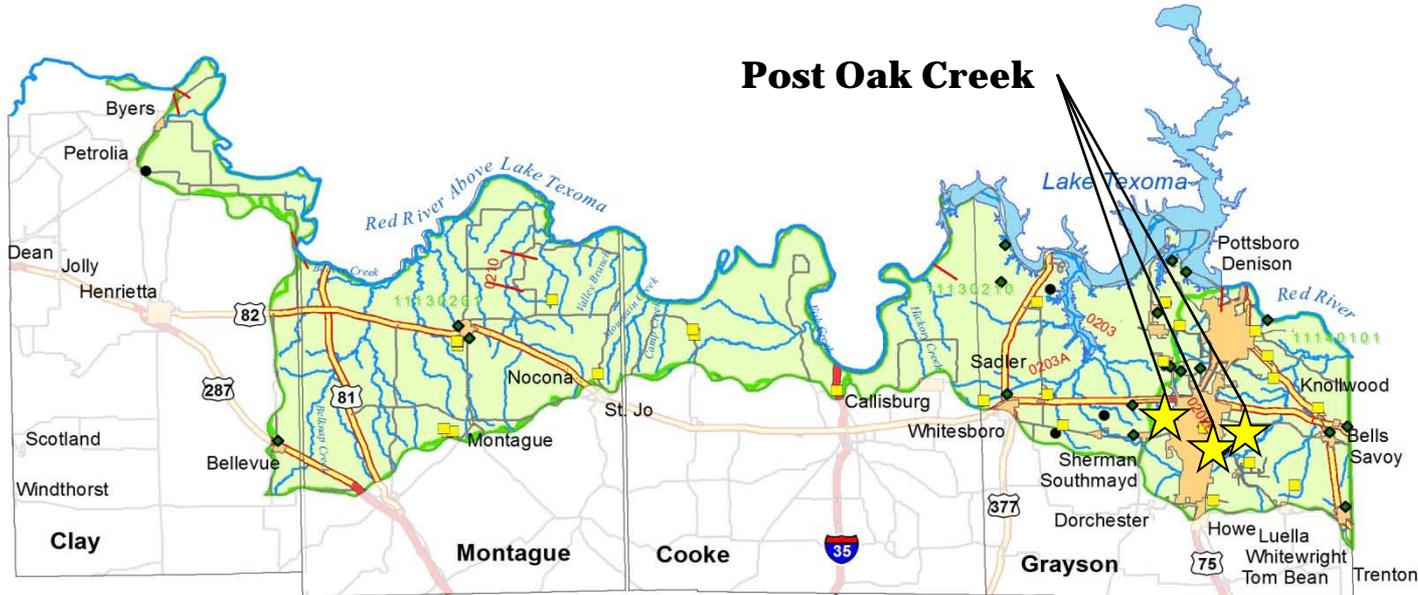
- Post Oak Creek (0202E)
  - No impairments
  - Total phosphorus concern
- Choctaw Creek (0202F)
- Sand Creek (0202J)
- Iron Ore Creek (0202K)
- Lake Texoma (0203)
- Big Mineral Creek (0203A)
- Mustang Creek (0203C)
- Deaver Creek (0203D)
- Red River Above Lake Texoma (0204)
- Moss Lake (0204B)
- Farmer's Creek Reservoir (0210)



# Red River Basin Upper Reach I



## Post Oak Creek



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Upper Reach I

# Post Oak Creek at First County Road Crossing



# Post Oak Creek at FM 1417



# Post Oak Creek at FM 1417



# Red Reach I Upper



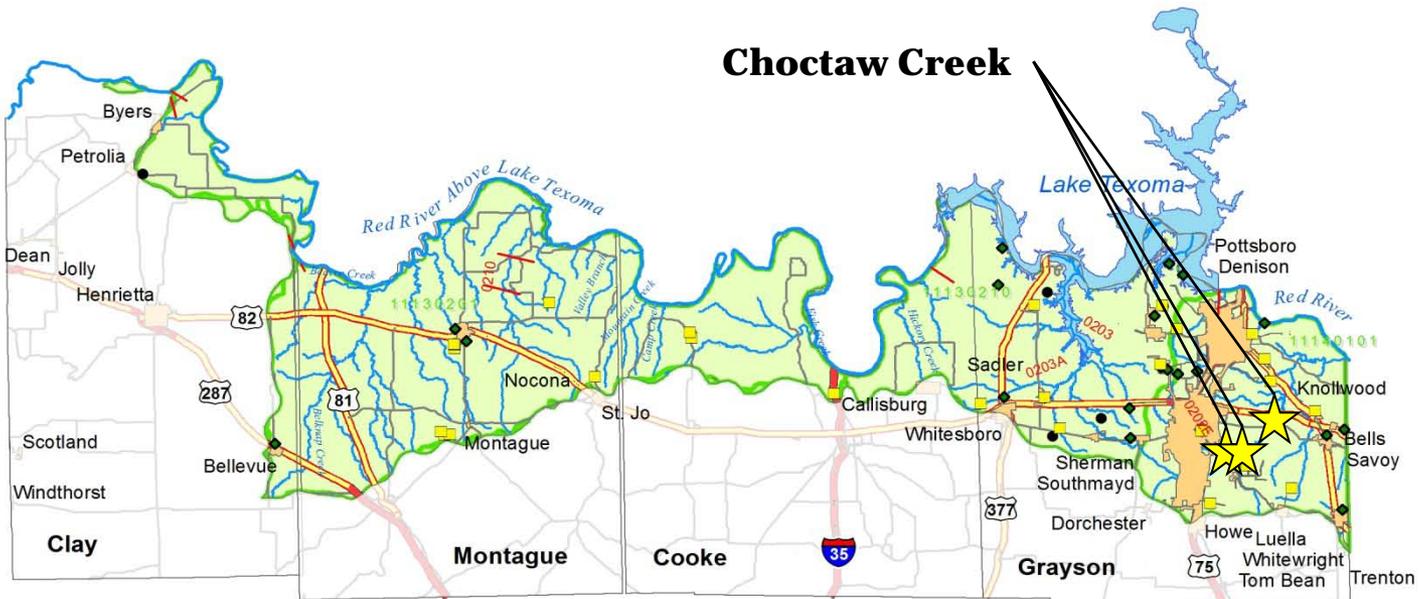
- Post Oak Creek (0202E)
- Choctaw Creek (0202F)
  - Bacteria impairment
  - Nitrate and ortho/total phosphorus concerns
- Sand Creek (0202J)
- Iron Ore Creek (0202K)
- Lake Texoma (0203)
- Big Mineral Creek (0203A)
- Mustang Creek (0203C)
- Deaver Creek (0203D)
- Red River Above Lake Texoma (0204)
- Moss Lake (0204B)
- Farmer's Creek Reservoir (0210)



# Red River Basin Upper Reach I



## Choctaw Creek



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Upper Reach I

# Choctaw Creek at SH 11



# Choctaw Creek at US 82



# Choctaw Creek at Luella Road



# Red Reach I Upper



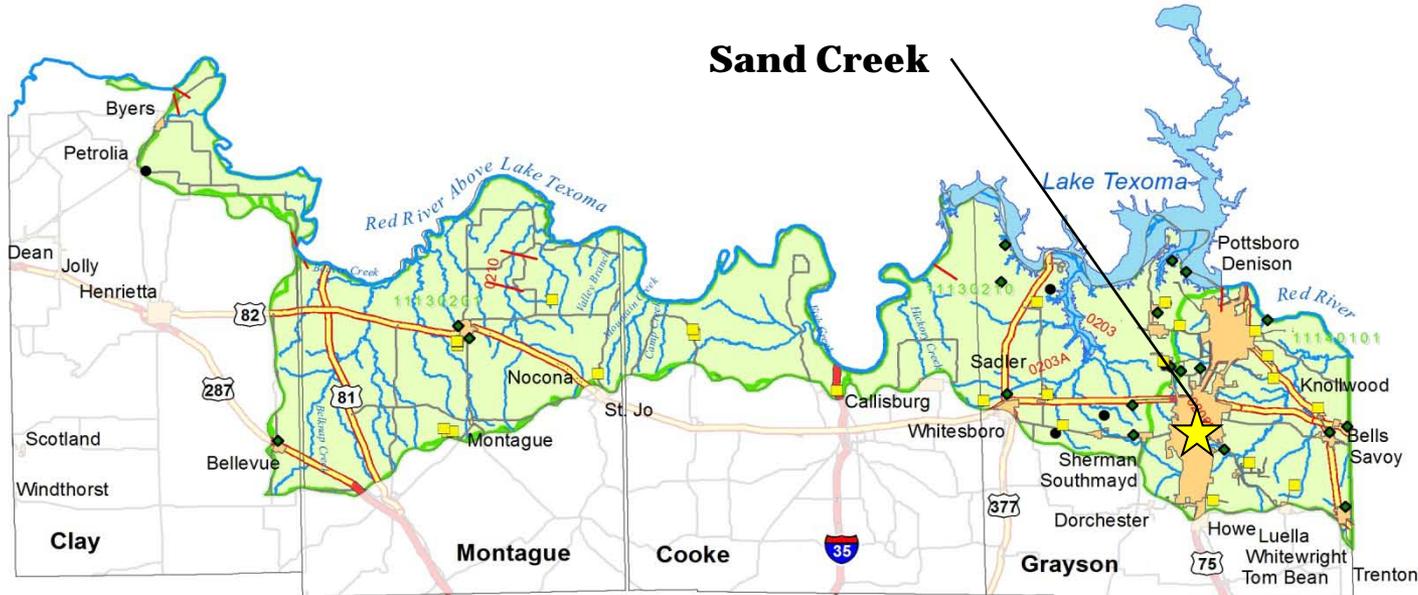
- Post Oak Creek (0202E)
- Choctaw Creek (0202F)
- Sand Creek (0202J)
  - No impairments or concerns
- Iron Ore Creek (0202K)
- Lake Texoma (0203)
- Big Mineral Creek (0203A)
- Mustang Creek (0203C)
- Deaver Creek (0203D)
- Red River Above Lake Texoma (0204)
- Moss Lake (0204B)
- Farmer's Creek Reservoir (0210)



# Red River Basin Upper Reach I



## Sand Creek



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Upper Reach I

# Sand Creek at SH 56



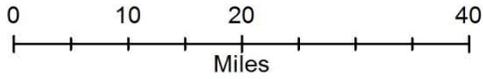
# Red Reach I Upper



- Post Oak Creek (0202E)
- Choctaw Creek (0202F)
- Sand Creek (0202J)
- Iron Ore Creek (0202K)
  - Bacteria impairment
  - No concerns
- Lake Texoma (0203)
- Big Mineral Creek (0203A)
- Mustang Creek (0203C)
- Deaver Creek (0203D)
- Red River Above Lake Texoma (0204)
- Moss Lake (0204B)
- Farmer's Creek Reservoir (0210)



# Red River Basin Upper Reach I



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Upper Reach I

# Red Reach I Upper



- Post Oak Creek (0202E)
- Choctaw Creek (0202F)
- Sand Creek (0202J)
- Iron Ore Creek (0202K)
- Lake Texoma (0203)
  - No impairments
  - Chlorophyll-*a*, orthophosphorus and harmful algal bloom
- Big Mineral Creek (0203A)
- Mustang Creek (0203C)
- Deaver Creek (0203D)
- Red River Above Lake Texoma (0204)
- Moss Lake (0204B)
- Farmer's Creek Reservoir (0210)



# Red River Basin Upper Reach I



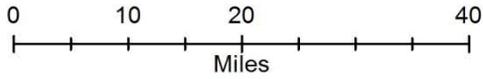
Lake Texoma

Red River



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Upper Reach I



# Lake Texoma at Little Mineral Arm



# Lake Texoma Near Dam



# Lake Texoma at Big Mineral Arm



# Lake Texoma at US 377 Bridge



# Lake Texoma at Simmons Shores



# Red River at US 75 Below Lake Texoma Dam



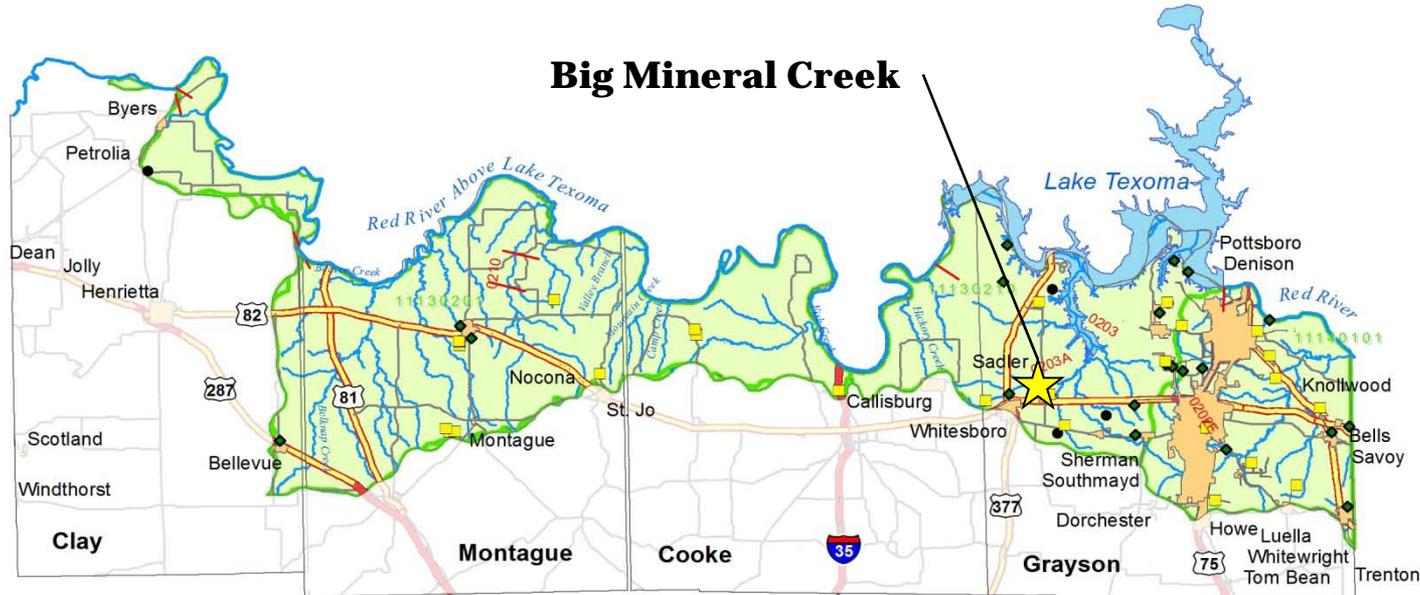
# Red Reach I Upper



- Post Oak Creek (0202E)
- Choctaw Creek (0202F)
- Sand Creek (0202J)
- Iron Ore Creek (0202K)
- Lake Texoma (0203)
- Big Mineral Creek (0203A)
  - No impairments
  - Nitrate and ortho/total phosphorus
- Mustang Creek (0203C)
  - No impairments or concerns
- Deaver Creek (0203D)
  - No impairments or concerns
- Red River Above Lake Texoma (0204)
- Moss Lake (0204B)
- Farmer's Creek Reservoir (0210)



