# Trinity River Authority

Clean Rivers Program

# 2009 Basin Highlights Report

## Introduction

The Basin Highlights Report is an annual report that provides an up date of the activities of the Clean Rivers Program (CRP) in the Trinity River Basin. The objectives of the CRP are to maintain and improve the quality of our water resources, and focuses on routine monitoring, special studies, and public outreach programs. The program was created in 1991 when the 72nd Texas Legislative Session passed Senate Bill 818, and is administered by the Texas Commission on Environmental Quality (TCEQ). By partnering with other river authorities, TCEQ can receive significantly more data and local knowledge that can be used in decision making processes. In return, TCEQ provides guidance that enables each authority to apply consistent methods for reaching their goals. CRP is funded, in part, by fees assessed to water and wastewater permits.

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## Trinity River Authority Clean Rivers Program

| Water Quality | Special Studies | Public Outreach |
|---|---|---|
| Develop and maintain basin-wide water quality monitoring Network | Perform investigations into potential water quality concerns and assist stakeholders in acquiring data related to regulatory issues | Increase public awareness of and involvement in water resource issues |

## Executive Summary—2008 Water Quality Inventory

Aquatic Life Use concerns and non-attainment are due to depressed dissolved oxygen in several areas of the basin. These may be due to intermittent nature of smaller streams and eutrophication in reservoirs.

Contact Recreation Use concerns and non-attainment are due to elevated *E. coli* levels along the main stem of the river as well as the upper reaches of the major forks. The 2008 Water Quality Inventory was the first year there was enough data to assess the metroplex streams. These streams as well as the upper reaches of the forks can be intermittent and affected by livestock, pets, and other wildlife.

General Use includes pH, anions, and dissolved solids. Elevated pH in the Cedar Creek subwatershed (818) may be due to eutrophication. In addition, this segment has a pH standard of 6 to 8.5 standard units while all other segments in the basin have a standard of 6.5 to 9. Sulfate was found to be exceeding the standard of 50 mg/L in Lake Livingston (803), however, TCEQ is proposing an increase of the standard to 70 mg/L for the next assessment.

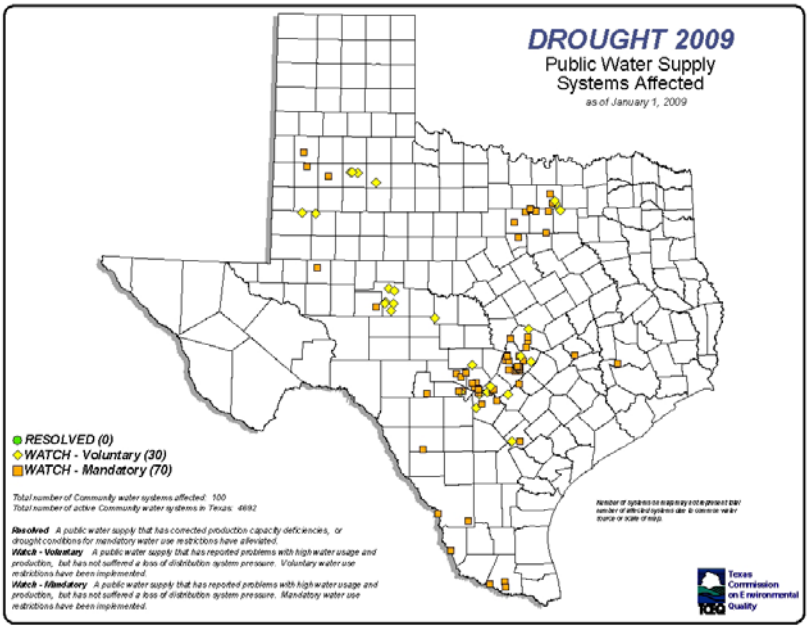
Fish consumption bans from Fort Worth to south of Dallas are due to elevated levels of legacy pollutants in fish tissue. There are TMDLs currently underway to determine the sources and extent of this issue.

There are concerns for elevated levels of Chlorophyll a and nutrients throughout the basin. Major sources of nutrients which can lead to excessive algal growth include runoff from residential and agricultural areas as well as wastewater treatment plant effluent.

# This Year's Highlights

## Drought 2008

For the past several years, a majority of the state of Texas has experienced severe drought conditions. These conditions have rivaled the Drought Record from 1947 to 1957 especially when viewed in light of the almost 164% increase in population between that period and now. The Annual Precipitation Total and Annual Temperature Average graph to the right illustrates the extent of the current drought as compared to the Drought of Record. By the beginning of 2007, the water supply situation was beginning to become critical. In the Trinity River basin, some lakes were more than 17 feet below conservation pool elevation and almost 100 public water supply systems had issued voluntary or mandatory rationing orders.




**Drought 2009 - Public Water Supply Systems Affected Within the Trinity River Basin**

In the early summer of 2007, heavy rainfall across the state helped to temporarily ease the impending dilemma. However, in the dichotomy of Texas weather, these rains caused severe flooding in many parts of the state. From May to July 2007, over 25 inches of rain was measured by the official rain gauge at Dallas-Fort Worth International Airport bringing the total rainfall for all of 2007 to just over 50 inches. By the beginning of 2008, there were no public water supply systems within the Trinity River basin affected by drought and all water use restrictions had been lifted. Unfortunately, the bounty of rain did not continue. Only 27.3 inches of rain was recorded at the DFW Airport gauge for all of 2008.

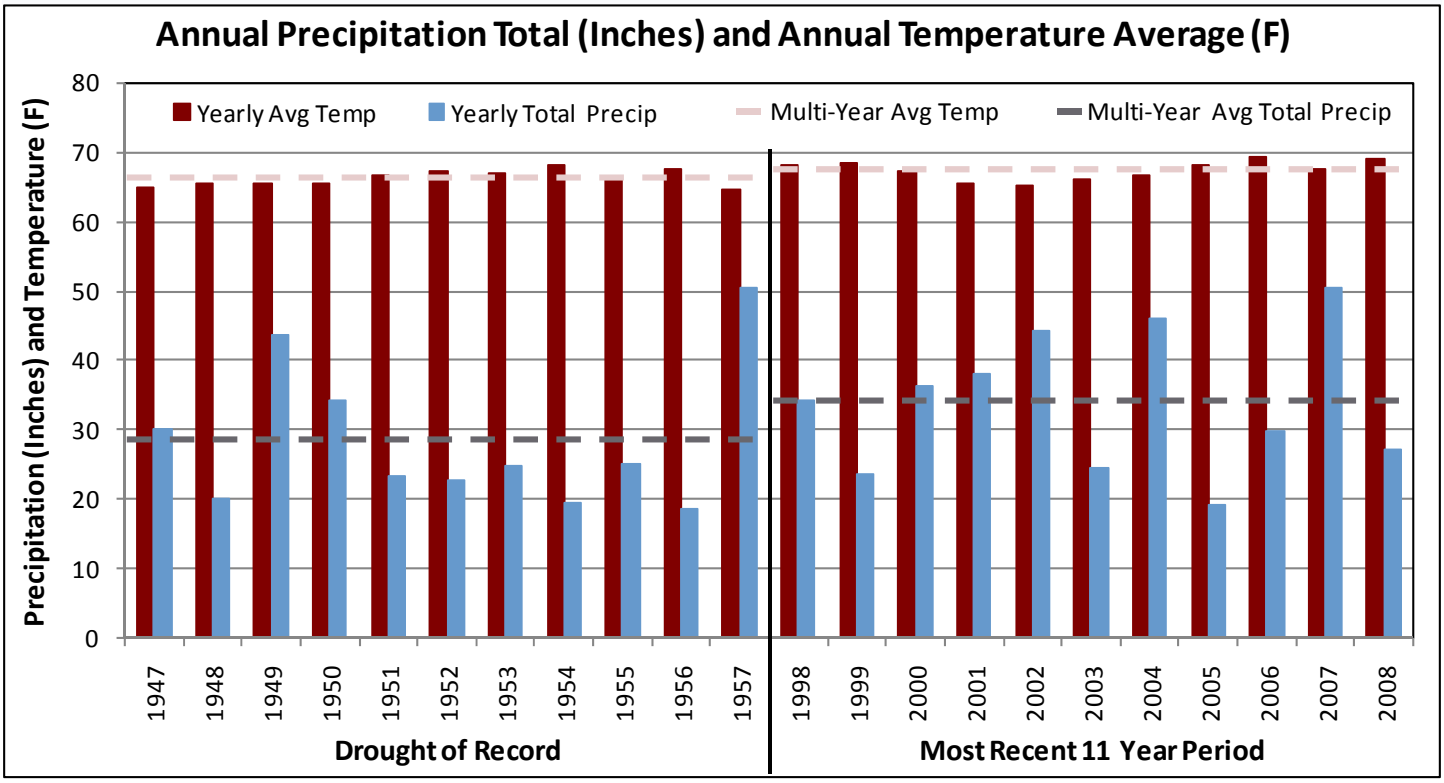
At the beginning of 2009, there were already 14 public water supply systems in the Trinity River basin that had issued a watch for water shortages. The Drought 2009 map and table to the left show the locations and details of the affected public water supply systems. Long term predictions for 2009 indicate that there is an above normal chance for greater than median temperatures and an equal chance for median precipitation. Therefore, it is not expected that we will have a return of the heavy rainfalls of 2007. It appears that the drought will continue through 2009. As of January 2009, most of the reservoirs within the Trinity River basin were below conservation pool elevation. By June 2009, many of the lake levels had risen with the spring rains, however, a majority of the reservoirs were still below conservation pool elevation with only a few slightly above. The Trinity River Basin Reservoir Elevations table to the right shows the reservoir elevations and their deviations from the conservation pool elevations for these two time periods.

