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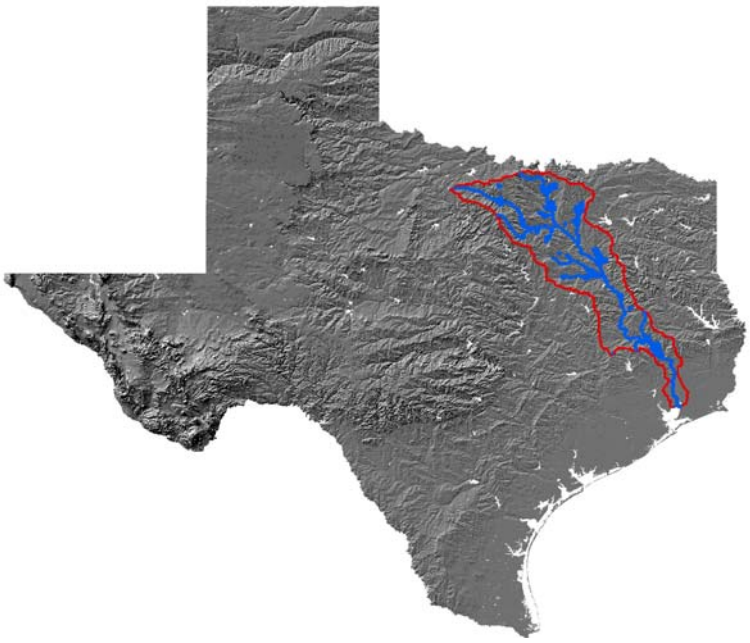
http://www.trinityra.org/BasinPlan/CRP/tra_crp1.html

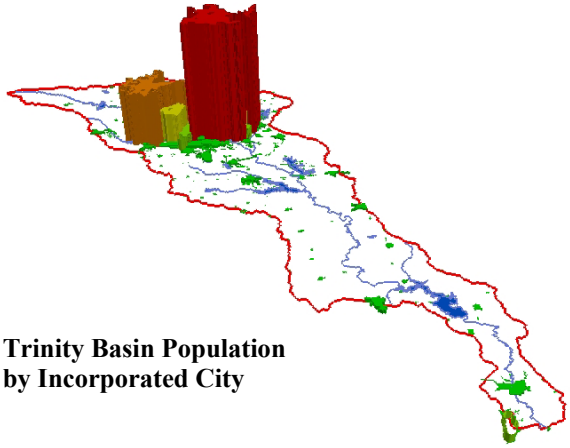
TRINITY RIVER AUTHORITY

2006 Basin Highlights Report



Trinity Quick Facts:

- The Trinity River was discovered on May 19, 1690 by Spanish explorer General Alonzo de Leon two days before "The Feast of the Most Holy ***Trinity***."
- The Trinity River is 715 miles long, and drains about 18,000 mi² of Texas before she delivers her water into Trinity Bay near Anahuac.
- It begins with four forks—the East Fork in Grayson County, the Elm Fork in Montague County, the West Fork in Archer County, and the Clear Fork in Parker County.
- The basin contains more than 25% of Texas' population.
- Currently, there are 22 major reservoirs that cover a total of 320,000 acres.
- 83,000-acre Lake Livingston is the largest reservoir in the Trinity River Basin



Trinity Basin Population by Incorporated City

Introduction

In 1991, the 72nd Texas Legislative Session passed Senate Bill 818 which established the Clean Rivers Program (CRP.) The CRP has evolved to ensure that an ongoing, systematic, quality-controlled monitoring system is established to help protect and improve Texas' surface water quality. Funding for the CRP Program comes, in part, from fees assessed on water and wastewater permits.

The Clean Rivers Program for the Trinity River basin is managed by the Trinity River Authority under contract with the Texas Commission on Environmental Quality. In this 15th year of the CRP, the TRA continues to focus on the three cornerstones of the program: routine monitoring, special studies, and public outreach. Learn more about us online at *http://trinityra.org/BasinPlan/CRP/tra_crp1.html*.

The CRP Basin Highlights Report is produced annually and is intended to present an overview of the Trinity River basin's Clean Rivers Program goals and current activities. Many of the issues highlighted in this publication, as well as statistical analyses of water quality data, are addressed in greater detail in the semi-decadal 2005 Basin Summary Report (BSR) published in 2005. If you would like to access the 2005 BSR in its entirety, visit *http://www.trinityra.org/BasinPlan/basin_highlight_2005.htm.*

Table of Contents:

This Year's Highlights

Rita

At four o'clock a.m. on September 24, 2005, Category 3 Hurricane Rita made landfall at Sabine Pass. With sustained winds at 120 mph, Rita devastated the Texas/Louisiana coastline. Eight counties (Liberty, Chambers, Walker, Hardin, San Jacinto, Polk, Trinity, and Houston) within the Trinity River basin were declared disaster areas by FEMA.