# Red River Basin Upper Reach I



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Upper Reach I

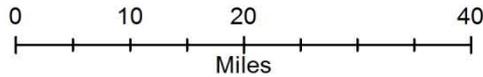
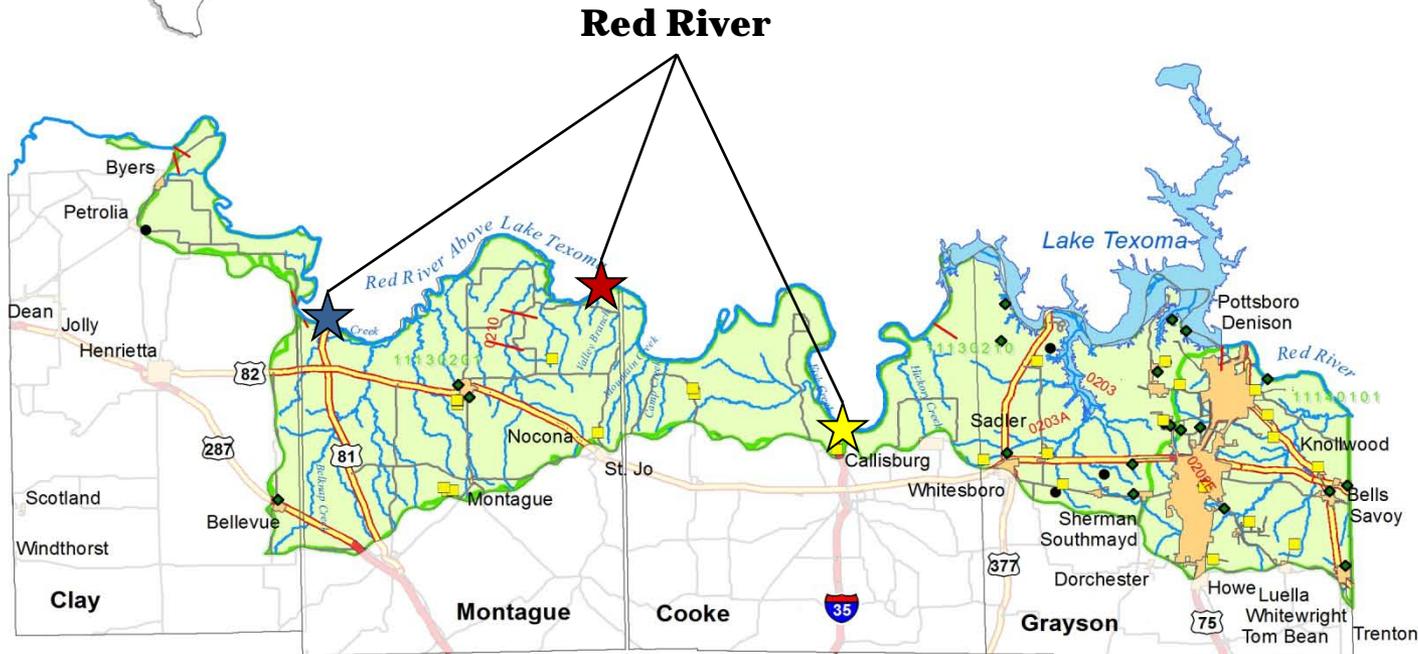
# Red Reach I Upper



- Post Oak Creek (0202E)
- Choctaw Creek (0202F)
- Sand Creek (0202J)
- Iron Ore Creek (0202K)
- Lake Texoma (0203)
- Big Mineral Creek (0203A)
- Mustang Creek (0203C)
- Deaver Creek (0203D)
- Red River Above Lake Texoma (0204)
  - No impairments
  - Chlorophyll-a concern
- Moss Lake (0204B)
- Farmer's Creek Reservoir (0210)



# Red River Basin Upper Reach I



**Legend**

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Upper Reach I

# Red River at FM 677



# Red River at US 81



# Red Reach I Upper



- Post Oak Creek (0202E)
- Choctaw Creek (0202F)
- Sand Creek (0202J)
- Iron Ore Creek (0202K)
- Lake Texoma (0203)
- Big Mineral Creek (0203A)
- Mustang Creek (0203C)
- Deaver Creek (0203D)
- Red River Above Lake Texoma (0204)
- Moss Lake (0204B)
  - No impairments or concerns
- Farmer's Creek Reservoir (0210)

# Red Reach I Upper



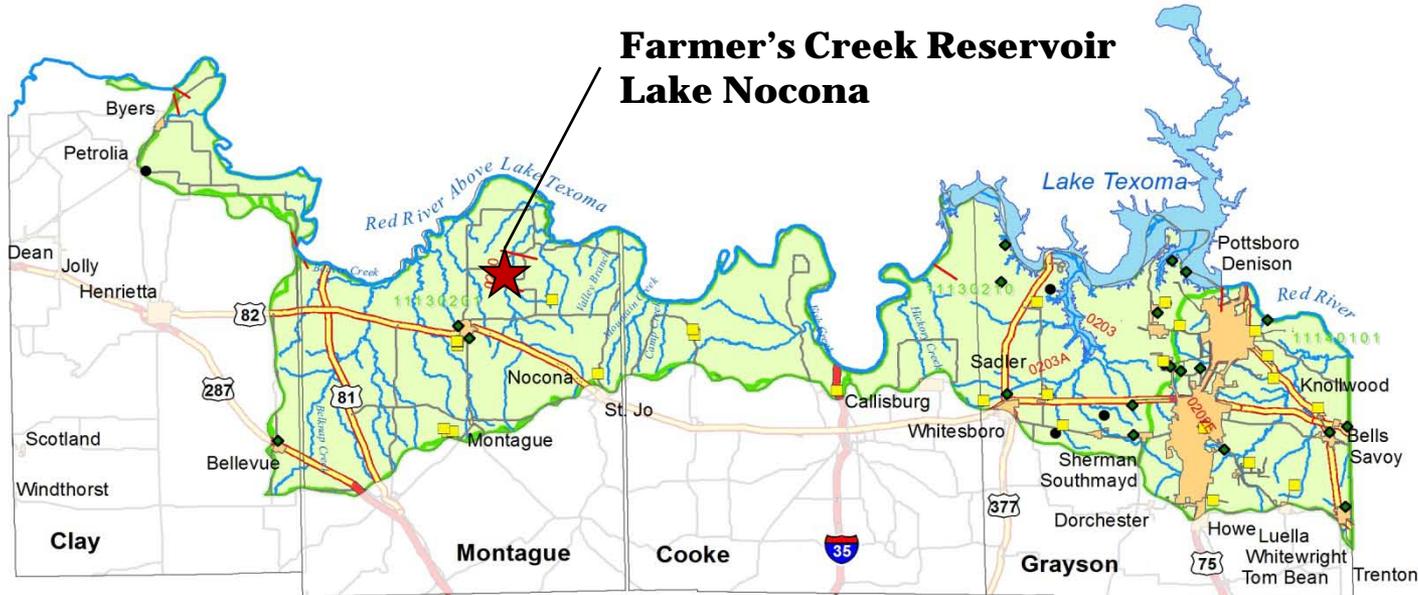
- Post Oak Creek (0202E)
- Choctaw Creek (0202F)
- Sand Creek (0202J)
- Iron Ore Creek (0202K)
- Lake Texoma (0203)
- Big Mineral Creek (0203A)
- Mustang Creek (0203C)
- Deaver Creek (0203D)
- Red River Above Lake Texoma (0204)
- Moss Lake (0204B)
- Farmer's Creek Reservoir (0210)
  - No impairments or concerns



# Red River Basin Upper Reach I



## Farmer's Creek Reservoir Lake Nocona



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Upper Reach I

# Farmer's Creek Reservoir – Lake Nocona



# Red Reach II



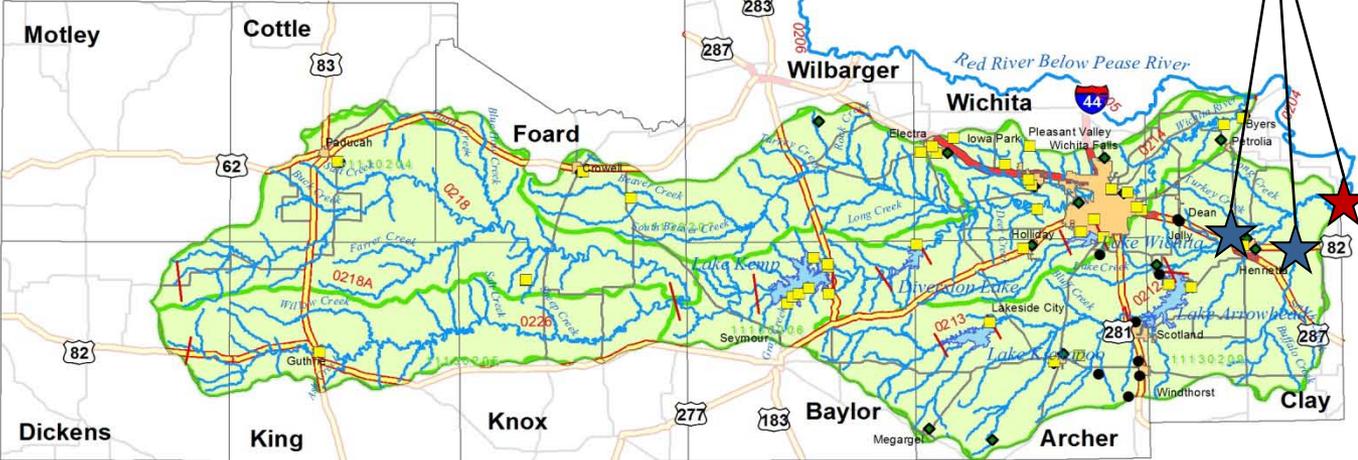
- Little Wichita River (0211)
  - Chloride, sulfate, TDS and depressed DO impairments
  - Chlorophyll-*a* concern
- Lake Arrowhead (0212)
- Lake Kickapoo (0213)
- Wichita River Below Lake Diversion Dam (0214)
- Beaver Creek (0214A)
- Buffalo Creek (0214B)
- Gordon Lake (0214D)
- Wichita Valley Irrigation Project (0214E)
- Diversion Lake (0215)
- Wichita River Below Lake Kemp (0216)
- Lake Kemp (0217)
- Wichita/North Fork Wichita River (0218)
- Middle Fork Wichita River (0218A)
- Lake Wichita (0219)
- South Fork Wichita River (0226)



# Red River Basin Reach II



## Little Wichita River



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach II

# Little Wichita River at FM 2332



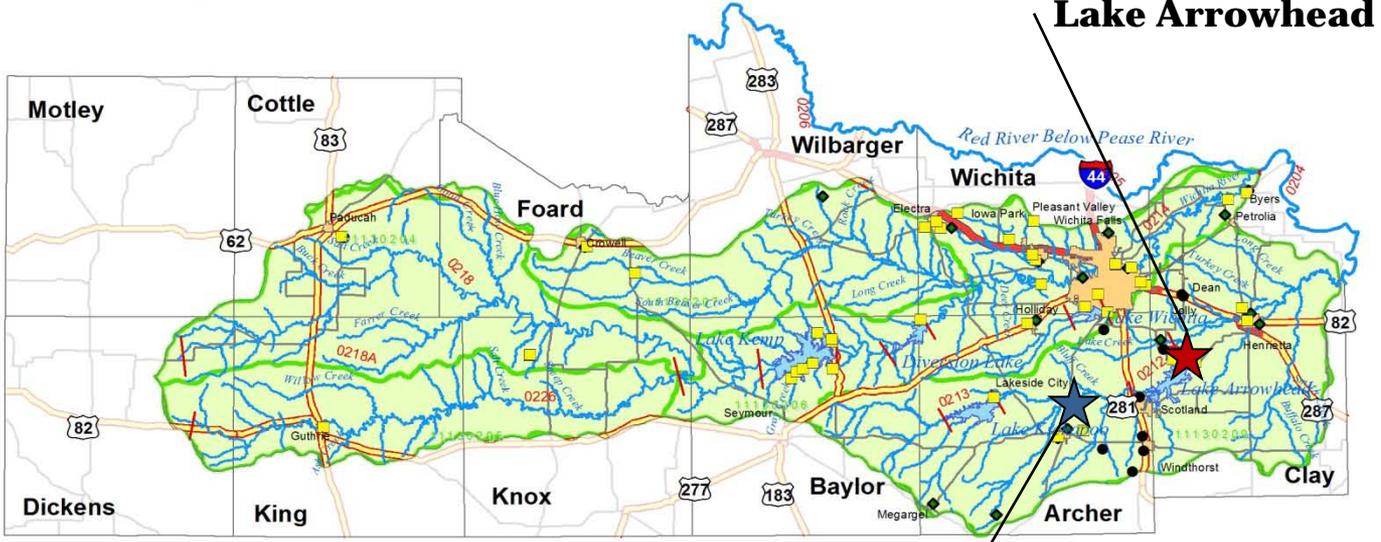
# Red Reach II



- Little Wichita River (0211)
- Lake Arrowhead (0212)
  - No impairments
  - Orthophosphorus concern
- Lake Kickapoo (0213)
- Wichita River Below Lake Diversion Dam (0214)
- Beaver Creek (0214A)
- Buffalo Creek (0214B)
- Gordon Lake (0214D)
- Wichita Valley Irrigation Project (0214E)
- Diversion Lake (0215)
- Wichita River Below Lake Kemp (0216)
- Lake Kemp (0217)
- Wichita/North Fork Wichita River (0218)
- Middle Fork Wichita River (0218A)
- Lake Wichita (0219)
- South Fork Wichita River (0226)