More information on drought and public water

| PWS Name | County | Priority | Stage | Population |
|---|---|---|---|---|
| City of Carrollton | Dallas | W | V | 120,150 |
| City of Lewisville | Denton | W | V | 91,550 |
| Town of Flower Mound | Denton | W | 1 | 60,000 |
| City of Highland Village | Denton | W | 1 | 14,500 |
| Woodland Hills | Denton | W | 1 | 105 |
| Last Resort Properties | Denton | W | V | 57 |
| Walnut Creek SUD | Parker | W | 2 | 16,842 |
| Saddle Club Estates | Parker | W | 1 | 273 |
| City of Southlake | Tarrant | W | 1 | 25,700 |
| Westside Rural WSC | Tarrant | W | 1 | 681 |
| Cooley Point | Tarrant | W | 3 | 153 |
| North Ridge Estates | Tarrant | W | 1 | 138 |
| Prairie Ridge Estates | Tarrant | W | 1 | 270 |
| Hills of Briar Oaks | Wise | W | 1 | 315 |

**Priority of Water Use**
**W - Watch.** Water shortage possible.

**Stages of Water Rationing**
**V - Voluntary.** Water supply suggests that customers limit water use to avoid further restrictions.
**1 - Mild rationing.** Usage of water for outdoor purposes, such as lawns, gardens, and car washing, can be restricted by the utility.
**2 - Moderate rationing.** All outdoor water usage is prohibited except by hand-held hoses with manual on/off nozzles. Water usage for livestock is exempt from this restriction.
**3 - Severe rationing.** All outdoor water usage is prohibited; livestock watering may be exempted by the utility. All consumption may also be limited to each customer in specific ways.




## Trinity River Basin Reservoir Elevations

| Reservoir | Conservation Pool (ft) | Elevation as of 1/23/09 (ft) | 1/23/09 Deviation From Conservation Pool (ft) | Elevation as of 6/9/09 (ft) | 6/9/09 Deviation From Conservation Pool (ft) |
|---|---|---|---|---|---|
| Bridgeport | 836 | 827.8 | -8.2 | 827.44 | -8.56 |
| Grapevine | 535 | 527.4 | -7.6 | 531.49 | -3.51 |
| Benbrook | 694 | 686.8 | -7.2 | 693.51 | -0.49 |
| Weatherford | 896 | 889.7 | -6.3 | 890.8 | -5.2 |
| Arlington | 550 | 543.8 | -6.2 | 549.51 | -0.49 |
| Richland Chambers | 315 | 310.2 | -4.8 | 312.34 | -2.66 |
| Eagle Mountain | 649 | 644.4 | -4.6 | 644.98 | -4.02 |
| Lavon | 492 | 487.8 | -4.2 | 491.82 | -0.18 |
| Lewisville | 522 | 517.8 | -4.2 | 522.03 | 0.03 |
| Bardwell | 421 | 417.8 | -3.2 | 419.87 | -1.13 |
| Navarro Mills | 424.5 | 421.4 | -3.1 | 424.36 | -0.14 |
| Amon G. Carter | 920 | 917.3 | -2.7 | 919.1 | -0.9 |
| Ray Roberts | 632.5 | 629.9 | -2.6 | 632.96 | 0.46 |
| Joe Pool | 522 | 519.5 | -2.5 | 521.56 | -0.44 |
| Cedar Creek | 322 | 319.5 | -2.5 | 321.44 | -0.56 |
| Lake Worth | 594 | 592.1 | -1.9 | 591.91 | -2.09 |
| Ray Hubbard | 435.5 | 433.8 | -1.8 | 435.51 | 0.01 |
| Waxahachie | 531 | 530.6 | -0.4 | 530.18 | -0.82 |
| Mountain Creek | 457 | 456.8 | -0.2 | 457.34 | 0.34 |
| Livingston | 131 | 131.0 | 0.0 | 131.11 | 0.11 |
| Houston County | 260 | 260.1 | 0.1 | 259.74 | -0.26 |

supply systems can be found on the TCEQ website at h*ttp://tceq.state.tx.us/nav/util_water/drought.html*. To find more information on water conservation, please visit the Texas Water Development Board website at *http://www.twdb.state.tx.us/assistance/conservation/pubs.asp*.

# This Year's Highlights

## Hurricane Ike

In the early morning hours of September 13, 2008, Hurricane Ike made initial landfall at Galveston, Texas as a Category 2 hurricane before moving inland over Baytown and the lower portions of the Trinity River basin. It was named the third costliest hurricane to hit the United States with damages at approximately $24 billion and almost 150 people dead or missing in the US alone. Storm surges flooded low lying coastal areas and washed away almost everything in its path leaving piles of debris miles long. Several months after the hurricane, much of the debris piles remain due to funding and FEMA reimbursement issues. Oyster beds in the bay have been damaged or destroyed due to a thick silt layer deposited by the storm.

Within the Trinity River basin, the saltwater influx from the 15.65 foot storm surge caused massive fish kills and damaged cropland and marhes. Flooding and strong winds further inland caused heavy damage to structures and utilities. Large trees and power lines were knocked down leaving many communities without power for weeks. Floodwaters entering the control room of the Wallisville Saltwater Barrier destroyed electrical panels and caused the project to be shut down until repairs are made.


*The storm surge from Hurricane Ike lifted this house from its foundation and moved it across this service road.*

*Fish kill from saltwater influx into freshwater areas.*

## Trinity River Audubon Center

The Trinity River Audubon Center (TRAC) opened in October 2008 as part of the Trinity River Corridor Project being developed by the City of Dallas. The TRAC is located on 120 acres of land reclaimed from an illegal construction debris dump site. The site has been restored to include prairie grasslands, wetlands, ponds. The TRAC offers four miles of trails; several family, children, adult, and school programs; as well as volunteer opportunities. The facility building is LEED (Leadership in Energy and Environmental Design) certified and includes features such as a green roof, permeable surfaces, rainwater harvesting, low flow plumbing fixtures, and use of renewable and low environmental impact construction materials. For more information on visiting the TRAC and getting involved, visit *http://www.trinityriveraudubon.org.*

*Observation pond at the Trinity River Audubon Center.*

## Bacteria Effluent Limits

*Wastewater treatment plant effluent discharge into Trinity River.*

Beginning with the next Texas Pollutant Discharge Elimination System (TPDES) permit renewal applications, many domestic wastewater dischargers will be required to monitor bacteria levels in their effluent. In an agreement with the Environmental Protection Agency (EPA), the Texas Commission on Environmental Quality (TCEQ) has begun the rule-making process that will add bacterial effluent limits to TPDES permits. The agreement consists of an interim approach to start requiring bacterial limits for facilities that discharge into waterbodies with bacterial impairments. In addition, the agreement specifies that the frequency of monitoring will be based on the amount of discharge and the disinfection method. Larger dischargers as well as dischargers that use ultraviolet or non-chlorine chemical disinfection will be required to monitor more frequently than small dischargers or those using chlorine disinfection. For more information, please visit *http://www.tceq.state.tx.us/rules/pendprop.html* and *http://www.tceq.state.tx.us/assets/public/permitting/waterquality/attachments/stakeholders/bacteriasummary.pdf.*


*PCB TMDL study area.*


*Bacteria TMDL study area.*

## TMDL Updates

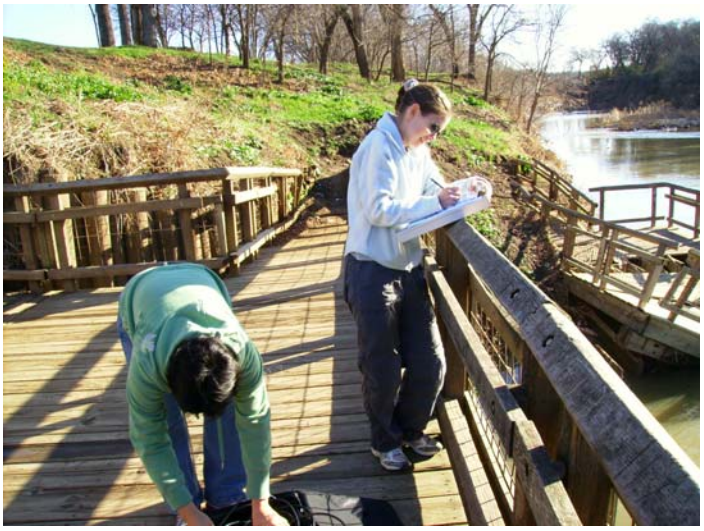
Two of the current Total Maximum Daily Load (TMDL) projects currently underway in the Trinity River basin include those for bacteria and polychlorinated biphenyls (PCBs). The bacteria TMDL covers segments 805, 806, 822, and 841 while the PCB TMDL involves segments 805, 806, 829, 841. Segments 805, 806, and 841 span the basin from Fort Worth to south of Dallas. Segment 829 is the Clear Fork of the Trinity River below Lake Benbrook and Segment 822 is the Elm Fork of the Trinity River below Lake Lewisville.

To date, the PCB TMDL study has determined that the PCB levels through the metroplex fluctuate greatly and that the levels are much higher in urban areas than they are in suburban and rural areas. In addition, there were measureable levels of PCBs found in wastewater effluent samples, however, they were approximately an order of magnitude lower than in-stream samples. The production and use of PCBs was banned in 1976 and these findings indicate that there are still sources of PCBs in the watershed. Possible sources may include old electrical transformers, salvage yards, and landfills. A study conducted in relation to the bacteria TMDL has used bacterial DNA to determine the sources of bacteria found in segments 805, 806, and 841. It was found that a majority of the bacteria in these segments came from animal sources—birds, wildlife, livestock, and pets. Both of these TMDLs are ongoing and additional information can be found at *http://www.tceq.state.tx.us/implementation/water/tmdl/66-trinity bacteria.html* and *http://www.tceq.state.tx.us/implementation/water/tmdl/77-trinity_pcbs.html*.