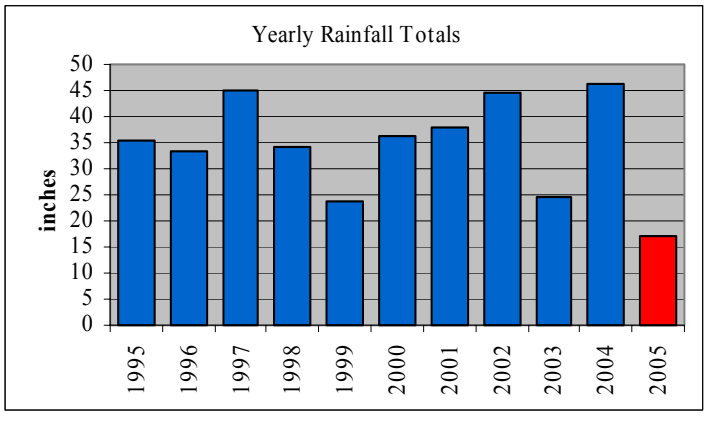
Because of her direction of travel, Rita battered Lake Livingston with a 120 mph *north* wind. This wind acted like a giant foot pushing tons-upon-tons of water against the dam and causing waves to crest over the top and remove existing riprap. To avoid damage to the earthen dam structure, Livingston's water level was lowered by four feet—equal to the elevation of the remaining riprap. The water level will remain at 127 feet above mean sea level until repair operations are completed.

Dye

On January 3, 2006, a red dye was observed entering the TRA's Central Regional Wastewater Treatment plant located in the DFW Metroplex. This input created a reddish effluent that discolored the Trinity River. Later, on the 7th of January, a rust colored input entered the treatment facility and created a "burnt orange" tint to the effluent.

During routine monitoring on January 9th, CRP personnel observed a dark red color to the Trinity River at station number 10934 located approximately 18 river miles downstream from the treatment plant.

TRA laboratory personnel completed toxicity tests and found that both the water flea and bullhead minnow survived and reproduced as normal when subjected to the discolored media. The source of the dye



"Burnt Orange" coloration of the Main Stem Trinity River. Taken January 9, 2006 in Dallas County (10934-South Loop 12 near I-45.)

is unknown, but the incident of the "burnt orange" color occurred quickly after the University of Texas' football team won the National Championship. This incident remains under investigation.

Drought

Much of the Trinity Basin is experiencing severe drought conditions. As of January 2006, the DFW area was approximately 17 inches shy of normal rainfall amounts. Further, low relative humidity and high winds have produced dangerous wildfire conditions. A burn ban for the State of Texas has been in effect for much of the winter and wildfires have burned hundreds of acres in the basin. Lands scarred by fire can have a negative short-term affect on a river system's water quality.

At these times of minimal precipitation, wastewater effluent makes up almost all of the Trinity River's base flow. The discharging of clean effluent is essential for river bottom flora and fauna to survive these periods of minimal rainfall.

TRA's Central Wastewater Discharging into the West Fork, Grand Prairie, TX.

Water Quality Conditions

The Trinity River's tributaries and reservoirs are divided into "segments" which group stretches of river that share common attributes. The boundaries could be dams, confluences, or tidal reach. Segments are broken down into assessment units (AU's) so that a segment may be further categorized, analyzed, and compared both within and across basins.

Waterbodies are assessed based on the "designated uses" applicable to that segment. The designated use and its necessary analysis is noted in the table below.

"So, how's the water quality in the Trinity River?"

Uses & Secondary Concerns	Analyses
Aquatic Life Use	dissolved oxygen, water and sediment toxicity, and habitat screening
Public Water Supply Use	organic and inorganic MCLs (ex. benzene, chlordane, atrazine, PCBs)
Contact Recreation Use	e. coli, fecal coliform, enteroccoci
Fish Consumption Use	Human Health Criteria in Water & TDH's toxicity analysis of fish filets
General Use	water temperature, pH, chloride, sulfate, TDS
Nutrient Concerns	NH3-N, NO2-N + NO3-N, OP, & TP
Algal Growth Concerns	chlorophyll a

In theory, the stream standards are adjusted for each segment's designated use. For example, Segment A is a perennial river in the upper reaches of a watershed and is given a "high aquatic life use" (DO criteria > 5 mg/L) and shows values ranging from 6.1 to 8.9 mg/L. Segment B is a shallow, shaded creek and is given a "limited aquatic life use" (DO criteria > 3 mg/L) and shows values ranging from 3.1 to 4.8 mg/L. Although Stream B shows significantly lower DO values than Stream A, it is "fully supporting" its designated use.