# Red River Basin Reach II



Lake Arrowhead

Little Wichita River



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach II

# Lake Arrowhead



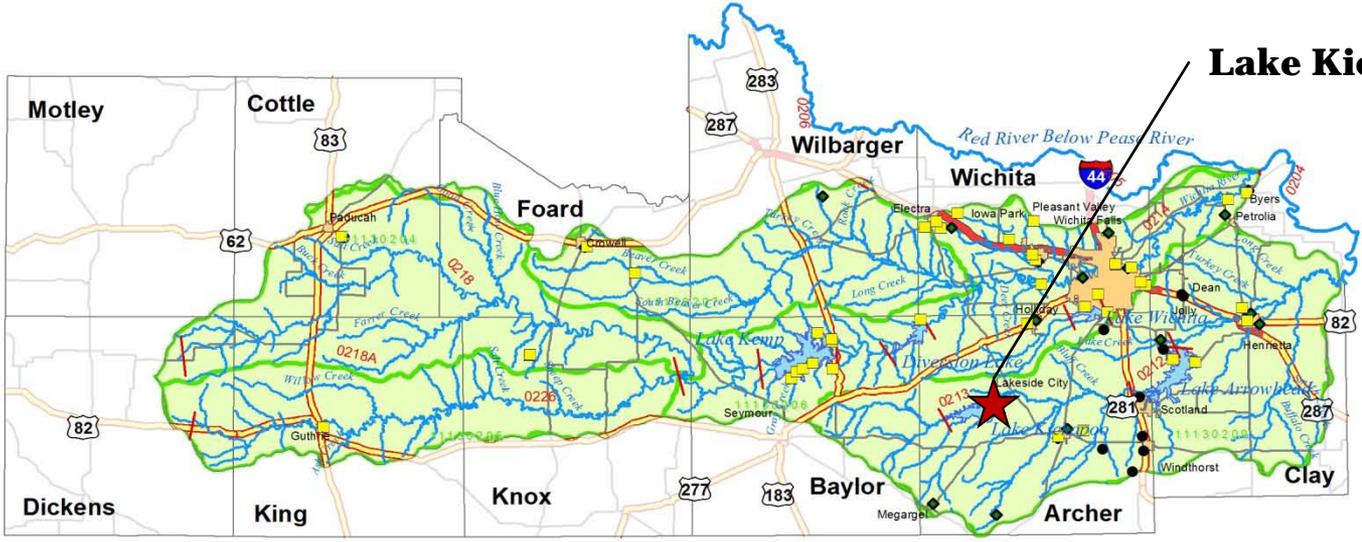
# Red Reach II



- Little Wichita River (0211)
- Lake Arrowhead (0212)
- Lake Kickapoo (0213)
  - No impairments or concerns
- Wichita River Below Lake Diversion Dam (0214)
- Beaver Creek (0214A)
- Buffalo Creek (0214B)
- Gordon Lake (0214D)
- Wichita Valley Irrigation Project (0214E)
- Diversion Lake (0215)
- Wichita River Below Lake Kemp (0216)
- Lake Kemp (0217)
- Wichita/North Fork Wichita River (0218)
- Middle Fork Wichita River (0218A)
- Lake Wichita (0219)
- South Fork Wichita River (0226)



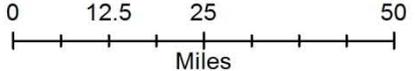
# Red River Basin Reach II



**Lake Kickapoo**

### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach II



# Lake Kickapoo



# Red Reach II



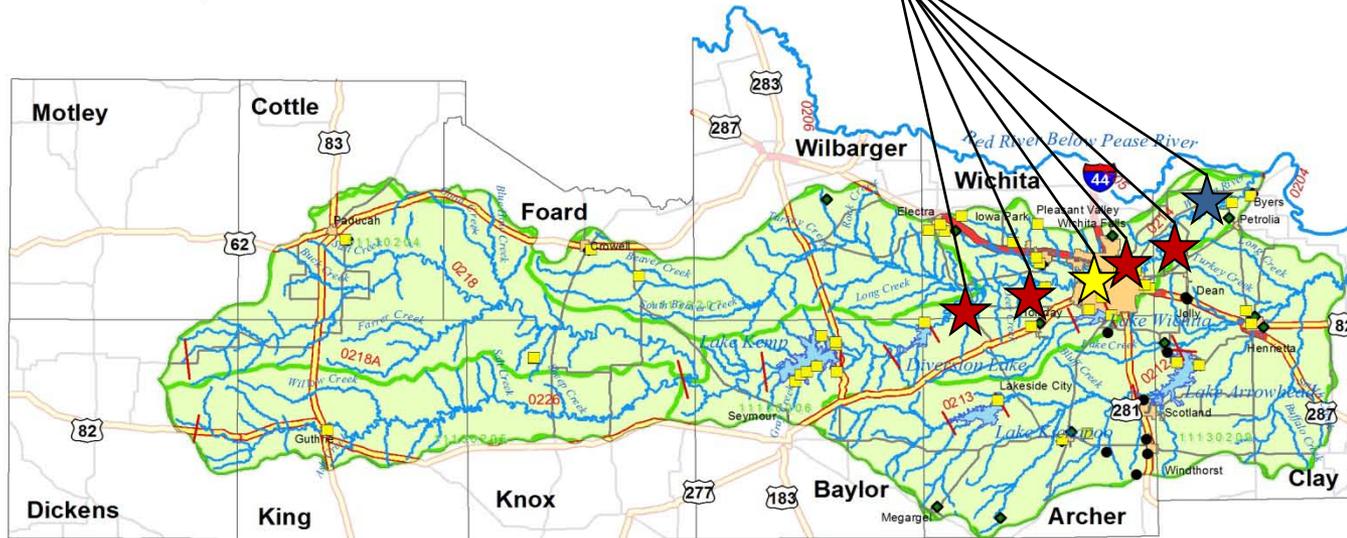
- Little Wichita River (0211)
- Lake Arrowhead (0212)
- Lake Kickapoo (0213)
- Wichita River Below Diversion Lake Dam (0214)
  - Bacteria impairment
  - Chlorophyll-*a*, nitrate and ortho/total phosphorus concerns
- Beaver Creek (0214A)
- Buffalo Creek (0214B)
- Gordon Lake (0214D)
- Wichita Valley Irrigation Project (0214E)
- Diversion Lake (0215)
- Wichita River Below Lake Kemp (0216)
- Lake Kemp (0217)
- Wichita/North Fork Wichita River (0218)
- Middle Fork Wichita River (0218A)
- Lake Wichita (0219)
- South Fork Wichita River (0226)



# Red River Basin Reach II

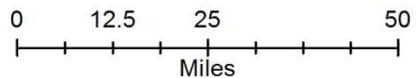


## Wichita River



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach II



# Wichita River at SH 25



# Wichita River at FM 368



# Wichita River at SH 240



# Wichita River at Eastland Lane



# Wichita River at FM 810



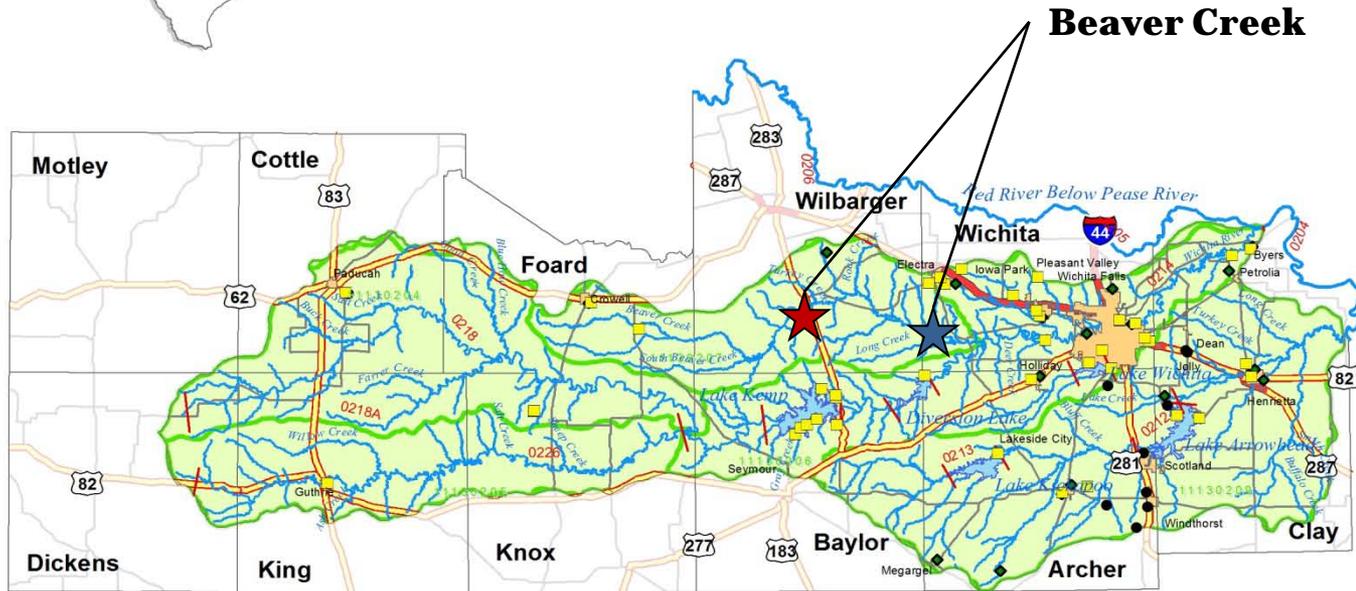
# Red Reach II



- Little Wichita River (0211)
- Lake Arrowhead (0212)
- Lake Kickapoo (0213)
- Wichita River Below Lake Diversion Dam (0214)
- Beaver Creek (0214A)
  - Bacteria impairment
  - Chlorophyll-*a* and depressed DO concerns
- Buffalo Creek (0214B)
- Gordon Lake (0214D)
- Wichita Valley Irrigation Project (0214E)
- Diversion Lake (0215)
- Wichita River Below Lake Kemp (0216)
- Lake Kemp (0217)
- Wichita/North Fork Wichita River (0218)
- Middle Fork Wichita River (0218A)
- Lake Wichita (0219)
- South Fork Wichita River (0226)

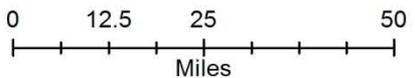


# Red River Basin Reach II



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach II



# Beaver Creek at US 283



# Beaver Creek at FM 2326



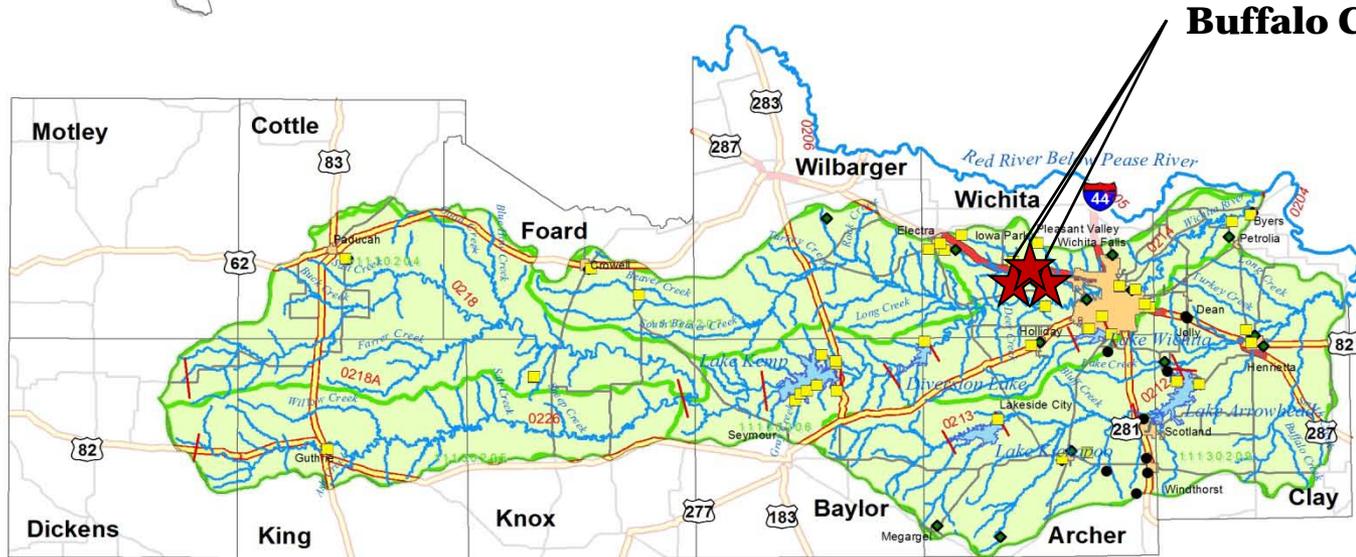
# Red Reach II



- Little Wichita River (0211)
- Lake Arrowhead (0212)
- Lake Kickapoo (0213)
- Wichita River Below Lake Diversion Dam (0214)
- Beaver Creek (0214A)
- Buffalo Creek (0214B)
  - Bacteria impairment
  - Ammonia, chlorophyll-*a*, nitrate, ortho/total phosphorus concerns
- Gordon Lake (0214D)
- Wichita Valley Irrigation Project (0214E)
- Diversion Lake (0215)
- Wichita River Below Lake Kemp (0216)
- Lake Kemp (0217)
- Wichita/North Fork Wichita River (0218)
- Middle Fork Wichita River (0218A)
- Lake Wichita (0219)
- South Fork Wichita River (0226)



# Red River Basin Reach II



**Buffalo Creek**

## Legend

- MSW / Landfill
- ◆ Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- ~ Hydrology
- ⊕ Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach II



# Buffalo Creek at FM 1814



# Buffalo Creek at Coleman Road



# Unnamed Tributary to Buffalo Creek at Coleman Road



# Red Reach II



- Little Wichita River (0211)
- Lake Arrowhead (0212)
- Lake Kickapoo (0213)
- Wichita River Below Lake Diversion Dam (0214)
- Beaver Creek (0214A)
- Buffalo Creek (0214B)
- Gordon Lake (0214D)
  - No impairments or concerns
- Wichita Valley Irrigation Project (0214E)
  - No impairments
  - Chlorophyll-*a* concern
- Diversion Lake (0215)
- Wichita River Below Lake Kemp (0216)
- Lake Kemp (0217)
- Wichita/North Fork Wichita River (0218)
- Middle Fork Wichita River (0218A)
- Lake Wichita (0219)
- South Fork Wichita River (0226)



# Red River Basin Reach II

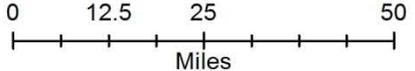


## South Canal Below Lake Diversion



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach II



# South Canal Below Lake Diversion



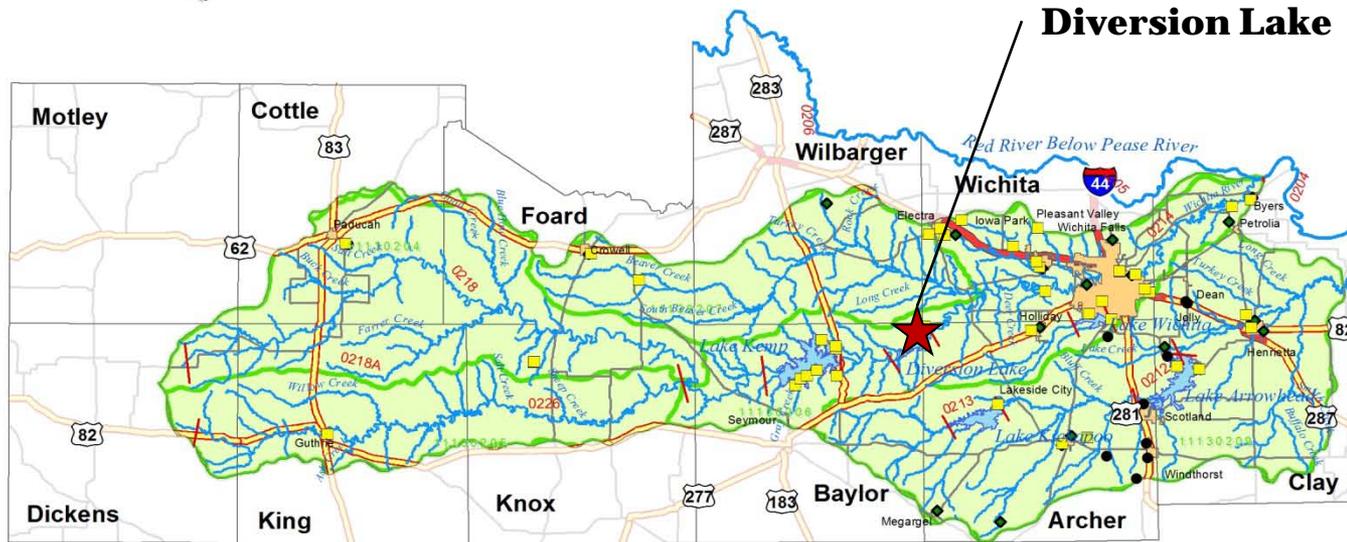
# Red Reach II



- Little Wichita River (0211)
- Lake Arrowhead (0212)
- Lake Kickapoo (0213)
- Wichita River Below Lake Diversion Dam (0214)
- Beaver Creek (0214A)
- Buffalo Creek (0214B)
- Gordon Lake (0214D)
- Wichita Valley Irrigation Project (0214E)
- Diversion Lake (0215)
  - No impairments
  - Harmful algal bloom concern
- Wichita River Below Lake Kemp (0216)
- Lake Kemp (0217)
- Wichita/North Fork Wichita River (0218)
- Middle Fork Wichita River (0218A)
- Lake Wichita (0219)
- South Fork Wichita River (0226)