# Water Quality

## Water Quality Monitoring

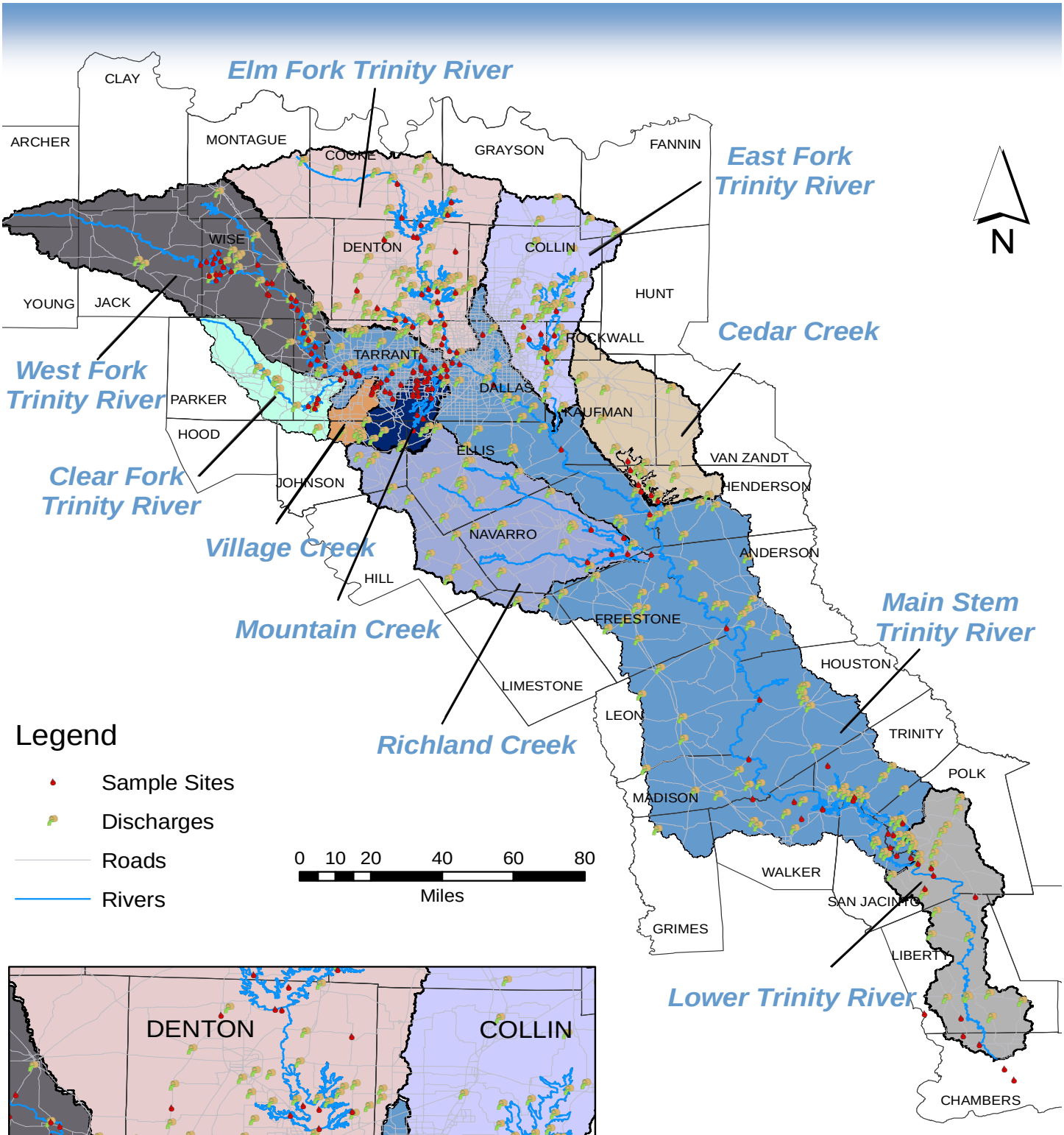
One of the most important functions of the Trinity River Authority Clean Rivers Program (TRA CRP) is the collection of water quality data through a network of local volunteer agencies. These agencies include: the cities of Arlington, Dallas, Fort Worth, Grand Prairie, and Irving, as well as Lake Livingston and Tarrant Regional Water District. TRA also has its own in house monitoring program. These agencies collect data by following a select set of guidelines enforced by the TRA CRP. In return, the TRA CRP supports each agency by providing sampling supplies, equipment, and analytical costs, as well as training, additional help for sampling, and data management. In partnering with these agencies, the TRA CRP obtains data from approximately 150 sites. Most sampling programs include field and conventional parameters. Field parameters are measurements taken while at the site and can include dissolved oxygen, pH, temperature, and conductivity. Conventional parameters are collected in the field and taken to the laboratory for analysis. These include nutrients and solids. Metals are also measured at some sites if approved by TRA CRP. The data collected from each agency is analyzed and then submitted to the TCEQ, which is then used to conduct biannual assessments of each water body. These assessments include: drinking water supply, contact recreation, general use, protection of aquatic life, and fish consumption. Any nutrient and algal growth concerns are also examined at this time.

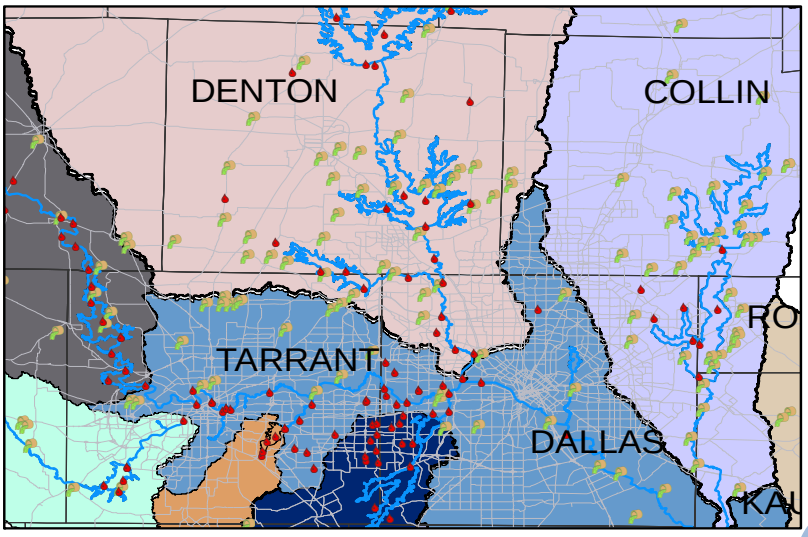


*Hong Wu-Planning and Environmental Management Assistant and Cynthia Makowsky-TRA Water Quality Technician II*

*Angela Kilpatrick–TRA CRP Coordinator and Hong Wu*

| Entity | Monitoring Type | Sites | Parameters |
|---|---|---|---|
| City of Arlington | Routine | 12 | Metals, Nutrients/Conventionals, Bacteria, Field |
| City of Dallas | Routine | 30 | Metals, Field |
| City of Fort Worth | Routine | 6 | Bacteria, Field |
| City of Grand Prairie | Routine | 22 | Metals, Organics, Nutrients/Conventionals, Bacteria, Field |
| City of Irving | Routine | 6 | Metals, Nutrients/Conventionals, Bacteria, Field |
| TRA LLP | Seasonally Biased | 6 | Diurnal Field |
| TRA LLP | Routine | 22 | Metals, Nutrients/Conventionals, Bacteria, Field |
| TRWD | Seasonally Biased | 6 | Diurnal Field |
| TRWD | Routine | 52 | Metals, Nutrients/Conventionals, Bacteria, Field |
| TRA GO | Routine | 12 | Metals, Nutrients/Conventionals, Bacteria, Field |