# Red River Basin Reach II



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach II



# Diversion Lake



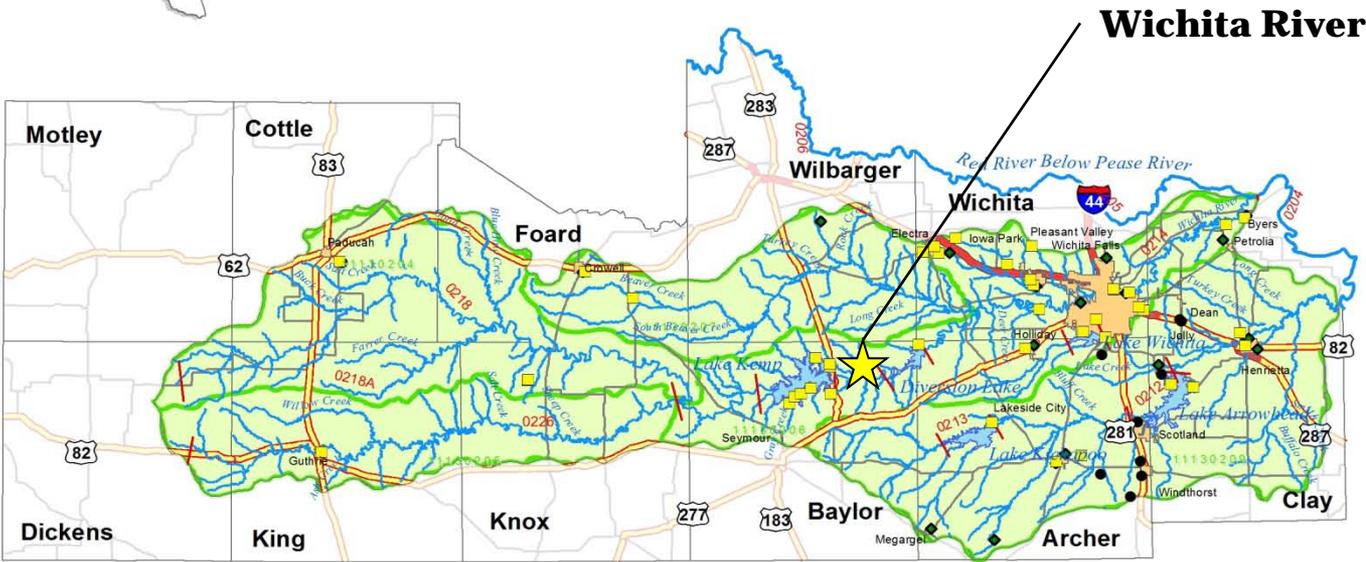
# Red Reach II



- Little Wichita River (0211)
- Lake Arrowhead (0212)
- Lake Kickapoo (0213)
- Wichita River Below Lake Diversion Dam (0214)
- Beaver Creek (0214A)
- Buffalo Creek (0214B)
- Gordon Lake (0214D)
- Wichita Valley Irrigation Project (0214E)
- Diversion Lake (0215)
- Wichita River Below Lake Kemp (0216)
  - No impairments or concerns
- Lake Kemp (0217)
- Wichita/North Fork Wichita River (0218)
- Middle Fork Wichita River (0218A)
- Lake Wichita (0219)
- South Fork Wichita River (0226)



# Red River Basin Reach II



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach II



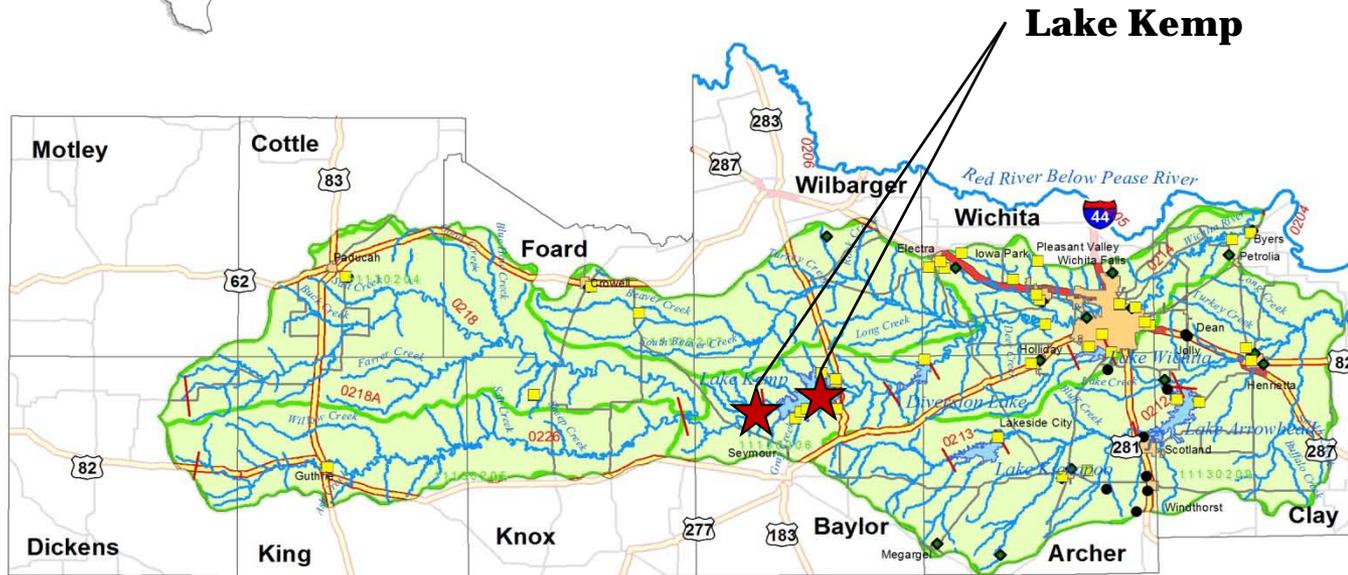
# Red Reach II



- Little Wichita River (0211)
- Lake Arrowhead (0212)
- Lake Kickapoo (0213)
- Wichita River Below Lake Diversion Dam (0214)
- Beaver Creek (0214A)
- Buffalo Creek (0214B)
- Gordon Lake (0214D)
- Wichita Valley Irrigation Project (0214E)
- Diversion Lake (0215)
- Wichita River Below Lake Kemp (0216)
- Lake Kemp (0217)
  - No impairments or concerns
- Wichita/North Fork Wichita River (0218)
- Middle Fork Wichita River (0218A)
- Lake Wichita (0219)
- South Fork Wichita River (0226)

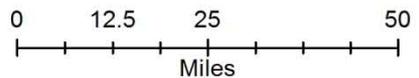


# Red River Basin Reach II



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach II



# Lake Kemp Near Dam



# Lake Kemp at the Headwaters of the Wichita River



# Red Reach II



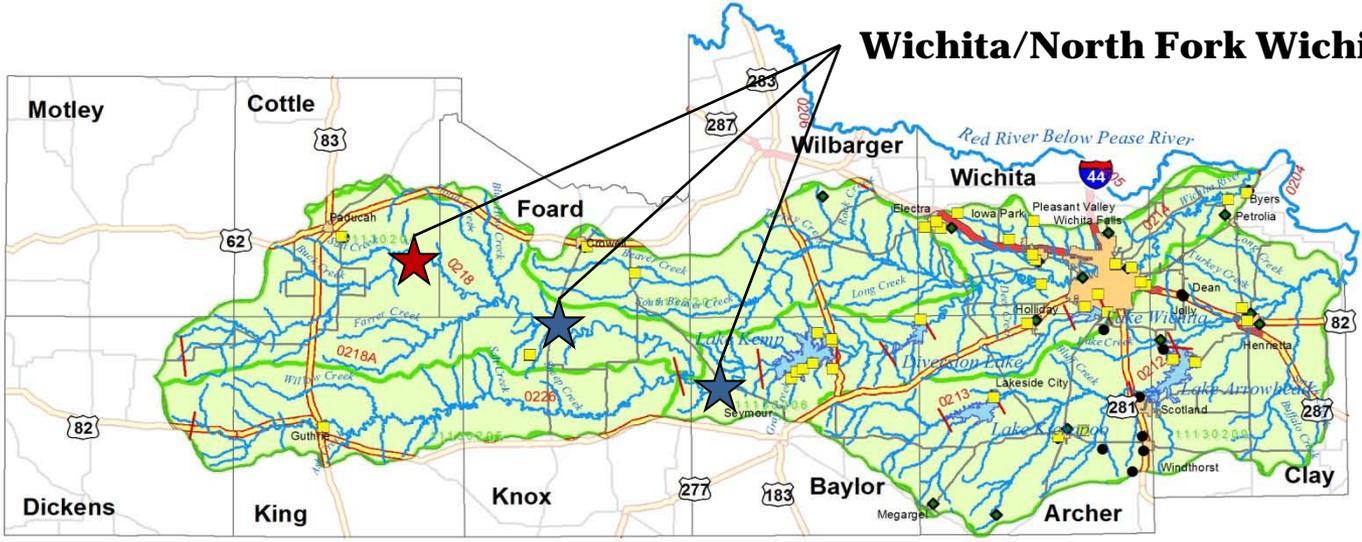
- Little Wichita River (0211)
- Lake Arrowhead (0212)
- Lake Kickapoo (0213)
- Wichita River Below Lake Diversion Dam (0214)
- Beaver Creek (0214A)
- Buffalo Creek (0214B)
- Gordon Lake (0214D)
- Wichita Valley Irrigation Project (0214E)
- Diversion Lake (0215)
- Wichita River Below Lake Kemp (0216)
- Lake Kemp (0217)
- Wichita/North Fork Wichita River (0218)
  - No impairments
  - Selenium in water concern
- Middle Fork Wichita River (0218A)
- Lake Wichita (0219)
- South Fork Wichita River (0226)



# Red River Basin Reach II

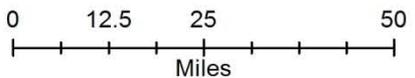


## Wichita/North Fork Wichita River



**Legend**

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach II



# North Wichita River Near Paducah



# North Wichita River at SH 6



# North Wichita River at FM 1919



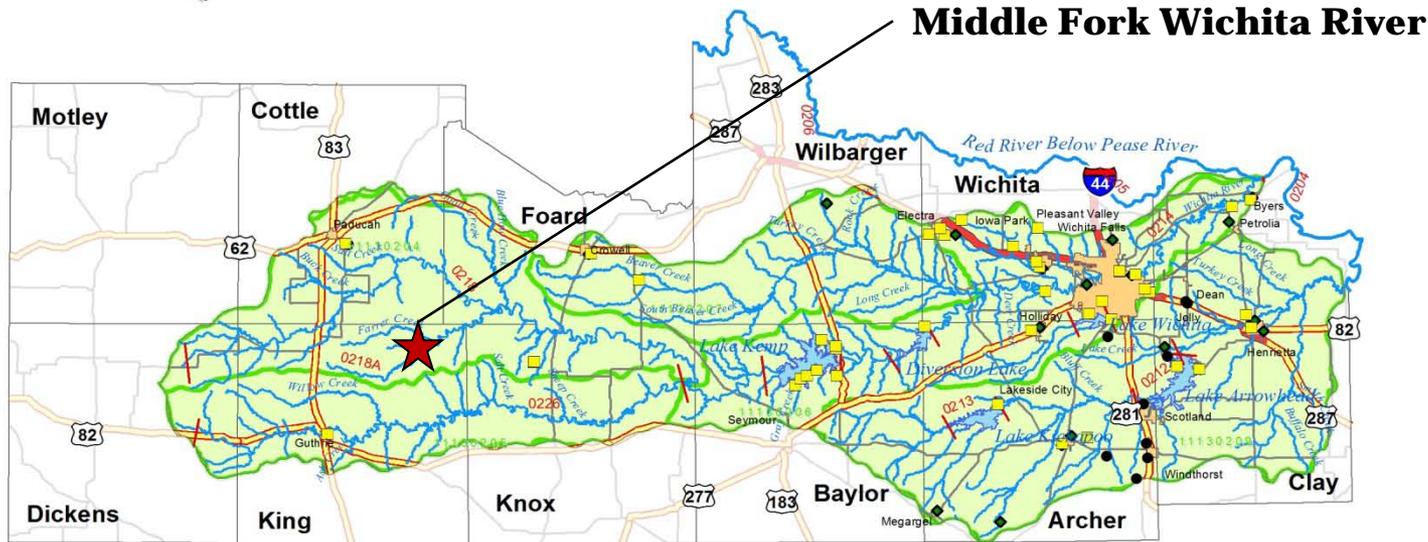
# Red Reach II



- Little Wichita River (0211)
- Lake Arrowhead (0212)
- Lake Kickapoo (0213)
- Wichita River Below Lake Diversion Dam (0214)
- Beaver Creek (0214A)
- Buffalo Creek (0214B)
- Gordon Lake (0214D)
- Wichita Valley Irrigation Project (0214E)
- Diversion Lake (0215)
- Wichita River Below Lake Kemp (0216)
- Lake Kemp (0217)
- Wichita/North Fork Wichita River (0218)
- Middle Fork Wichita River (0218A)
  - No impairments
  - Selenium in water concern
- Lake Wichita (0219)
- South Fork Wichita River (0226)

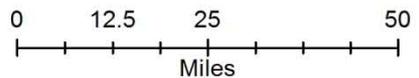


# Red River Basin Reach II



### Legend

- MSW / Landfill
- ◆ Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- ~ Hydrology
- + Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach II



# Middle Fork Wichita River NE of Guthrie



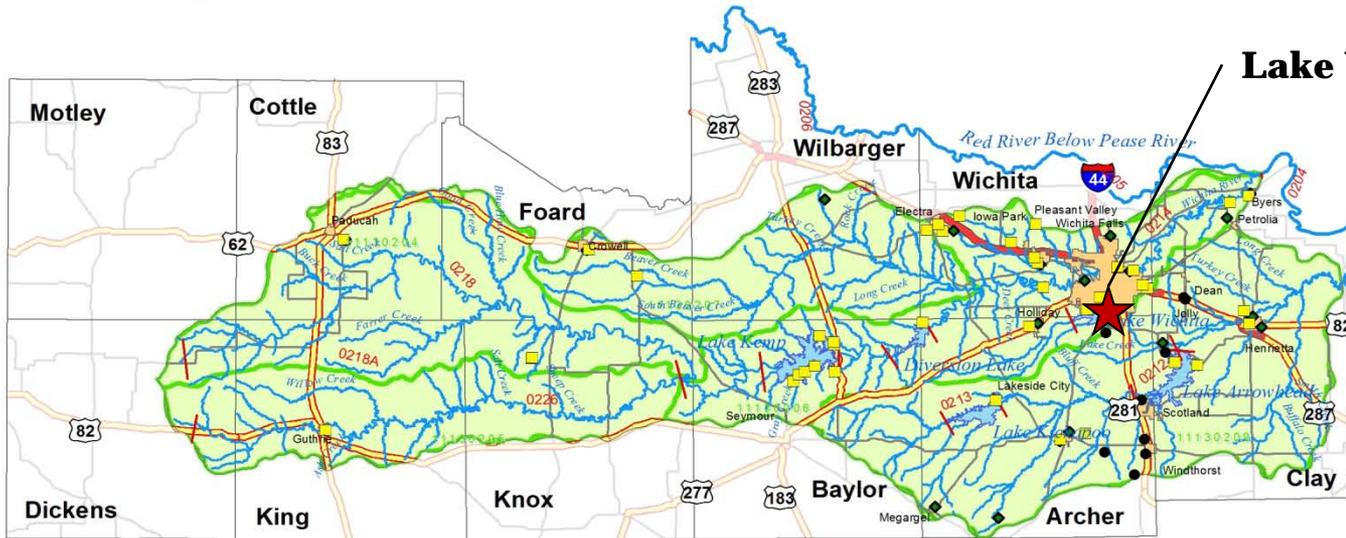
# Red Reach II



- Little Wichita River (0211)
- Lake Arrowhead (0212)
- Lake Kickapoo (0213)
- Wichita River Below Lake Diversion Dam (0214)
- Beaver Creek (0214A)
- Buffalo Creek (0214B)
- Gordon Lake (0214D)
- Wichita Valley Irrigation Project (0214E)
- Diversion Lake (0215)
- Wichita River Below Lake Kemp (0216)
- Lake Kemp (0217)
- Wichita/North Fork Wichita River (0218)
- Middle Fork Wichita River (0218A)
- Lake Wichita (0219)
  - No impairments
  - Chlorophyll-*a*, harmful algal bloom, total phosphorus
- South Fork Wichita River (0226)



# Red River Basin Reach II



**Lake Wichita**

## Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach II



# Lake Wichita



# Red Reach II



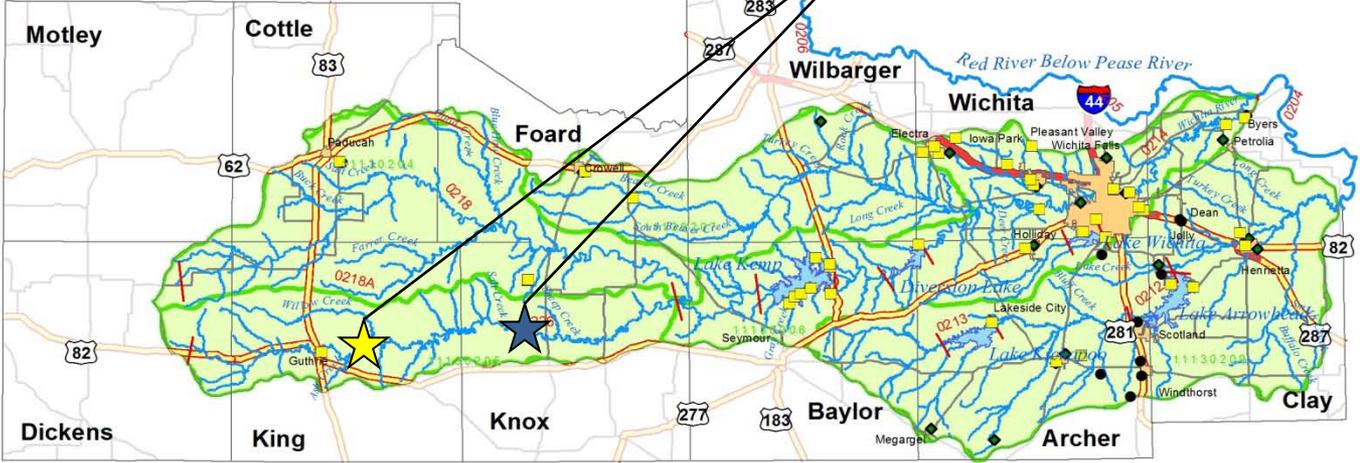
- Little Wichita River (0211)
- Lake Arrowhead (0212)
- Lake Kickapoo (0213)
- Wichita River Below Lake Diversion Dam (0214)
- Beaver Creek (0214A)
- Buffalo Creek (0214B)
- Gordon Lake (0214D)
- Wichita Valley Irrigation Project (0214E)
- Diversion Lake (0215)
- Wichita River Below Lake Kemp (0216)
- Lake Kemp (0217)
- Wichita/North Fork Wichita River (0218)
- Middle Fork Wichita River (0218A)
- Lake Wichita (0219)
- South Fork Wichita River (0226)
  - No impairments
  - Ammonia concern



# Red River Basin Reach II

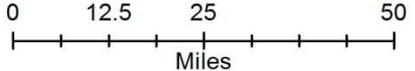


## South Fork Wichita River



### Legend

- MSW / Landfill
- ◆ Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- ~ Hydrology
- + Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach II



# South Fork of the Wichita River at SH 6



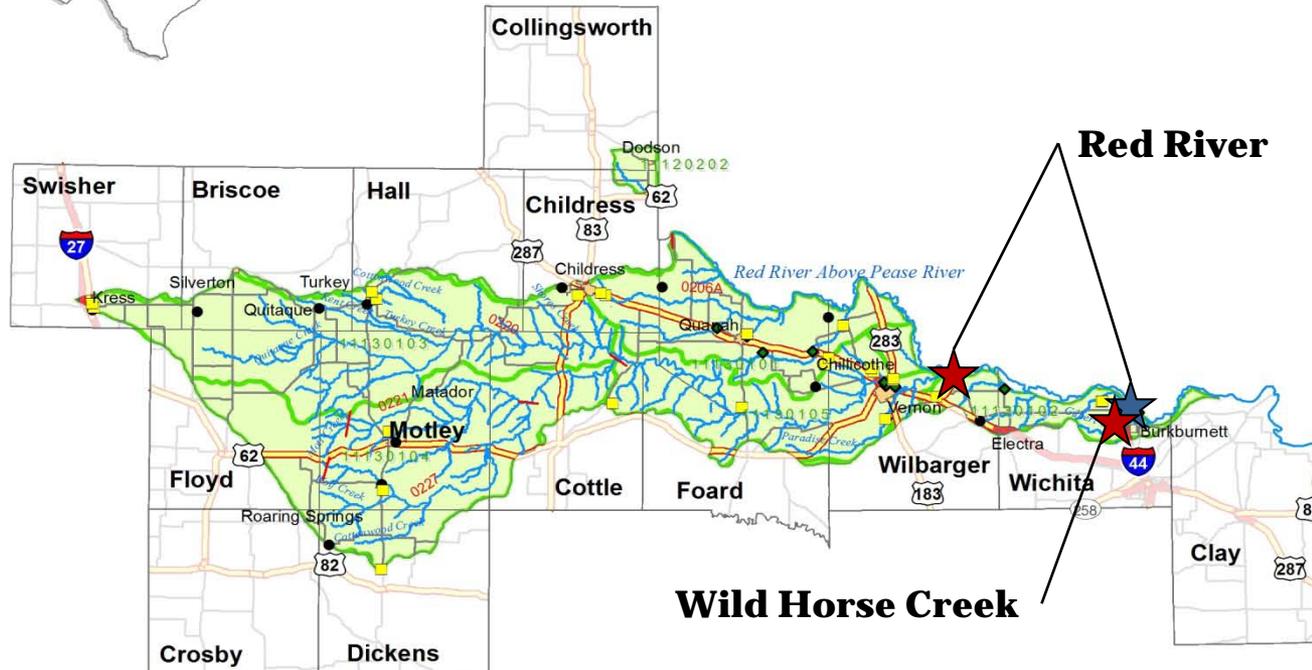
# Red Reach III



- Red River Below Pease River (0205)
  - Bacteria impairment
  - Chlorophyll-*a* concern
- Red River Above Pease River (0206)
- South Groesbeck Creek (0206B)
- Upper/North Fork Pease River (0220)
- Middle Fork Pease River (0221)
- Pease River (0230)
- Paradise Creek (0230A)



# Red River Basin Reach III



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach III

# Red River at US 183



# Red River at US 277/281



# Wild Horse Creek at US 277/281



# Red Reach III

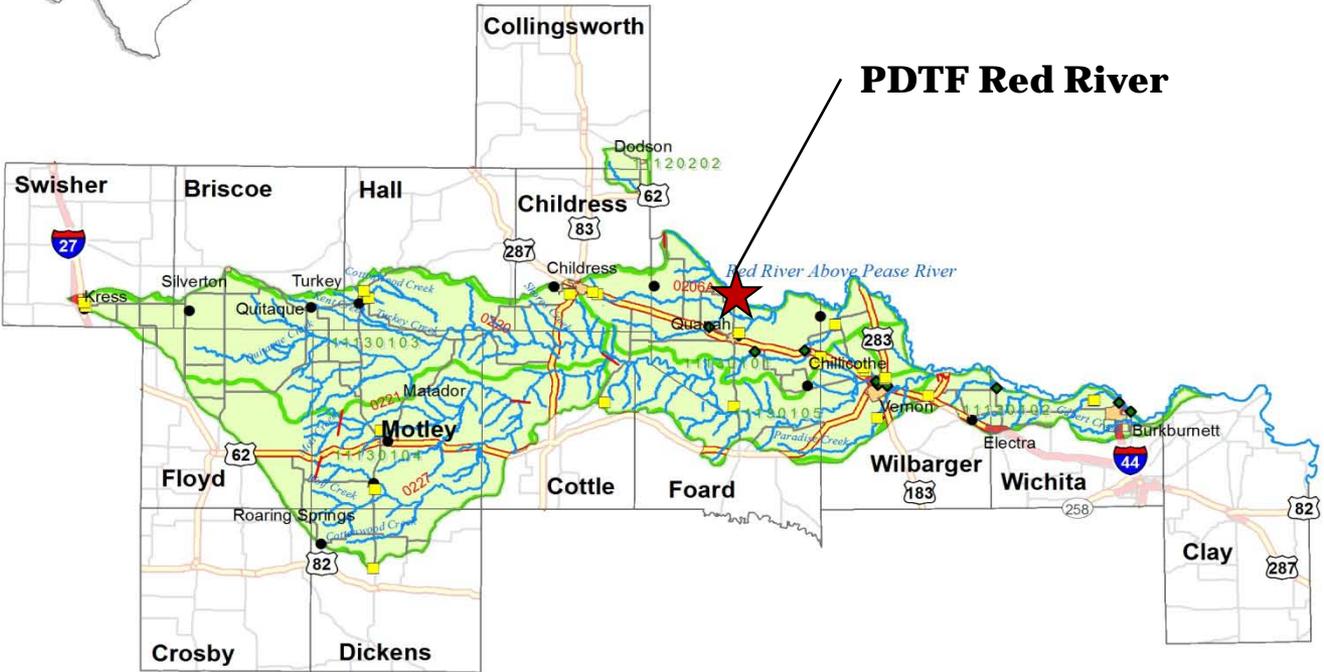


- Red River Below Pease River (0205)
- Red River Above Pease River (0206)
  - No impairments or concerns
- South Groesbeck Creek (0206B)
- Upper/North Fork Pease River (0220)
- Middle Fork Pease River (0221)
- Pease River (0230)
- Paradise Creek (0230A)



# Red River Basin

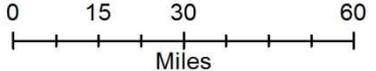
## Reach III



**PETF Red River**

### Legend

- MSW / Landfill
- ◆ Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- ~ Hydrology
- ⊕ Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach III



# PDTF Red River at SH 6



# Red Reach III

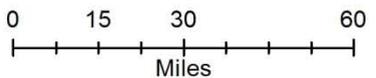
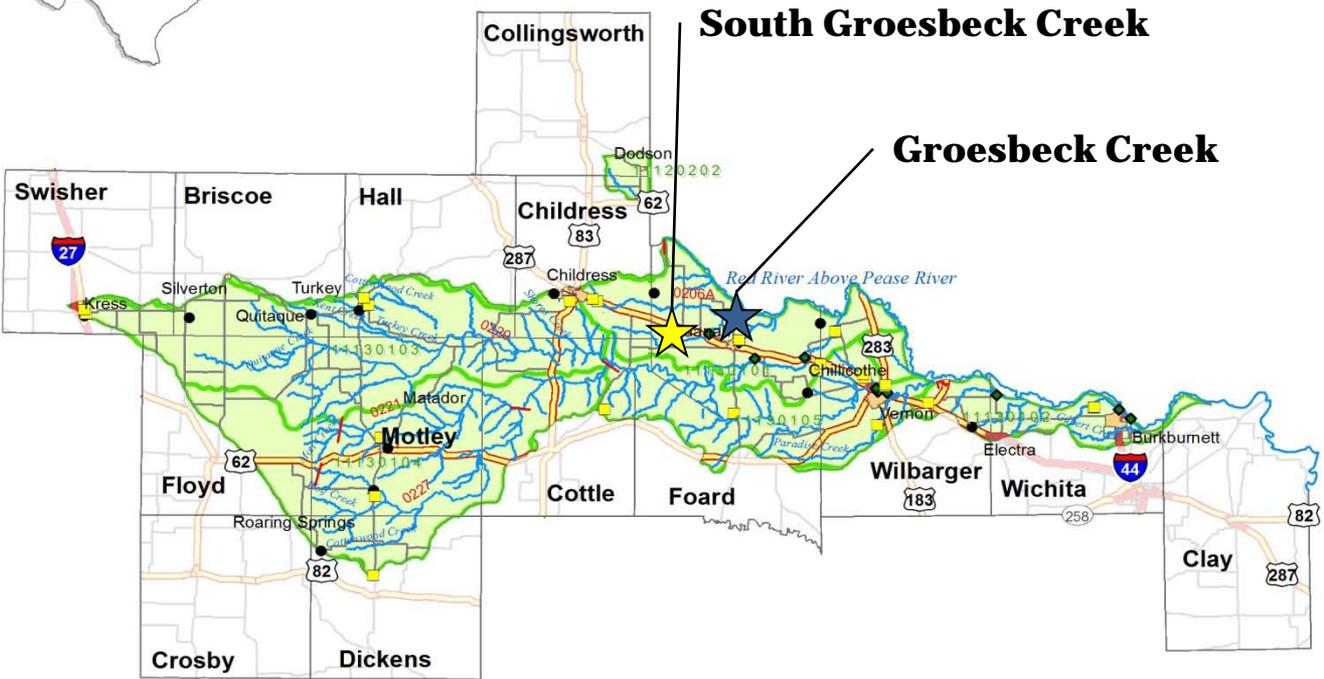