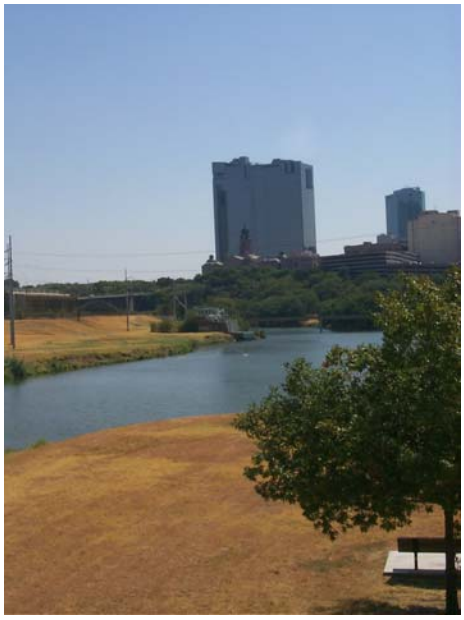



*Enlarged Map of DFW Metroplex*

**TRA Water Quality Monitoring Sites**

# Trinity River Subwatersheds



*West Fork*

*Clear Fork*

*Village Creek*

*East Fork*

*Mountain Creek*

*Elm Fork*

## Trinity River Subwatersheds Continued

*Richland-Chambers*

*Lower Trinity River*

*Cedar Creek Dam*

*Main Stem*

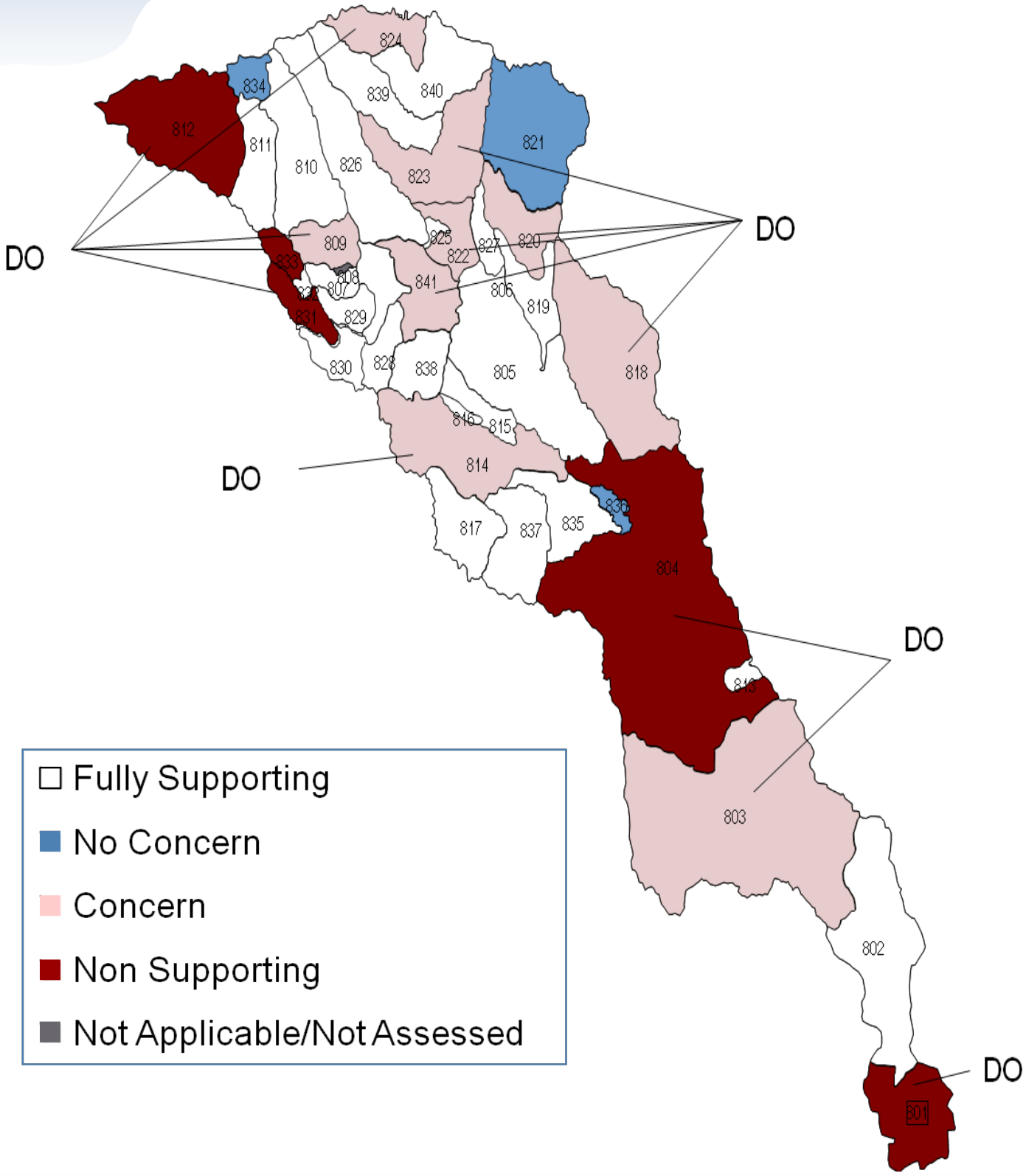
## Water Quality Inventory and 303(d) List of Impaired Waters

The following pages contain a summary of the 2008 Water Quality Inventory and 303(d) list of impaired waters. On the left hand pages, maps are used to show each segment in the basin and any impairments listed for each assessment category within that segment. These categories include: aquatic life, contact recreation, general use, fish consumption, chlorophyll A, and nutrient enrichment. Public Water Supply Use was not included because there are no listed impairments known at this time. The charts on the right hand pages list the specific impaired water body and location within each segment, flow status, possible sources of impairment in the watershed, and any special studies being performed in that area. For the purposes of this summary, an entire segment is shaded to indicate that there is an impairment in a portion of that segment and is not meant to imply that the entire segment is impaired. The full Water Quality Inventory and associated documentation can be found on the TCEQ webpage at *http://www.tceq.state.tx.us/compliance/monitoring/water/quality/data/wqm/305_303.html#y2008.*

*Catfish found while performing an impact study.*

**Water Quality Inventory, 303(d) List of Impaired Waters**

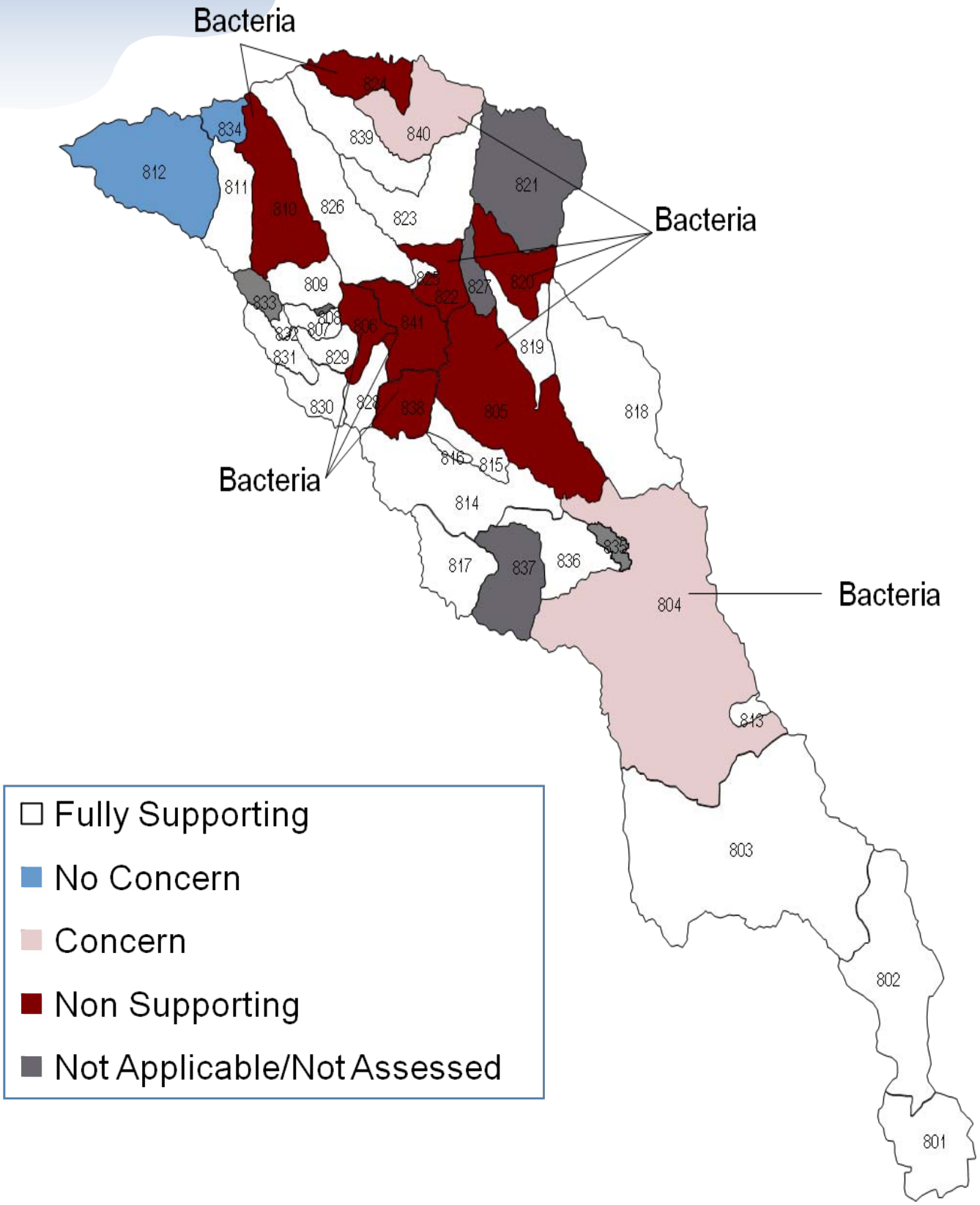
# Aquatic Life



| Water Body and Location | Flow Status | Possible Sources in the Watershed | Special Study (Group and Status) |
|---|---|---|---|
| 812—West Fork Trinity River Above Bridgeport Reservoir | | NPS; PS Unknown | West Fork Trinity River UAA (WQS-Report Preparation)<br>Technical Assistance and Implementation in West Fork of the Trinity River Watershed (TSSWCB-Report Preparation)<br>Envirocast (TSSWCB-In Progress) |
| 809—Eagle Mountain Reservoir | Reservoir | Source Unknown | |
| 833—Clear Fork Trinity River Above Lake Weatherford | | PS Unknown; Source Unknown, NPS | Clear Fork Trinity - DO (UAA-Completed, Standards Review-In Progress)<br>Envirocast (TSSWCB-In Progress) |
| 831—Clear Fork Trinity River Below Lake Weatherford | | Source Unknown | Clear Fork Trinity - DO (UAA-Completed, Standards Review-In Progress)<br>Envirocast (TSSWCB-In Progress) |
| 824—Elm Fork Trinity River Above Ray Roberts Lake | Perennial | Source Unknown; PS Unknown | |
| 823A—Little Elm Creek | | NPS; PS Unknown | |
| 822—Elm Fork Trinity River Below Lewisville Lake | Perennial | Source Unknown | |
| 820C—Muddy Creek | | Source Unknown | |
| 818—Cedar Creek Reservoir | Reservoir | Source Unknown; PS Unknown | Cedar Creek Reservoir Watershed Protection Plan (NPS—In Progress) |
| 814—Chambers Creek Above Richland-Chambers Reservoir | | Source Unknown; PS Unknown | BMP verification using observed water quality data and watershed planning for implementation of BMPs (TSSWCB-In Progress)<br>Envirocast (TSSWCB-In Progress) |
| 841l—Johnson Creek | | Source Unknown | |
| 841M—Kee Branch | | Source Unknown | |
| 804G—Catfish Creek | | Source Unknown | |
| 803—Lake Livingston | Reservoir | Source Unknown | |
| 801C—Cotton Bayou | Tidal | NPS; PS-Municipal Point Source Discharges | |