- Red River Below Pease River (0205)
- Red River Above Pease River (0206)
- South Groesbeck Creek (0206B)
  - Bacteria impairment
  - Chlorophyll-*a* and nitrate concerns
- Upper/North Fork Pease River (0220)
- Middle Fork Pease River (0221)
- Pease River (0230)
- Paradise Creek (0230A)



# Red River Basin

## Reach III



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach III

# Groesbeck Creek at SH 6



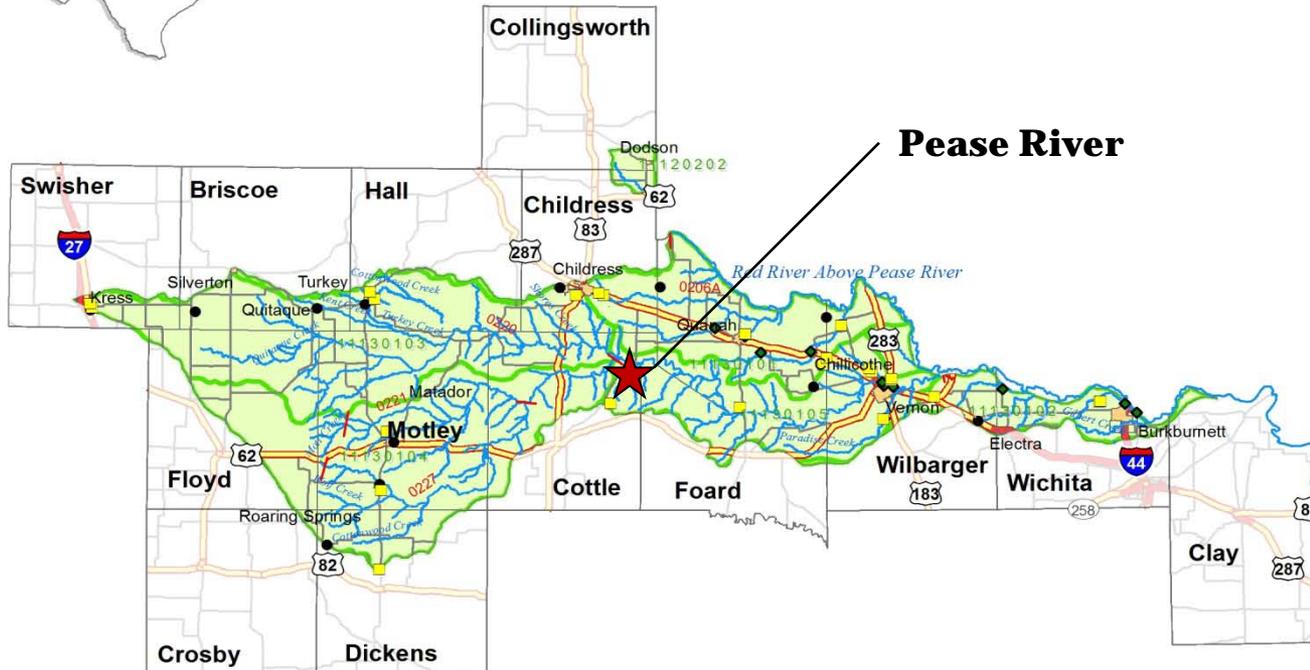
# Red Reach III



- Red River Below Pease River (0205)
- Red River Above Pease River (0206)
- South Groesbeck Creek (0206B)
- Upper/North Fork Pease River (0220)
  - No impairments or concerns
- Middle Fork Pease River (0221)
- Pease River (0230)
- Paradise Creek (0230A)



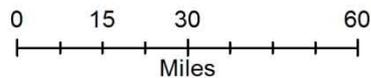
# Red River Basin Reach III



**Pease River**

### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach III



# Pease River at FM 104



# Red Reach III



- Red River Below Pease River (0205)
- Red River Above Pease River (0206)
- South Groesbeck Creek (0206B)
- Upper/North Fork Pease River (0220)
- Middle Fork Pease River (0221)
  - No impairments or concerns
- Pease River (0230)
- Paradise Creek (0230A)

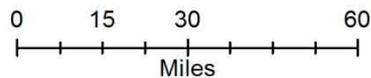
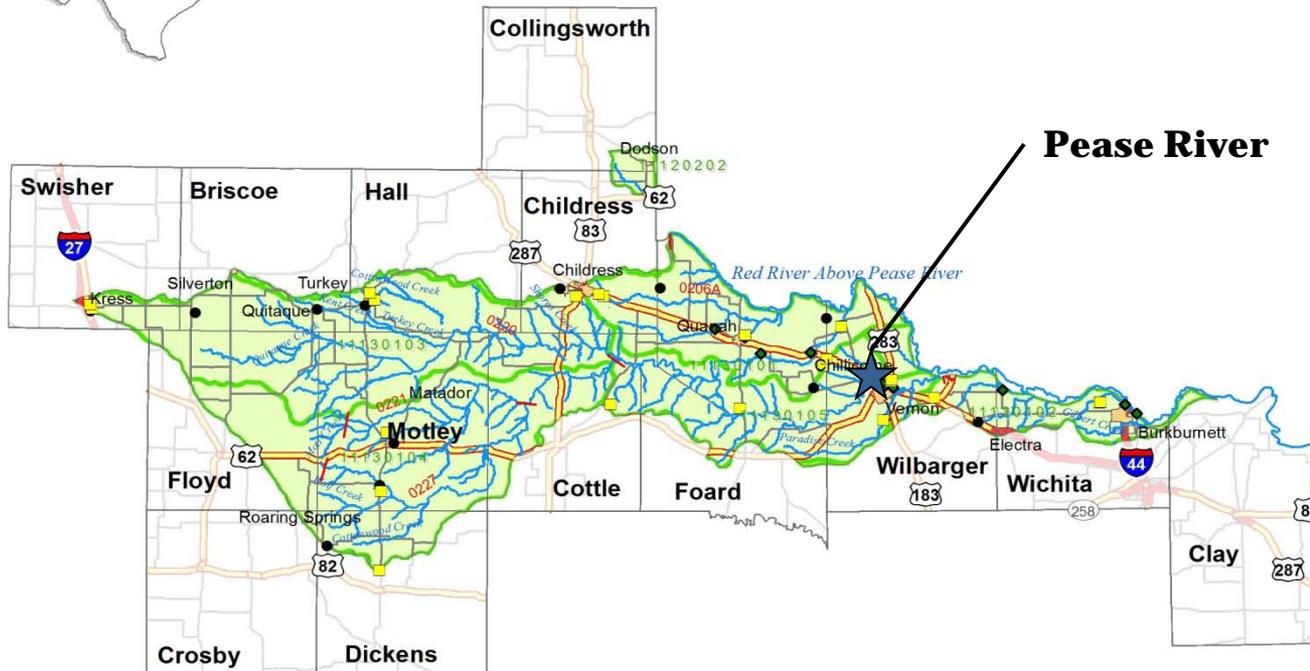
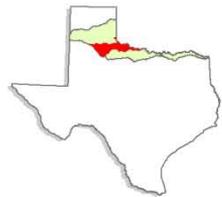
# Red Reach III



- Red River Below Pease River (0205)
- Red River Above Pease River (0206)
- South Groesbeck Creek (0206B)
- Upper/North Fork Pease River (0220)
- Middle Fork Pease River (0221)
- Pease River (0230)
  - No impairments or concerns
- Paradise Creek (0230A)



# Red River Basin Reach III



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach III

# Pease River at US 287



# Red Reach III

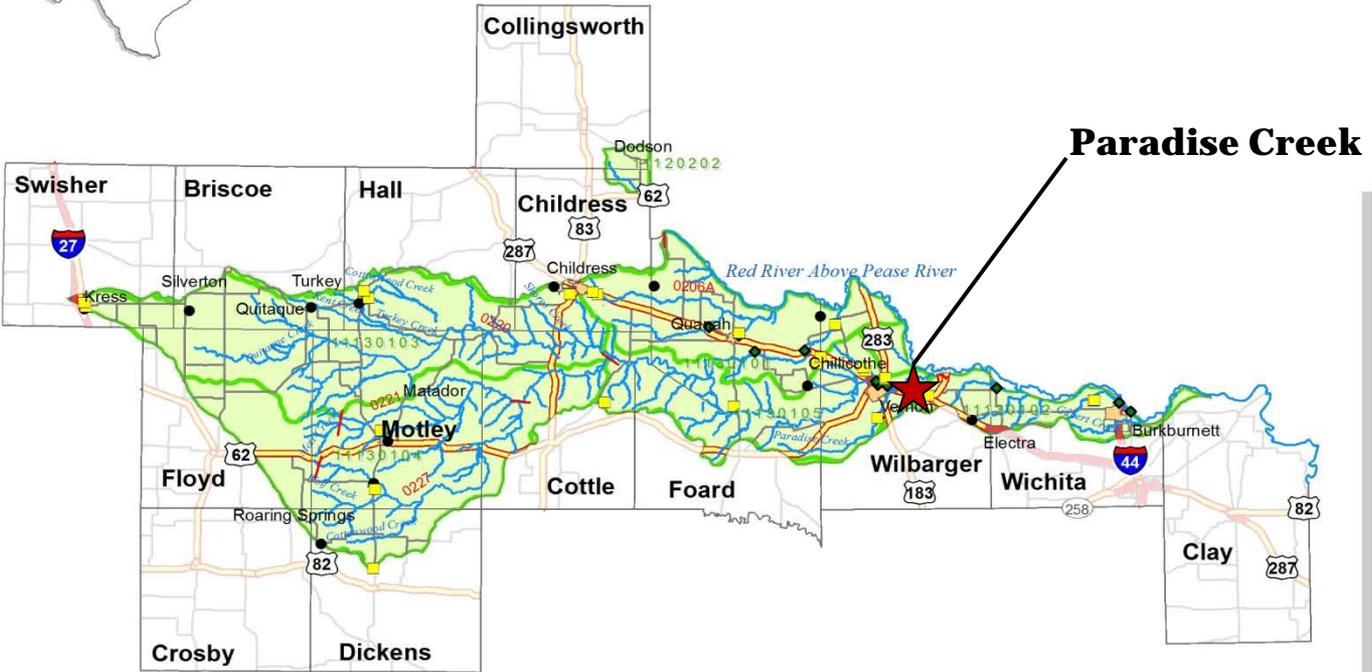


- Red River Below Pease River (0205)
- Red River Above Pease River (0206)
- South Groesbeck Creek (0206B)
- Upper/North Fork Pease River (0220)
- Middle Fork Pease River (0221)
- Pease River (0230)
- Paradise Creek (0230A)
  - Bacteria impairment
  - Chlorophyll-*a* and nitrate concerns



# Red River Basin

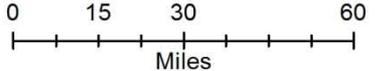
## Reach III



**Paradise Creek**

### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach III



# Paradise Creek at US 287



# Red Reach IV



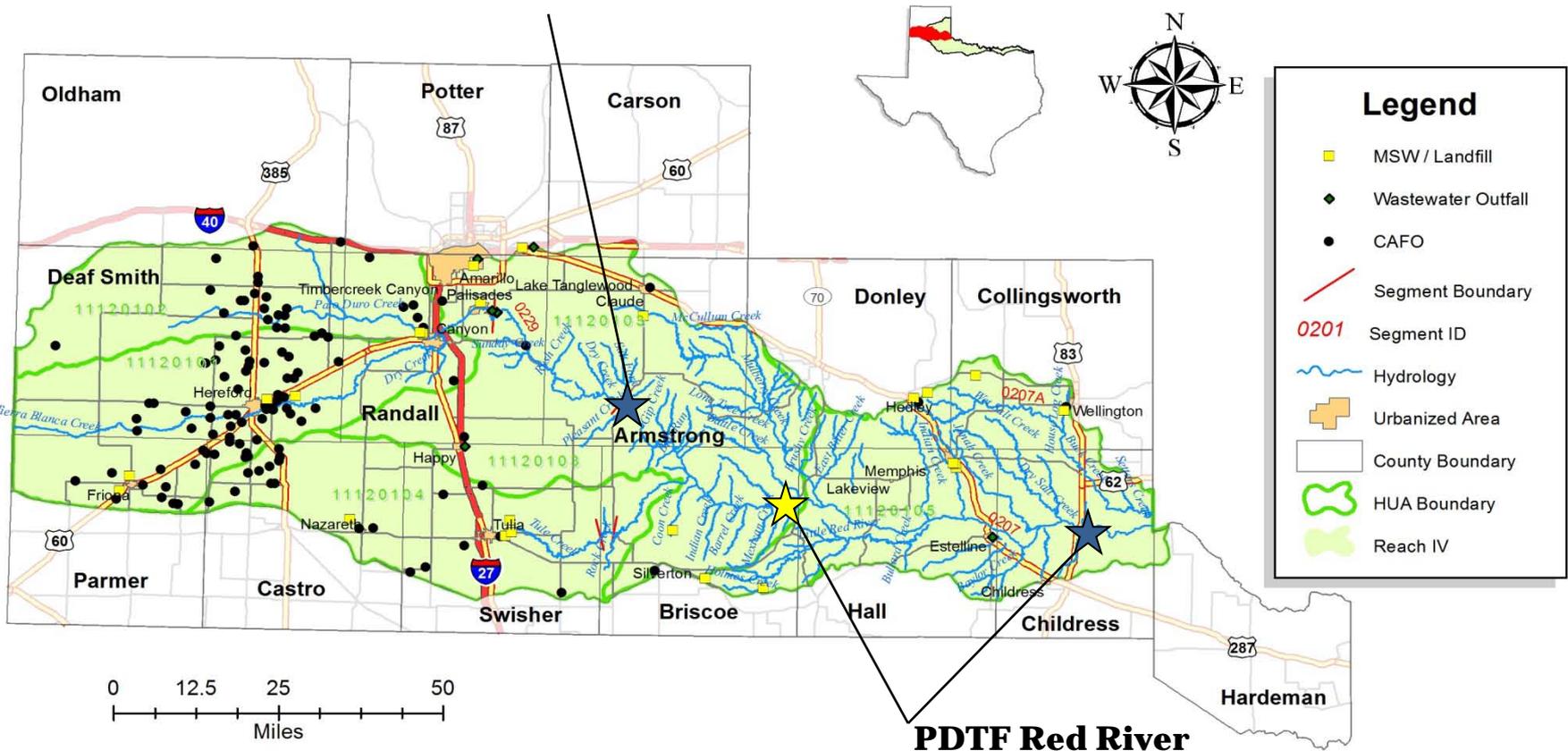
- Lower PDTF Red River (0207)
  - Bacteria impairment
  - Chlorophyll-*a* concern
- Buck Creek (0207A)
- Mackenzie Reservoir (0228)
- Upper PDTF Red River (0229)
- Lake Tanglewood (0229A)



# Red River Basin Reach IV



## Lower PDTF Red River



# Lower PDTF Red River at SH 207



# Red Reach IV



- Lower PDTF Red River (0207)
- Buck Creek (0207A)
  - No impairments
  - Nitrate concern
- Mackenzie Reservoir (0228)
  - No impairments or concerns
- Upper PDTF Red River (0229)
  - pH impairment
  - Chlorophyll-*a*, nitrate, ortho/total phosphorus concerns
- Lake Tanglewood (0229A)
  - No impairments
  - Ammonia, chlorophyll-*a*, depressed DO, nitrate, ortho/total phosphorus concerns

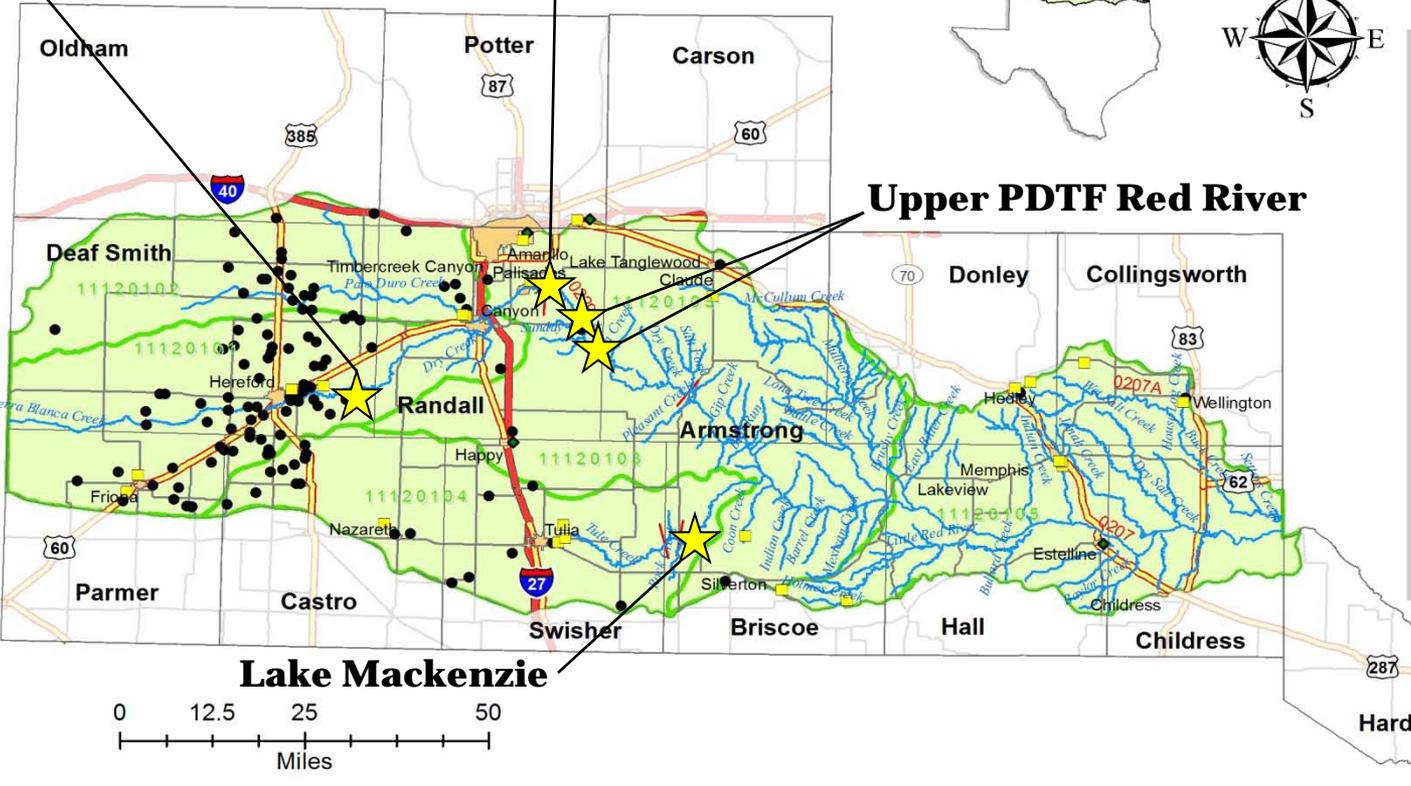


# Red River Basin Reach IV



Lake Tanglewood

Tierra Blanca Creek



Upper PDTF Red River

### Legend

- MSW / Landfill
- ◆ Wastewater Outfall
- CAFO
- Segment Boundary
- 0201 Segment ID
- ~ Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Reach IV

# Red Reach V

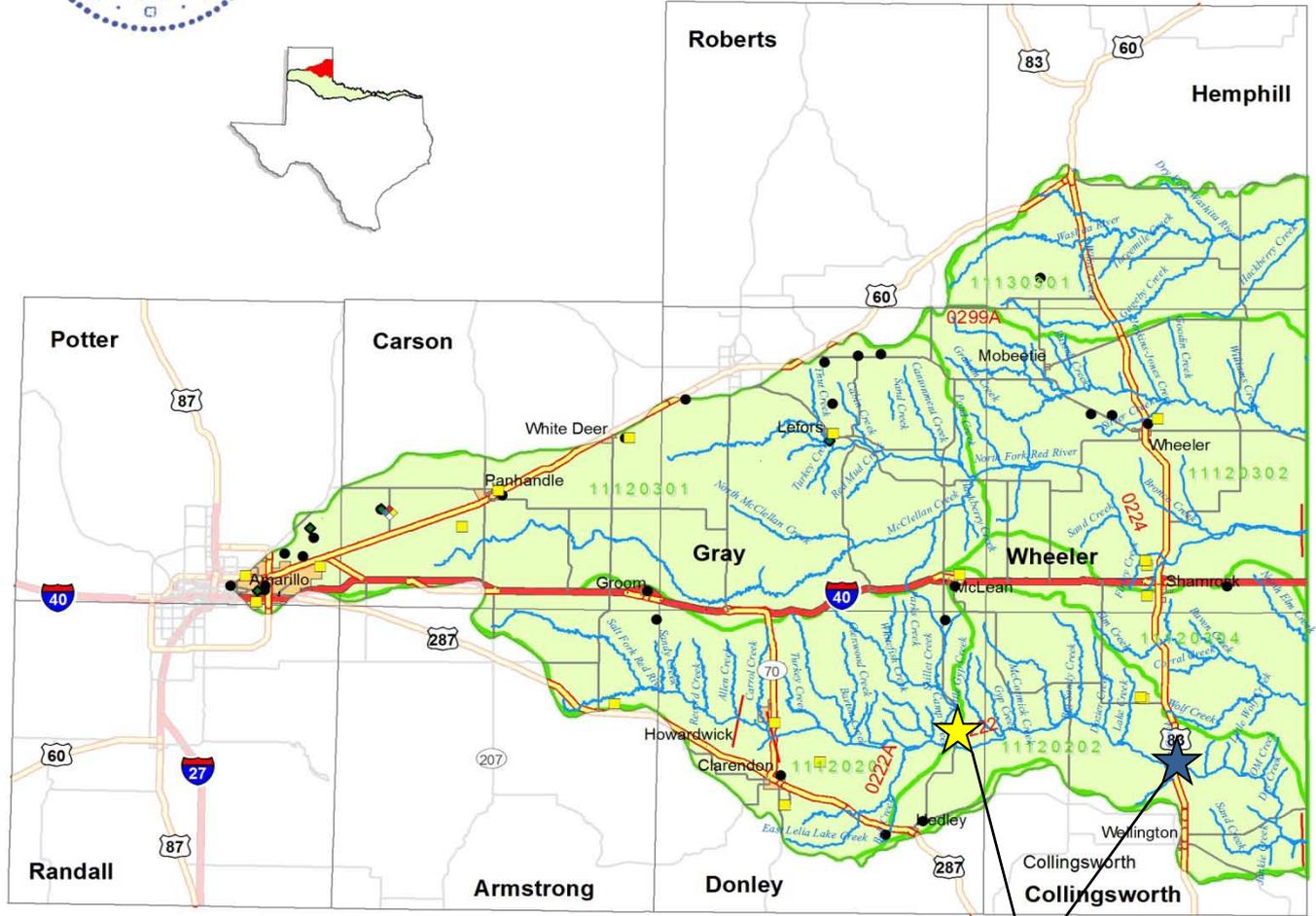
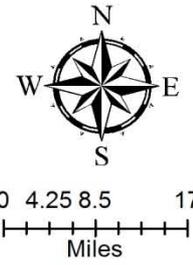


- Salt Fork of the Red River (0222)
  - Bacteria impairment
  - No concerns
- Lelia Lake Creek (0222A)
- Greenbelt Lake (0223)
- North Fork of the Red River (0224)
- McClellan Creek (0224A)
- Sweetwater Creek (0299A)



# Red River Basin

## Reach V



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach V

**Salt Fork Red River**

# Salt Fork Red River at US 83



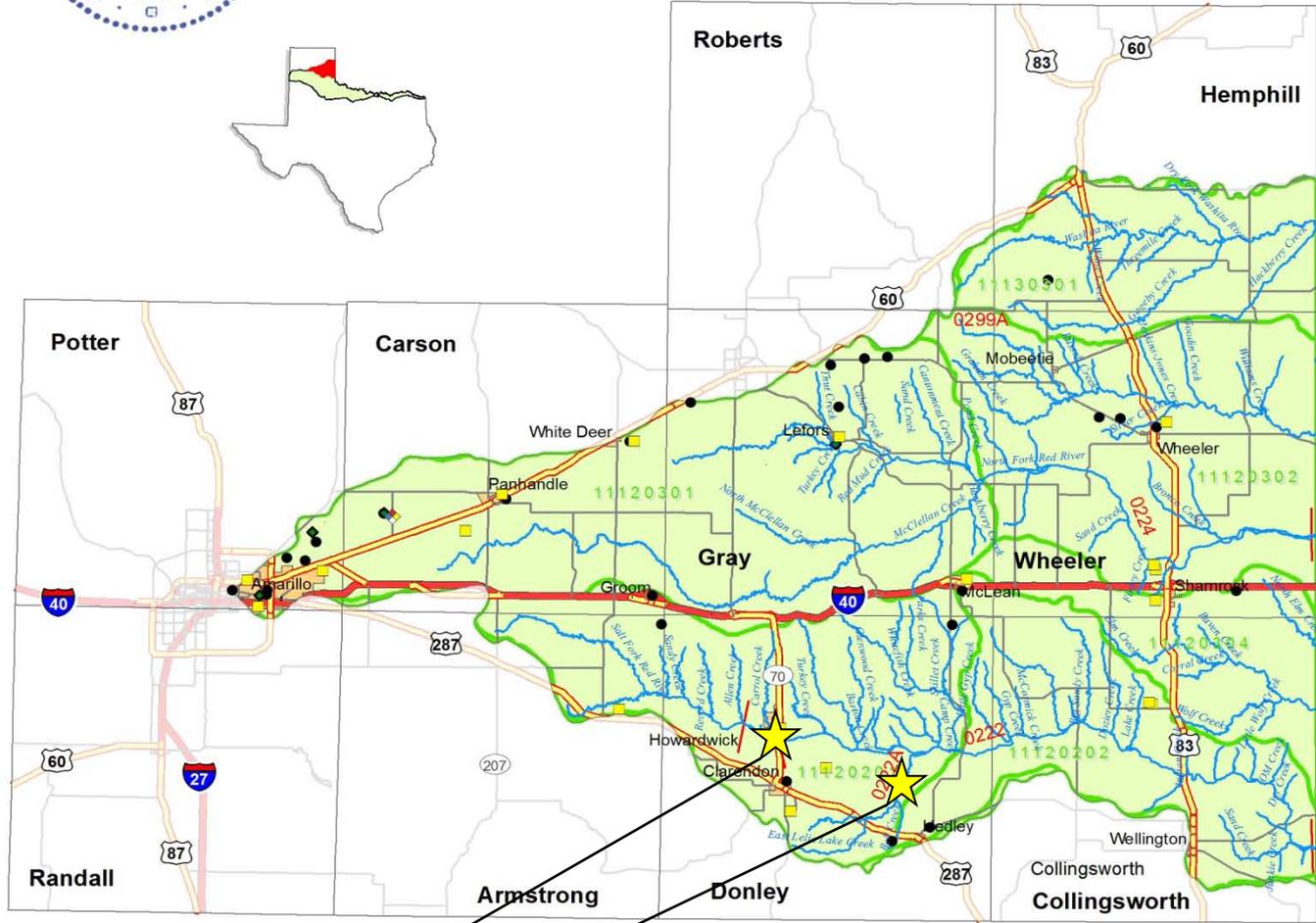
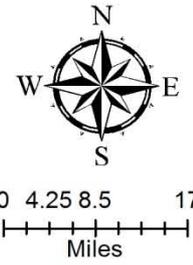
# Red Reach V



- Salt Fork of the Red River (0222)
- Lelia Lake Creek (0222A)
  - No impairments or concerns
- Greenbelt Lake (0223)
  - No impairments or concerns
- North Fork of the Red River (0224)
- McClellan Creek (0224A)
- Sweetwater Creek (0299A)