**Acronyms**
NPS-Nonpoint Source
PS-Point Source
TMDL-Total Maximum Daily Load
TSSWCB-Texas State Soil and Water Conservation Board
UAA-Use Attainability Analysis
WQS-Water Quality Standards

# Contact Recreation



| Water Body and Location | Flow Status | Possible Sources in the Watershed | Special Study (Group and Status) |
|---|---|---|---|
| 810—West Fork Trinity River Below Bridgeport Reservoir | Perennial | Source Unknown | West Fork TR Below Bridgeport Reservoir - Bacteria (TMDL-Planning)<br>Envirocast (TSSWCB-In Progress) |
| 810A—Big Sandy Creek | | Source Unknown | Recreational UAA (WQS-Planning) |
| 810B—Garrett Creek | | Source Unknown | Recreational UAA (WQS-Planning) |
| 810C—Martin Branch | | Source Unknown | Recreational UAA (WQS-Planning) |
| 810D—Salt Creek | | Source Unknown | Recreational UAA (WQS-Planning) |
| 824—Elm Fork Trinity River Above Ray Roberts Lake | Perennial | Source Unknown | Envirocast (TSSWCB-In Progress) |
| 840—Ray Roberts Lake | Reservoir | Source Unknown | |
| 822—Elm Fork Trinity River Below Lewisville Lake | Perennial | Source Unknown | Trinity River - Bacteria (TMDL-Report Preparation) |
| 822A—Cottonwood Branch | | Source Unknown | Cottonwood Branch & Grapevine Creek - Bacteria (TMDL-Sampling) |
| 822B—Grapevine Creek | | Source Unknown | Cottonwood Branch & Grapevine Creek - Bacteria (TMDL-Sampling) |
| 820C—Muddy Creek | | Source Unknown | Envirocast (TSSWCB-In Progress) |
| 838B—Sugar Creek | | Source Unknown | |
| 838C—Walnut Creek | | Source Unknown | |
| 806—West Fork Trinity River Below Lake Worth | Perennial | Source Unknown | Trinity River - Bacteria (TMDL-Report Preparation)<br>Envirocast (TSSWCB-In Progress) |
| 806D—Marine Creek | | Source Unknown | |
| 806E—Sycamore Creek | | Source Unknown | Recreational UAA (WQS-Planning) |
| 841—Lower West Fork Trinity River | Perennial | Source Unknown | Trinity River - Bacteria (TMDL-Report Preparation)<br>Envirocast (TSSWCB-In Progress) |
| 841B—Bear Creek | | Source Unknown | |
| 841C—Arbor Creek | | Source Unknown | |
| 841D—Big Bear Creek | | Source Unknown | |
| 841E—Copart Branch Mountain Creek | | Source Unknown | Recreational UAA (WQS-Planning) |
| 841F—Cottonwood Creek | | Source Unknown | Recreational UAA (WQS-Planning) |
| 841G—Dalworth Creek | | Source Unknown | Recreational UAA (WQS-Planning) |
| 841H—Delaware Creek | | Source Unknown | Recreational UAA (WQS-Planning) |
| 841I—Dry Branch Creek | | Source Unknown | |
| 841J—Estelle Creek | | Source Unknown | Recreational UAA (WQS-Planning) |
| 841K—Fish Creek | | Source Unknown | Recreational UAA (WQS-Planning) |
| 841L—Johnson Creek | | Source Unknown | |
| 841M—Kee Branch | | Source Unknown | |
| 841N—Kirby Creek | | Source Unknown | Recreational UAA (WQS-Planning) |
| 841P—North Fork Cottonwood Creek | | Source Unknown | |
| 841S—Vilbig Lakes | Reservoir | Source Unknown | Recreational UAA (WQS-Planning) |
| 841U—West Irving Creek | | Source Unknown | Recreational UAA (WQS-Planning) |
| 805—Upper Trinity River | Perennial | NPS; PS-Municipal PS Discharges | Trinity River - Bacteria (TMDL-Report Preparation)<br>Envirocast (TSSWCB-In Progress) |
| 804—Trinity River Above Lake Livingston | Perennial | Source Unknown | |
| 804G—Catfish Creek | | Source Unknown | |

**Acronyms**
NPS-Nonpoint Source
PS-Point Source
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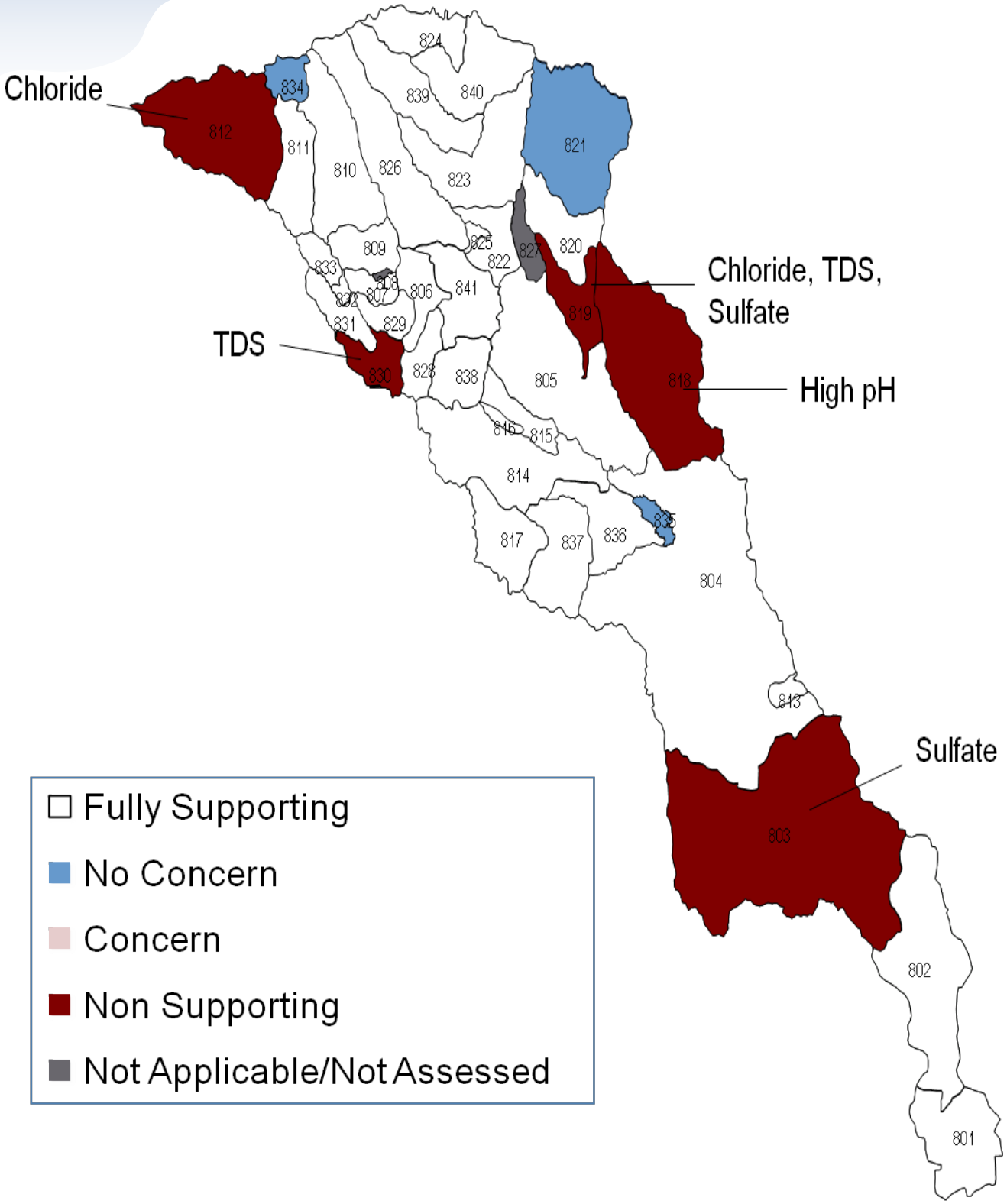
UAA-Use Attainability Analysis
WQS-Water Quality Standards

# General Use


Chloride
Chloride, TDS, Sulfate
TDS
High pH
Sulfate
Fully Supporting
No Concern
Concern
Non Supporting
Not Applicable/Not Assessed
824
834
839
840
812
811
821
810
826
823
809
825
827
820
822
833
808
806
841
832
807
819
831
829
TDS
830
828
838
805
818
High pH
816
815
814
835
817
837
836
804
813
Sulfate
803
802
801

| Water Body and Location | Flow Status | Possible Sources in the Watershed | Special Study (Group and Status) |
|---|---|---|---|
| 812—West Fork Trinity River Above Bridgeport Reservoir | | NPS | West Fork Trinity River UAA (WQS-Report Preparation)<br>Technical Assistance and Implementation in West Fork of the Trinity River Watershed (TSSWCB-Report Preparation)<br>Archer/Jack Counties Saltwater Minimization (NPS-Completed)<br>Envirocast (TSSWCB-In Progress) |
| 830—Benbrook Lake | Reservoir | Source Unknown | |
| 819—East Fork Trinity River | Perennial | Source Unknown | |
| 818—Cedar Creek Reservoir | Reservoir | PS Unknown; NPS; Source Unknown | Agricultural NPS Remediation in the Cedar Creek Reservoir Watershed (TSSWCB-In Progress)<br>Cedar Creek Reservoir Watershed Protection Plan Implementation (NPS-In Progress)<br>Envirocast (TSSWCB-In Progress) |
| 803—Lake Livingston | Reservoir | PS Unknown; Source Unknown | |

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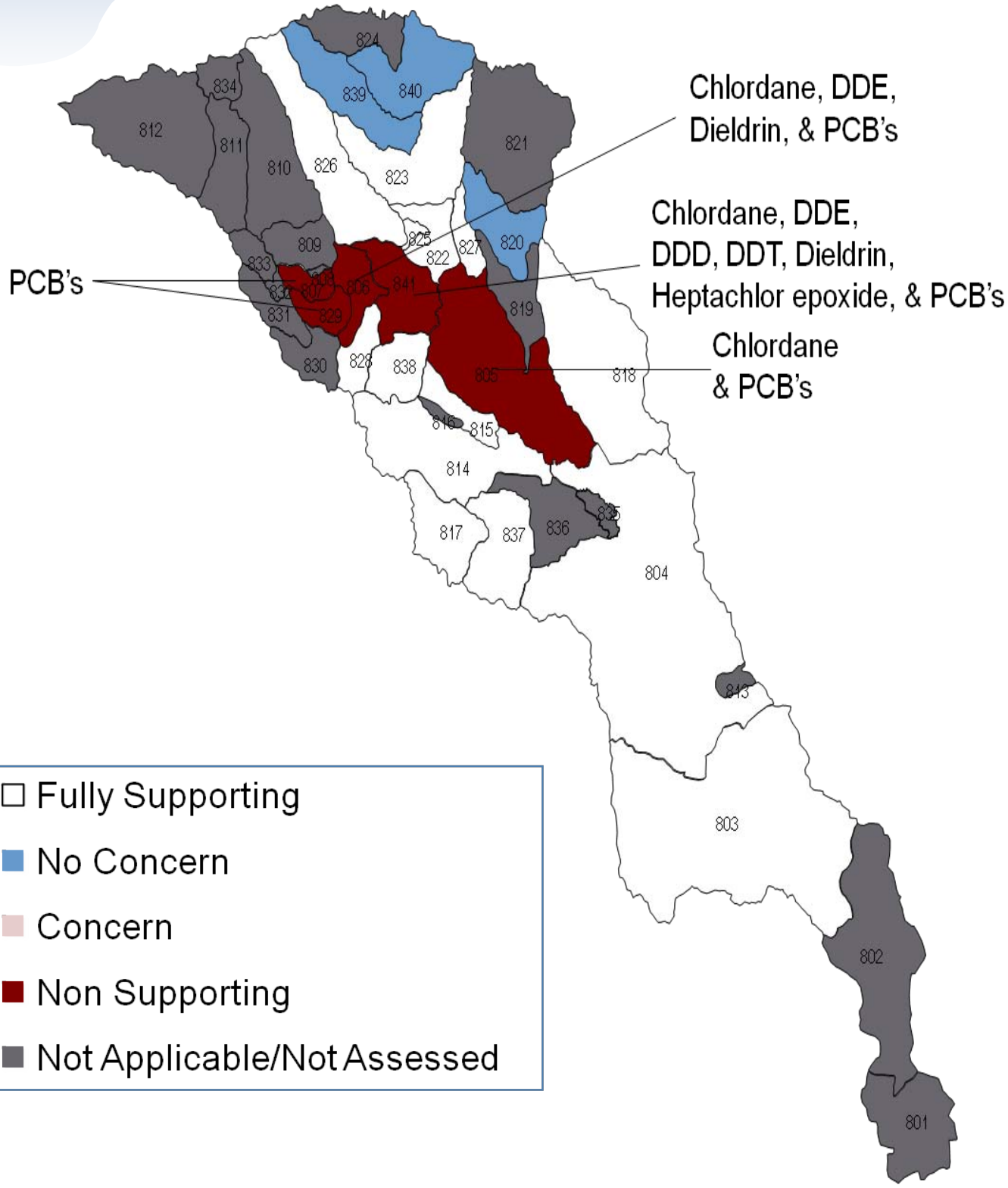
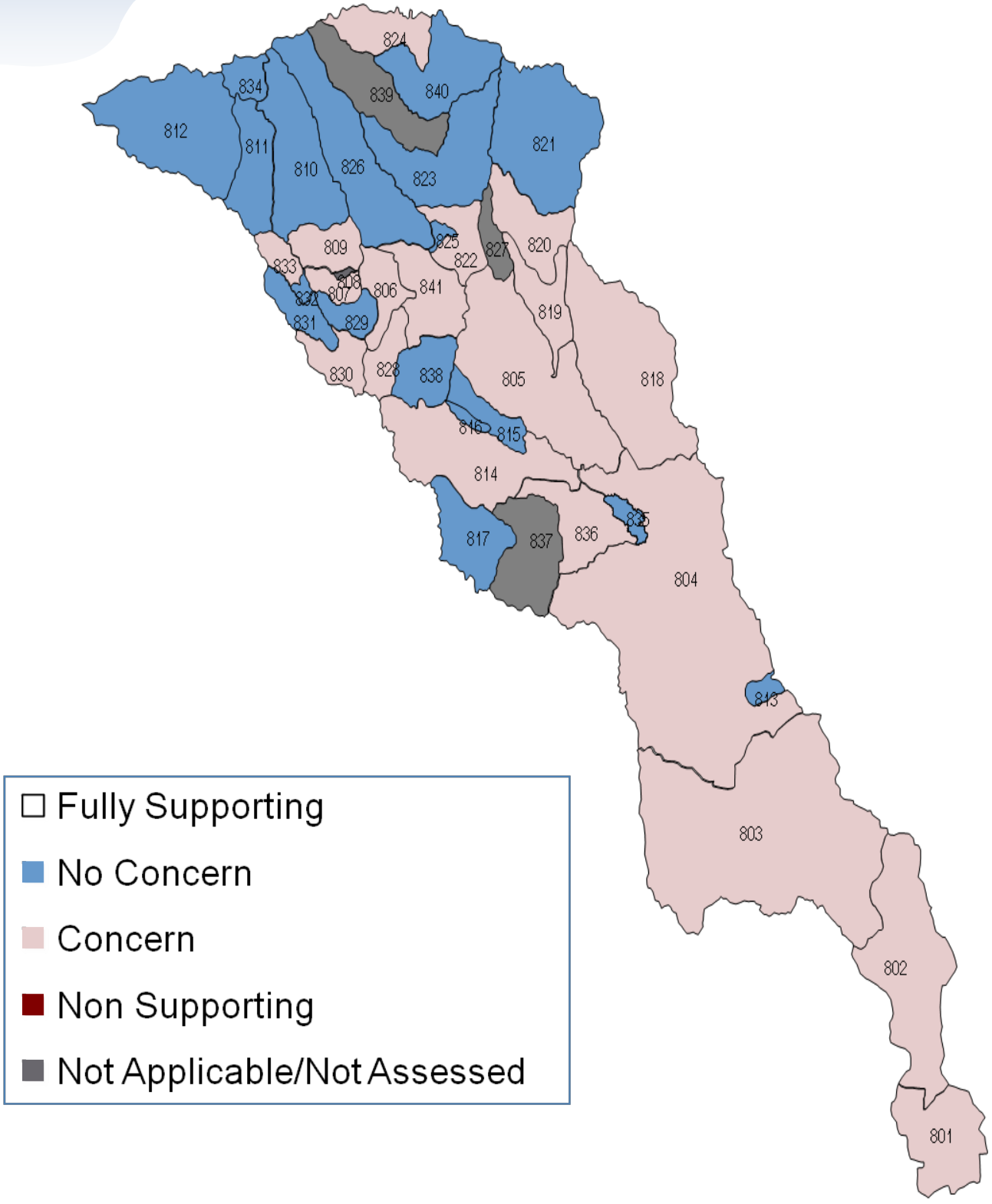
# Fish Consumption



| Water Body and Location | Flow Status | Possible Sources in the Watershed | Special Study (Group and Status) |
|---|---|---|---|
| 807—Lake Worth | Reservoir | PS Unknown; NPS | Lake Worth - PCBs (TMDL-Completed)<br>Lake Worth - PCBs - Implementation Plan (TMDL-Completed)<br>Envirocast (TSSWCB-In Progress) |
| 829—Clear Fork Trinity River Below Benbrook Lake | Perennial | Source Unknown | Envirocast (TSSWCB-In Progress)<br>Fort Worth - Legacy Pollutants (TMDL-Completed)<br>Fort Worth - Legacy Pollutants - Implementation Plan (TMDL-Completed) |
| 806—West Fork Trinity River Below Lake Worth | Perennial | Source Unknown | Trinity River - PCBs in Tissue (TMDL-Sampling)<br>Fort Worth - Legacy Pollutants (TMDL-Completed)<br>Fort Worth - Legacy Pollutants - Implementation Plan (TMDL-Completed)<br>Envirocast (TSSWCB-In Progress) |
| 806A—Fosdic Lake | Reservoir | NPS; PS Unknown | Fort Worth - Legacy Pollutants (TMDL-Completed)<br>Fort Worth - Legacy Pollutants - Implementation Plan (TMDL-Completed)<br>Fort Worth - Legacy - Fish Tissue Sampling (TMDL-Completed) |
| 806B—Echo Lake | Reservoir | Source Unknown | Fort Worth - Legacy Pollutants (TMDL-Completed)<br>Fort Worth - Legacy Pollutants - Implementation Plan (TMDL-Completed)<br>Fort Worth - Legacy - Fish Tissue Sampling (TMDL-Completed) |
| 841—Lower West Fork Trinity River | Perennial | Source Unknown | Trinity River - PCBs in Tissue (TMDL-Sampling)<br>Dallas & Tarrant Co. - Fish Tissue Sampling (TMDL-Completed)<br>Dallas & Tarrant Counties - Legacy Pollutants (TMDL-Completed)<br>Dallas & Tarrant Counties - Legacy Pollutants - Implementation Plan (TMDL-Completed)<br>Envirocast (TSSWCB-In Progress) |
| 841A—Mountain Creek Lake | Reservoir | PS Unknown; NPS | Dallas & Tarrant Counties - Legacy Pollutants (TMDL-Completed)<br>Dallas & Tarrant Counties - Legacy Pollutants - Implementation Plan (TMDL-Completed) |
| 805—Upper Trinity River | Perennial | Municipal Point Source Discharges; NPS; Source Unknown | Trinity River - PCBs in Tissue (TMDL-Sampling)<br>Dallas & Tarrant Co. - Fish Tissue Sampling (TMDL-Completed)<br>Dallas & Tarrant Counties - Legacy Pollutants (TMDL-Completed)<br>Dallas & Tarrant Counties - Legacy Pollutants - Implementation Plan (TMDL-Completed)<br>Envirocast (TSSWCB-In Progress) |