# Red River Basin Reach V



**Legend**

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach V

**Greenbelt Reservoir**

**Lelia Lake Creek**

# Red Reach V

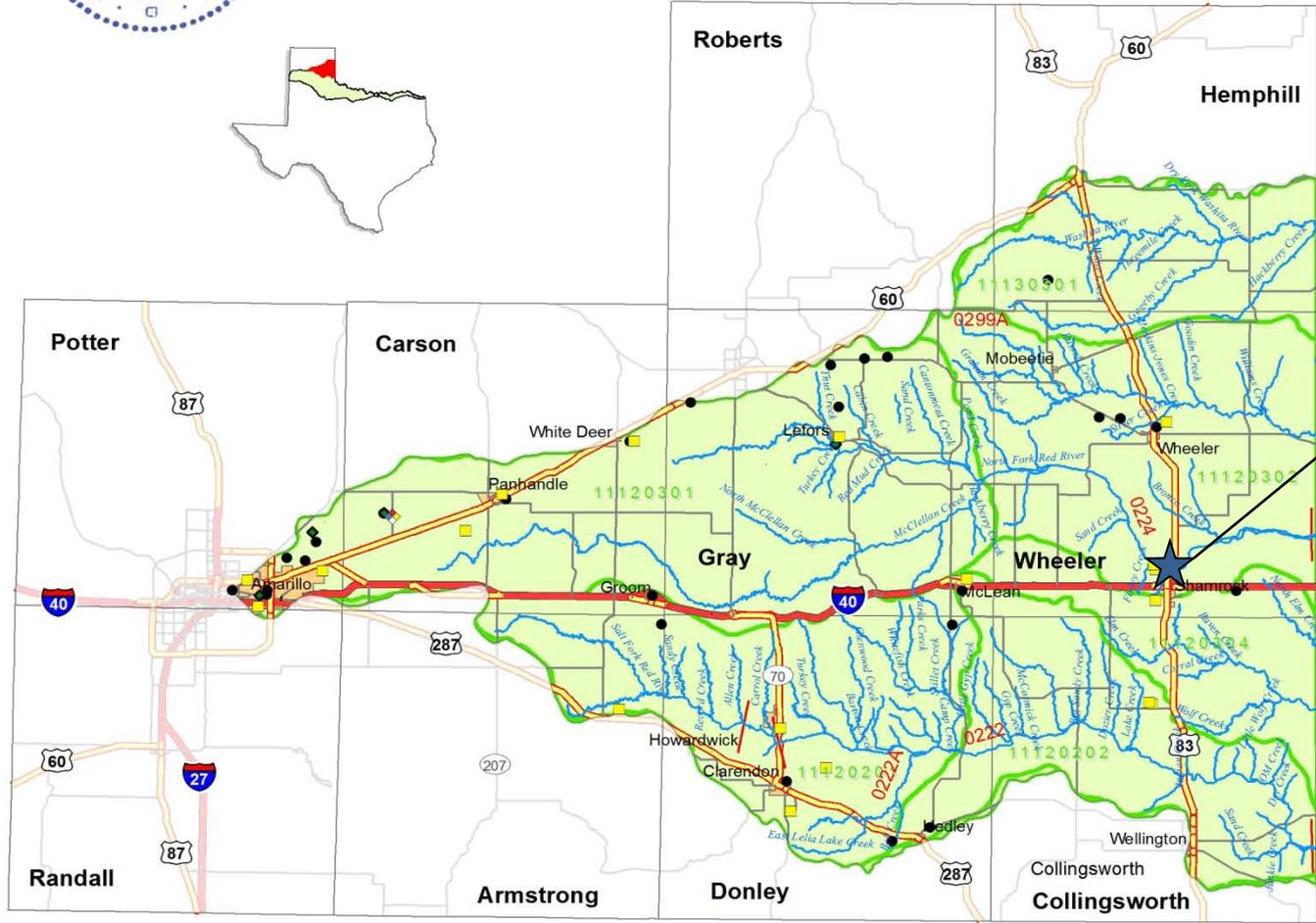
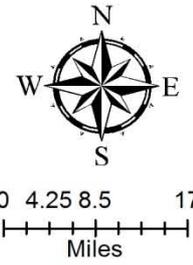


- Salt Fork of the Red River (0222)
- Lelia Lake Creek (0222A)
- Greenbelt Lake (0223)
- North Fork of the Red River (0224)
  - No impairments or concerns
- McClellan Creek (0224A)
- Sweetwater Creek (0299A)



# Red River Basin

## Reach V



**North Fork Red River**

**Legend**

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach V

# North Fork Red River at US 83



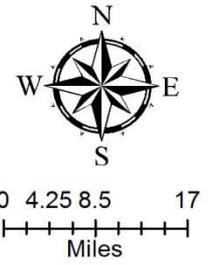
# Red Reach V



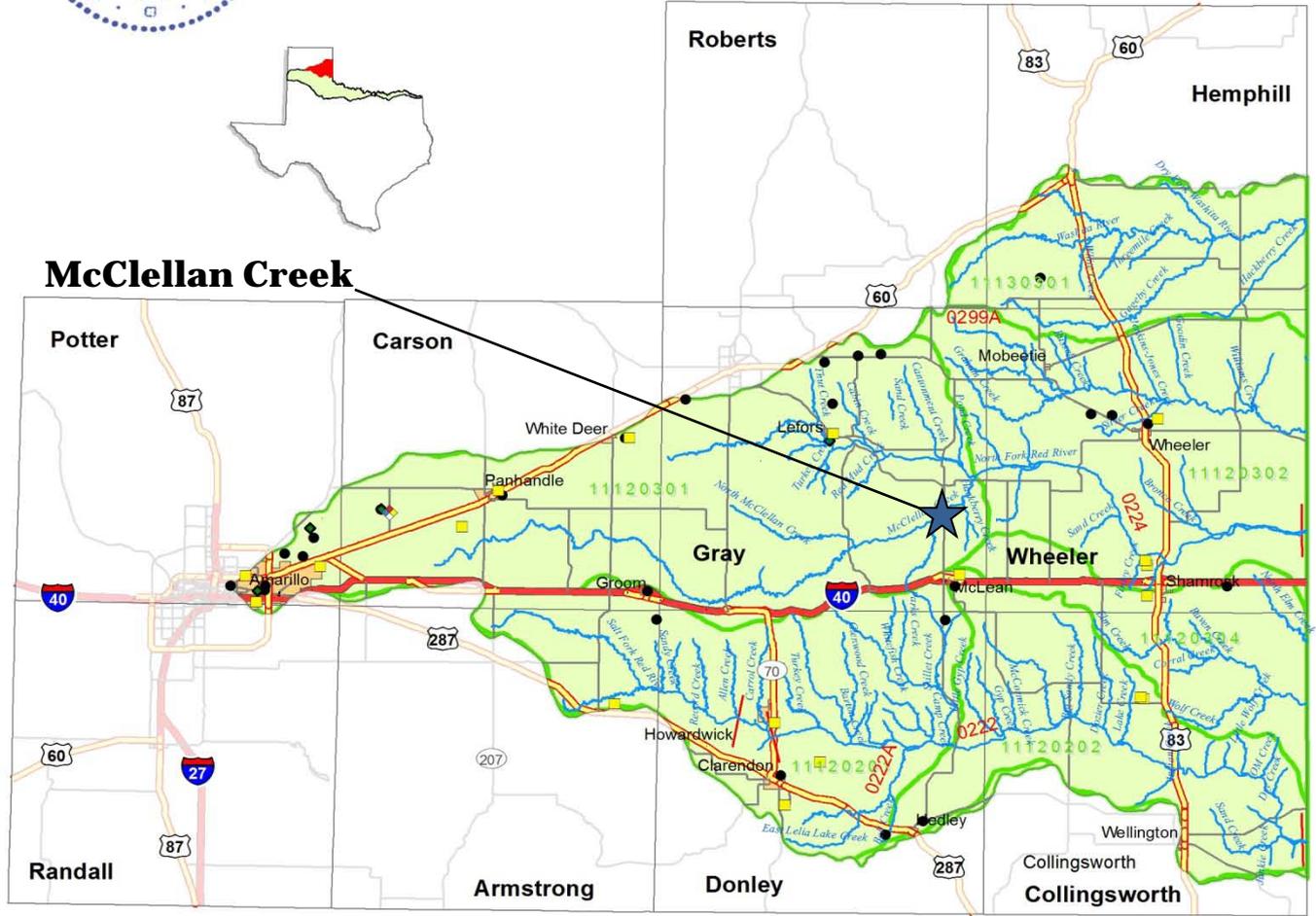
- Salt Fork of the Red River (0222)
- Lelia Lake Creek (0222A)
- Greenbelt Lake (0223)
- North Fork of the Red River (0224)
- McClellan Creek (0224A)
  - Bacteria impairment
  - No concerns
- Sweetwater Creek (0299A)



# Red River Basin Reach V



## McClellan Creek



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach V

# McClellan Creek at SH 273



# Red Reach V

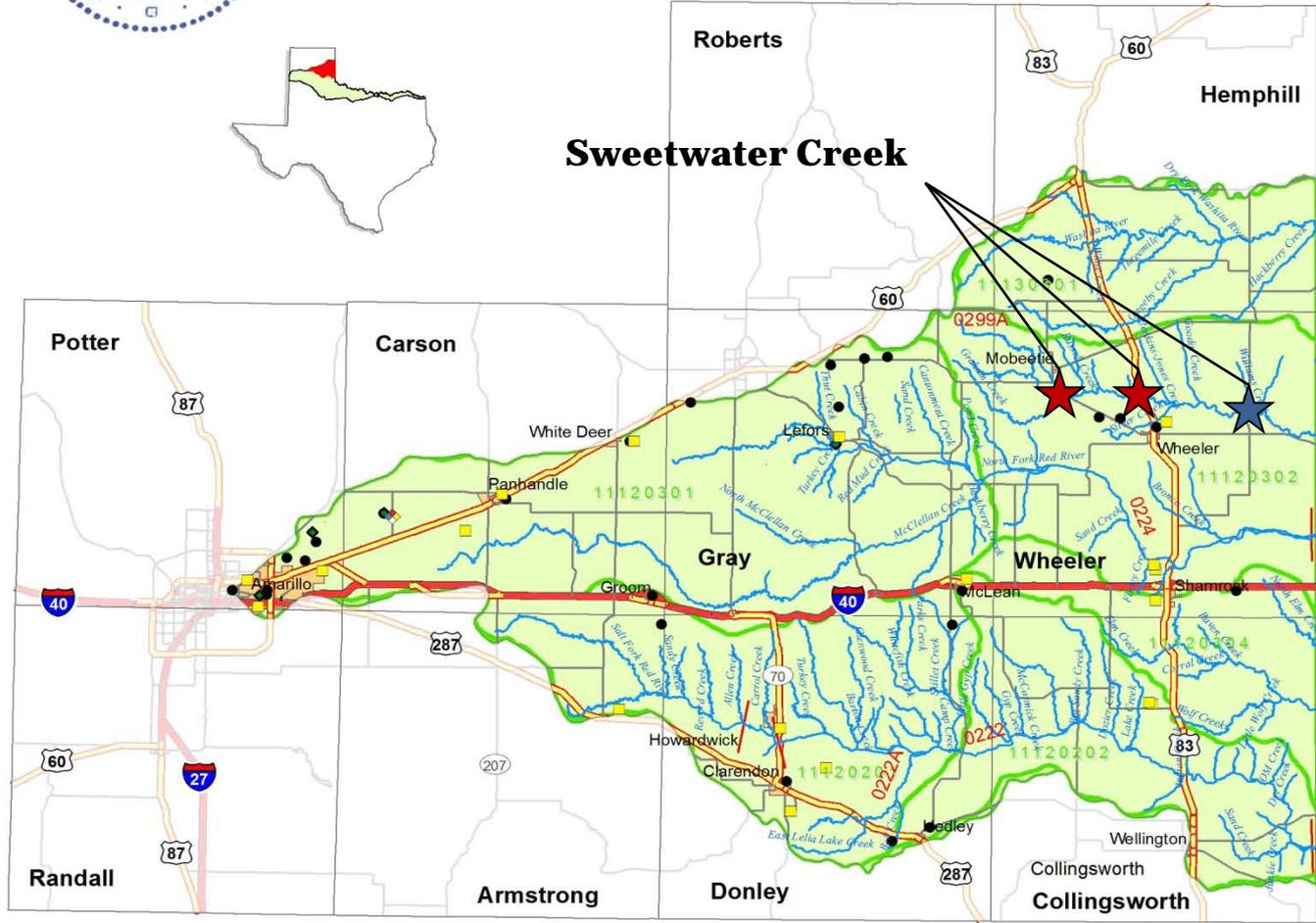
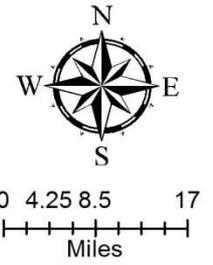


- Salt Fork of the Red River (0222)
- Lelia Lake Creek (0222A)
- Greenbelt Lake (0223)
- North Fork of the Red River (0224)
- McClellan Creek (0224A)
- Sweetwater Creek (0299A)
  - Bacteria impairment
  - Depressed DO concern



# Red River Basin

## Reach V



### Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach V

# Sweetwater Creek at SH 152



# Sweetwater Creek at US 83



# Sweetwater Creek at SH 592



# FY2014 Monitoring Considerations



- Additional monitoring stations have not been identified
- On-going drought conditions have impacted current monitoring
- Unlikely additional monitoring will take place until regular rainfall is present within the basin

# FY2014 Monitoring Drought Implications



- Prolonged drought conditions have drastically reduced stream flow
- Traditional monitoring techniques were not applicable in these conditions
- TCEQ released an Interim Drought Monitoring Guidance in November of 2011
- Provides additional parameters to help better characterize data collected during drought conditions

# FY2014 Monitoring Drought Implications



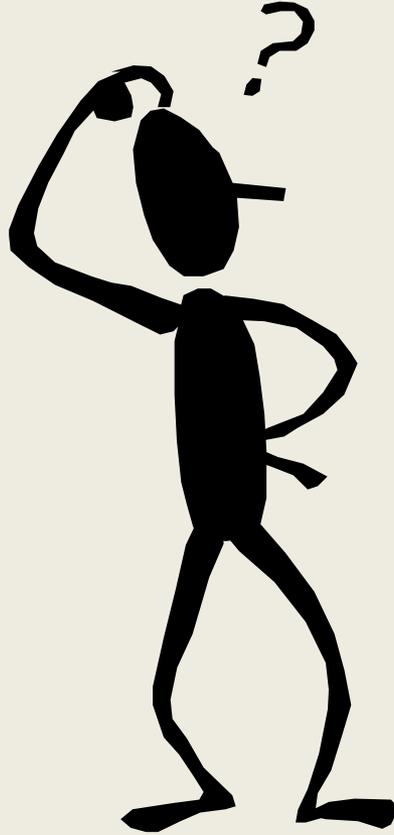
- Additional drought parameters (lake/reservoir)
  - 00051 Reservoir Stage
  - 00052 Reservoir Percent Full
  - 00053 Reservoir Access Not Possible
  - 82903 Depth of Bottom of Water Body at Sample Site
- Additional drought parameters (stream)
  - 89864 Maximum Pool Width (m)
  - 89865 Maximum Pool Depth (m)
  - 89869 Pool Length (m)
  - 89870 % Pool Coverage

# FY 2014 Goals



- Continue to pursue 24-hour dissolved oxygen studies to obtain data needed to better assess depressed DO impairments and concerns
- Continue to pursue additional monitoring locations to help identify already impaired water bodies
- Collect *Enterococcus* data on streams with elevated conductivity to better assess the presence of bacteria

# Questions



# RED RIVER AUTHORITY OF TEXAS



Clean Rivers  
Program  
Partner Since  
1991



NELAP  
Accredited  
Laboratory  
Since 2006

## Contact Information

P.O. Box 240, Wichita Falls, Texas 76307

Phone Number: (940) 723-8697 • Fax Number: (940) 723-8531

Hours of Operation: Monday –Friday 8:00 –5:00 • Emergency Laboratory Services: (940) 636-8024