**Acronyms**
NPS-Nonpoint Source
PS-Point Source
TMDL-Total Maximum Daily Load
TSSWCB-Texas State Soil and Water Conservation Board
UAA-Use Attainability Analysis
WQS-Water Quality Standards

# Chlorophyll A



| Water Body and Location | Flow Status | Possible Sources in the Watershed | Special Study (Group and Status) |
|---|---|---|---|
| 809—Eagle Mountain Reservoir | Reservoir | Source Unknown | |
| 807—Lake Worth | Reservoir | Point Source Unknown; NPS | |
| 833—Clear Fork Trinity River Above Lake Weatherford | | Source Unknown | |
| 830—Benbrook Lake | Reservoir | Point Source Unknown; Unknown Source | |
| 824—Elm Fork Trinity River Above Ray Roberts Lake | Perennial | Source Unknown; PS Unknown | |
| 822—Elm Fork Trinity River Below Lewisville Lake | Perennial | Source Unknown | |
| 822A—Cottonwood Branch | | Source Unknown | |
| 822D—Ski Lake | Reservoir | Source Unknown | |
| 820—Lake Ray Hubbard | Reservoir | Source Unknown | |
| 818—Cedar Creek Reservoir | Reservoir | PS Unknown; NPS; Source Unknown | Cedar Creek Reservoir Watershed Protection Plan (NPS-In Progress) |
| 828—Lake Arlington | Reservoir | Source Unknown | |
| 814—Chambers Creek Above Richland-Chambers Reservoir | | Source Unknown; PS Unknown | |
| 836—Richland-Chambers Reservoir | Reservoir | PS Unknown; Source Unknown | |
| 806—West Fork Trinity River Below Lake Worth | Perennial | PS Municipal Point Source Discharges; Source Unknown | |
| 841—Lower West Fork Trinity River | Perennial | Source Unknown | |
| 841H—Delaware Creek | | Source Unknown | |
| 805—Upper Trinity River | Perennial | NPS; PS Municipal Point Source Discharges | |
| 804—Trinity River Above Lake Livingston | Perennial | Source Unknown | |
| 803—Lake Livingston | Reservoir | Source Unknown; PS Unknown | |
| 802—Trinity River Below Lake Livingston | Perennial | PS Unknown; Source Unknown | |
| 801B—Old River | Tidal | Source Unknown | |
| 819—East Fork Trinity River | Perennial | Source Unknown | |

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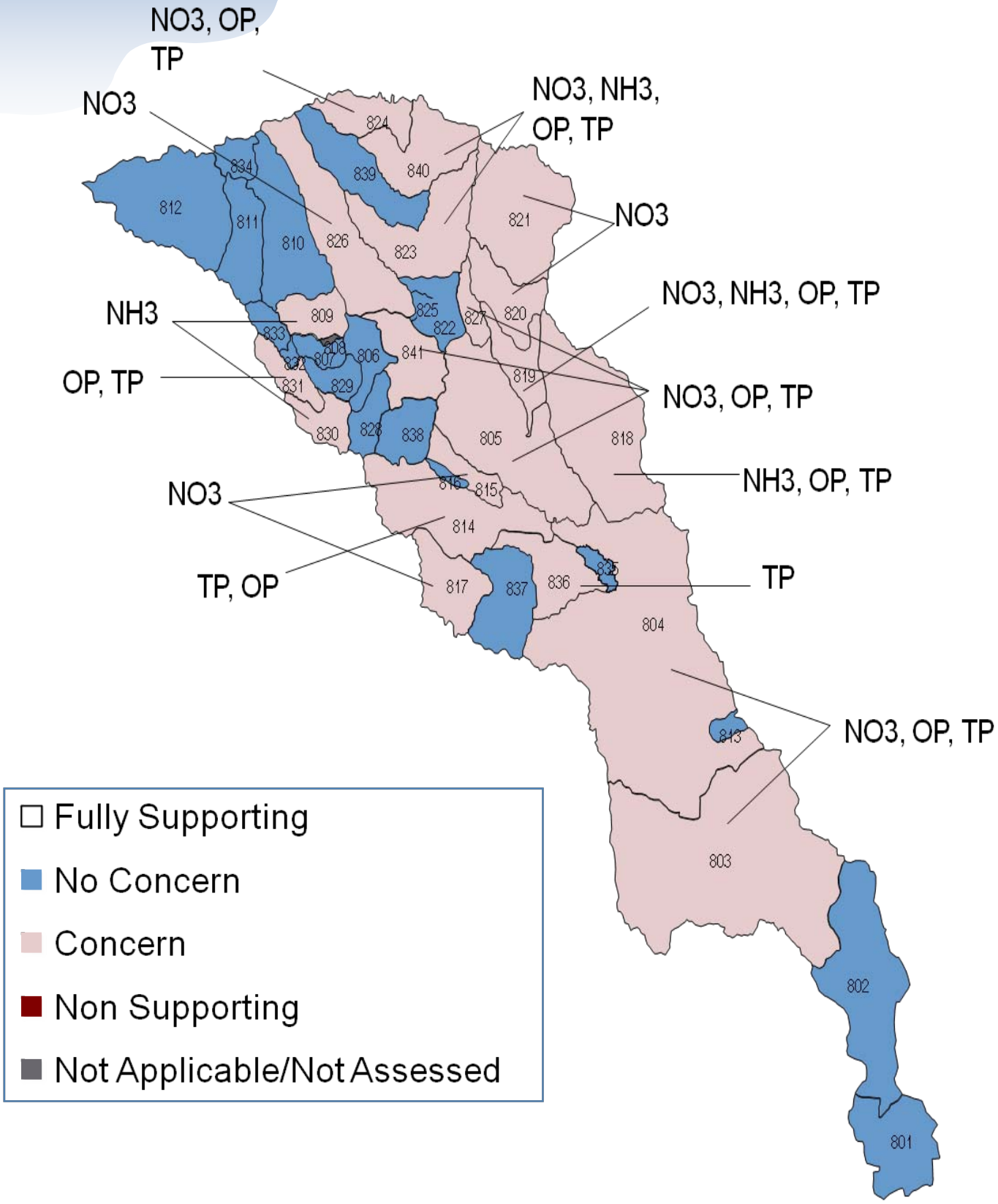
# Nutrient Enrichment



| Water Body and Location | Flow Status | Possible Sources in the Watershed | Special Study (Group and Status) |
|---|---|---|---|
| 809—Eagle Mountain Reservoir | Reservoir | Source Unknown; PS Unknown | |
| 831—Clear Fork Trinity River Below Lake Weatherford | | Source Unknown | |
| 831A—South Fork Trinity River | | Source Unknown | |
| 830—Benbrook Lake | Reservoir | PS Unknown; Source Unknown | |
| 824—Elm Fork Trinity River Above Ray Roberts Lake | Perennial | Source Unknown | |
| 840—Ray Roberts Lake | Reservoir | Source Unknown | |
| 823—Lewisville Lake | Reservoir | Source Unknown | Reservoir Research (TMDL-Report Preparation) |
| 823B—Stewart Creek | | Source Unknown | |
| 826—Grapevine Lake | Reservoir | Source Unknown; PS Unknown | |
| 826A—Denton Creek | | Source Unknown | |
| 821—Lake Lavon | Reservoir | Source Unknown | |
| 820—Lake Ray Hubbard | Reservoir | Source Unknown | |
| 820C—Muddy Creek | | Source Unknown | |
| 819—East Fork Trinity River | Perennial | Source Unknown | |
| 818—Cedar Creek Reservoir | Reservoir | NPS; PS Unknown; Source Unknown | Cedar Creek Reservoir Watershed Protection Plan (NPS-In Progress) |
| 815—Bardwell Reservoir | Reservoir | Source Unknown | |
| 815A—Waxahachie Creek | | Source Unknown | |
| 814—Chambers Creek Above Richland-Chambers Reservoir | | Source Unknown; PS Unknown | |
| 817—Navarro Mills Lake | Reservoir | Source Unknown | |
| 836—Richland-Chambers Reservoir | Reservoir | Source Unknown | |
| 841—Lower West Fork Trinity River | Perennial | Source Unknown | |
| 805—Upper Trinity River | Perennial | NPS; PS Municipal Point Source Discharges; PS Unknown, Source Unknown | |
| 804—Trinity River Above Lake Livingston | Perennial | Source Unknown | |
| 803—Lake Livingston | Reservoir | PS Unknown; Source Unknown | |
| 827A—White Rock Creek | | Source Unknown; PS Unknown | |

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# Special Projects

## TRA CRP Data Management & Integration System

The TRA CRP has begun implementation of a program to help streamline the data management process. Over the years, the amount of data being processed by TRA CRP staff has increased and, as a result, a large amount of time is being spent handling the data and preparing it for submittal to TCEQ for use in biennial assessments. To a large extent, data management is currently a manual process. This process includes conversion of the raw data into a single database format, consolidation of field and lab data, quality assurance verification and validation, conversion of final quality assured data into text files, and submittal of quality assured data to TCEQ. A software package called EnviroData from Geotech Computer Systems, Inc. was purchased to automate the steps of the data management process. A major benefit of the software will be the amount of time saved. The software is capable of conducting complicated conversion and quality assurance steps with a few simple mouse clicks. In addition, the program can produce reports summarizing the data entered into the system which may then be used for other purposes. Currently, the software is being updated with information on specific limits used during quality assurance verification and validation. A standard data submittal format has been developed and will be delivered to partner agencies for testing. In 2009, a report format will be developed with input from all partner agencies so that a single report format will accommodate all partner requirements.

## Urban Stream Site Characterization

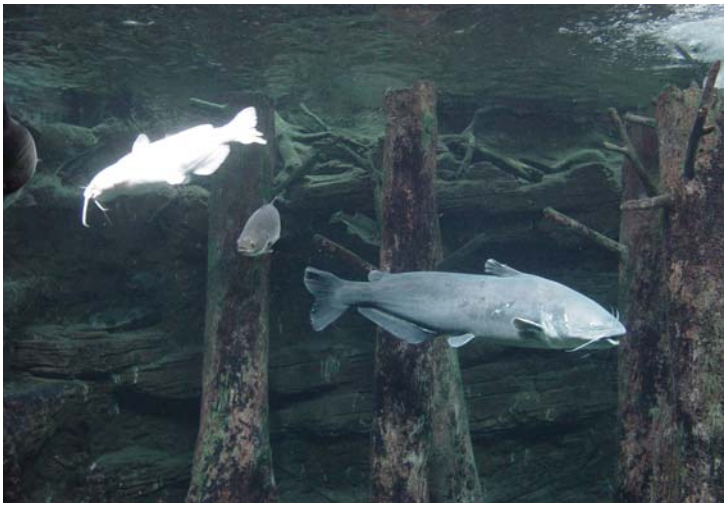
Over the past year, TRA CRP staff have conducted site characterizations at 46 of the urban stream sites in around the Dallas-Fort Worth Metroplex. The sites are monitored on a routine basis by the cities of Fort Worth, Arlington, Irving, and Grand Prairie. While obtaining data from our partner agencies allows the TRA CRP to leverage funds for special studies and outreach programs, it has prevented the staff from becoming familiar with the sites and their surroundings.

*Cynthia Makowsky, Conducting an Urban Stream Site Characterization*

In an effort to become more familiar with the sites, TRA CRP staff developed a modified program that is based on the habitat assessment guidelines as described in the TCEQ *Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data*. This modified program was designed to obtain a standardized set of data at each site in a short time period in order to ensure that all sites were visited under similar weather and flow conditions.

Currently one phase of characterizations was completed in the late fall and early winter of 2007. A summer phase of sampling was begun in the summer of 2008. However, staffing issues prevented the completion of this phase and will be completed in the summer of 2009. If it is noted that the weather and flow conditions in the summer of 2009 are different from those seen in the summer of 2008, sites that were previously visited will be re-characterized.

The project will not only familiarize TRA CRP staff with the urban stream sites, but the TCEQ assessment team as well. The results of the project will be sent to the basin assessor in order to provide additional information about the sites during the biennial assessments. The results of the project may also be used to determine which sites would be best suited to more detailed habitat and biological sampling while being representative of other sites in the area.



*Texas Fresh Water Fisheries Center Athens, TX*

## Trinity River Fish Population Summary/Survey

A concise historical summary of trends in fish communities and populations has never been available for the Trinity River basin. In order to obtain this information, a project was begun in FY 2007 and has continued through the current FY 2008-2009 TCEQ/TRA contract period. As well as providing a historical summary, the project may help identify data gaps and guide future monitoring of fish populations.

For this project, TRA CRP contracted with the University of Houston-Clear Lake to compile a database of all available information on fish populations in the Trinity River basin from academic, government, and published literature. Prior activities include the development of a format and database to summarize the accumulated data as well as an annotated bibliography of the literature used to compile the database. Current tasks include the completion of statistical analysis of fish population data and statistical analysis which will attempt to relate fish community changes with variables such as land use, wastewater loadings, and water quality.

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## Trinity River Wasteload Allocation

Since FY 2007, the Trinity River Compact (City of Dallas, City of Fort Worth, TRA, and North Texas Municipal Water District) has been working with consultants to update the 1990s wasteload allocation calculations. The allocation is used to determine the effluent limits for wastewater dischargers based on the assimilative capacity of the river. The allocation modeling conducted in the 1990s assumed maximum permitted effluent flow from dischargers and minimum flow in receiving streams; conditions that do not occur at the same time in the real world. The new allocation models will be updated with information on reuse permits and real-world flow regimes and will take into account effluent flow increases due to increasing population and expansion. It is important to note that wastewater treatment plants have been operating well under their current effluent limit permits and these permits are still in effect for the next couple of years. The recalculated allocation will be used to develop limits for the next permit cycle.

Activities to be conducted under the current contract include the evaluation of benefits of effluent limits based on seasonal flows and effluent flows based on a joint probability analysis. A separate task to be funded by the TRA CRP program will determine the impact of seasonal flow variability on permit limits.

The consultants will develop probability plots of background flow at several locations on the Trinity River and its forks and will work with the Compact to determine appropriate flows for each month to be used in modeling. Based on the modeling, potential permit limits for each month and their impacts on Dissolved Oxygen will be determined. If it is decided by the Compact and consultants that permits based on seasonal flows are beneficial, then additional work will be conducted to define the months to be included in each season and evaluate the potential economic benefits. In addition, the consultants will use joint probability analysis to determine the impacts of effluent flow on receiving streams at 7Q2 low-flow. This analysis will include the development of ratios of daily effluent volume to annual average effluent volume and compare them to instream 7Q2 flow values. Modeling will be conducted to determine the potential impacts on permit limits if the wasteload allocation is developed based on a percentage of effluent flow rather than the full permitted flow. Full permitted flows will be based on an assumed increase of 211% over 2005 discharges in order to account for expansion.

# Public Outreach

The Trinity River Authority Clean Rivers Program (TRA CRP) is involved in several educational and outreach programs each year. In addition, efforts have focused on funding local stream clean ups and the Texas Stream Team volunteer monitoring program. Texas Stream Team, formally known as Texas Watch, *http://txstreamteam.rivers.txstate.edu/*) is a group of volunteers that gather data on Texas natural resources, and collects water quality data to provide information to the public. TRA CRP provides funding for supplies and sampling kits as well as funding for a trainer and coordinator for the program.

*A group of Texas Stream Team Volunteers*

A new event for the TRA CRP staff was the 2008 Make a Splash Day: The Magic of the Trinity River at River Legacy Science Center (*http://www.riverlegacy.org/livingsciencecenter.html*). The event highlighted the uniqueness and beauty of the Trinity River as well as some of its inhabitants. The TRA CRP staff helped out with the pond sampling and did an educational game called guess the contaminants for children in area schools. This game demonstrated types of contaminants that can pollute our water, and taught students what they could do to help prevent this from happening. A display of benthic organisms collected around the area was also used to teach students about creatures that live in the Trinity River.

*Angela Kilpatrick, River Legacy Make a Splash: Magic of the Trinity River*

*Cynthia Makowsky, UT A Celebrating People and Planet*

Two Earth Day events were attended by the TRA CRP staff this year, UT Arlington Celebrating People and Planet and DFW International Airport Earth Day. Both events informed the visitors about the Trinity River, water quality, conservation, and the purpose of the Clean Rivers Program.

Two of the programs that TRA CRP are associated with were greatly impacted by Hurricane Ike that made landfall in Baytown, Texas in September 2008. The Waterborne Education Center (*http://www.txwaterborne.org/news.htm*) located in Anahuac, TX (approximately 30 miles from land fall), received severe damage from the storm. Both of their vessels that they use for floating classrooms are being assessed for damages and cannot be used until this is complete. Due to debris and safety issues, many of their normal activities and labs used to teach students about the ecology, history, and economic productivity of the Texas coast, have been suspended. However, they are preparing alternative programs until the clean up is complete. TRA CRP is funding educational supplies and equipment as well as giving additional funding for replacement of damaged and lost supplies. Another event affected by the hurricane was Anahuac's Gator Fest (*http://www.texasgatorfest.com/index.html*). This event had to be cancelled all together. At this event, TRA CRP staff usually set up information booths to teach the public about the Trinity River and the Clean Rivers Program.

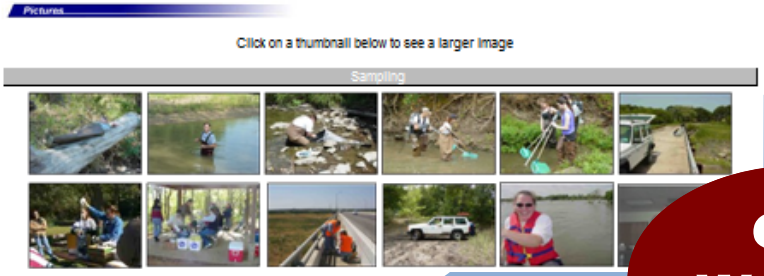
*Texas Waterborne Education Vessel*

# *Visit Us Online At*
# *http://www.trinityra.org/BasinPlan/CRP/tra_crp1.html*

Information about the Trinity River Clean Rivers Program and upcoming activities can be found at *http://www.trinityra.org/BasinPlan/CRP/tra_crp1.html.* The website contains information on CRP Activities, Reports, Studies, Monitoring and Data, Pictures, Public Participation, and Partners. The website provides access to past and present Basin Highlights and Summary Reports, Reports on Special Studies, and Quality Assurance Documents. Any ongoing or completed special studies in the basin are presented in the Studies page. The Monitoring and Data page contains links to interactive maps that allows users to click through the basin and select sites and parameters to view. Links to the Trinity River Information Management System (TRIMS) page and the Current Coordinated Monitoring Schedule are found here. There is also information on public outreach programs, and other agencies in the state that are involved with the Clean Rivers Program.








**CRP Website**

Trinity River Authority

Clean Rivers Program

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