Stream and reservoir data submitted to Texas' water quality database by the Texas Clean Rivers Partners are used by TCEQ assessment teams to determine if streams and reservoirs are meeting their designated uses. In other words, how does an *actual* sample measurement compare to its *pre-determined* benchmark value? For additional information on stream standards and assessment methods, visit the monitoring page of TCEQ's website.

http://www.tceq.state.tx.us/compliance/monitoring/crp/index.html

Once assessed, a segment is assigned one of 5 major category designations. These "ratings" determine whether or not further investigation of the segment or AU is warranted. Comparing water quality data to numeric stream standards is simple, right?

Big Picture Issues

In reality, the application of standards is quite complicated. For example, can standards created for reservoirs apply to the deep open-water areas and the shallow backwater coves? Both areas are within the reservoir, yet are hydrologically, biologically, and physically quite different. Are the stream standards relevant for coves? Where do the coves begin and end? Should there be specific cove standards? Can a standard be created that is relevant across many reservoirs?

A Use Attainability Analysis (UAA) is completed on streams to determine if the water quality standards are appropriate for that particular segment or AU. If no UAA has been completed, the stream criteria defaults to a "high" aquatic life use. Are many streams erroneously listed because water quality data is compared to an inappropriate standard?

Trinity River Authority

Water Quality Conditions

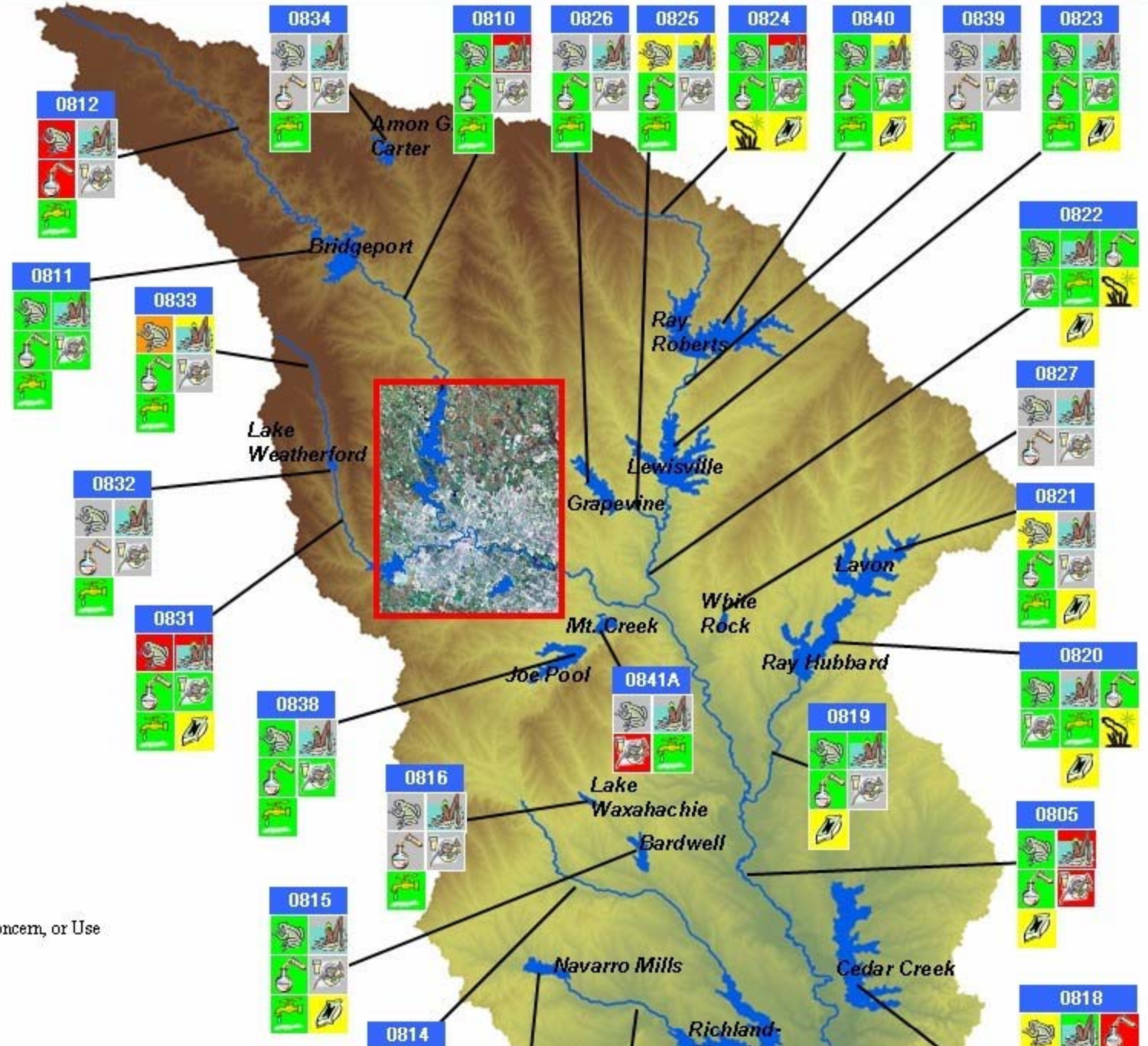
Designated Uses

- Aquatic Life
- Contact Recreation
- General Use
- Fish Consumption
- Public Water Supply

Secondary Concerns

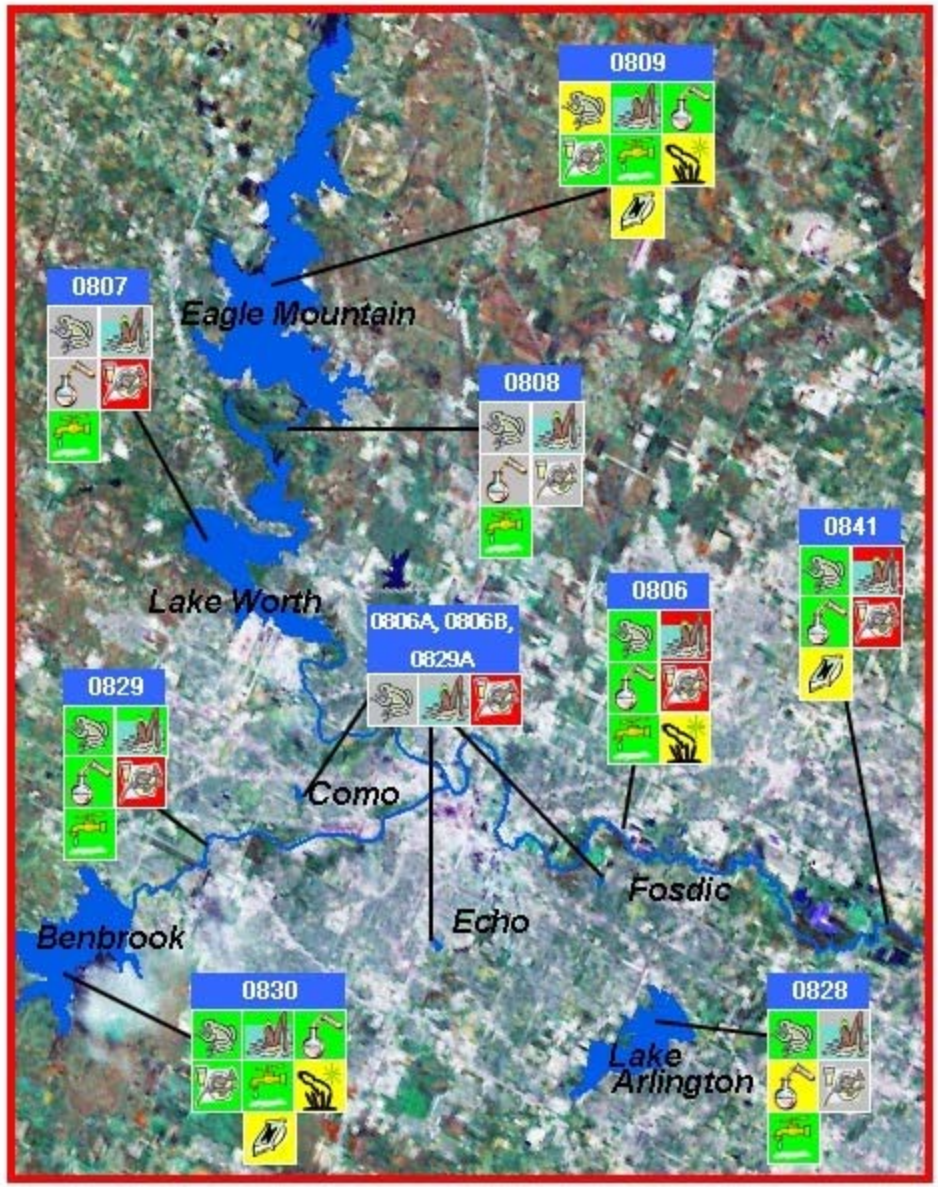
- Algal Growth
- Nutrients

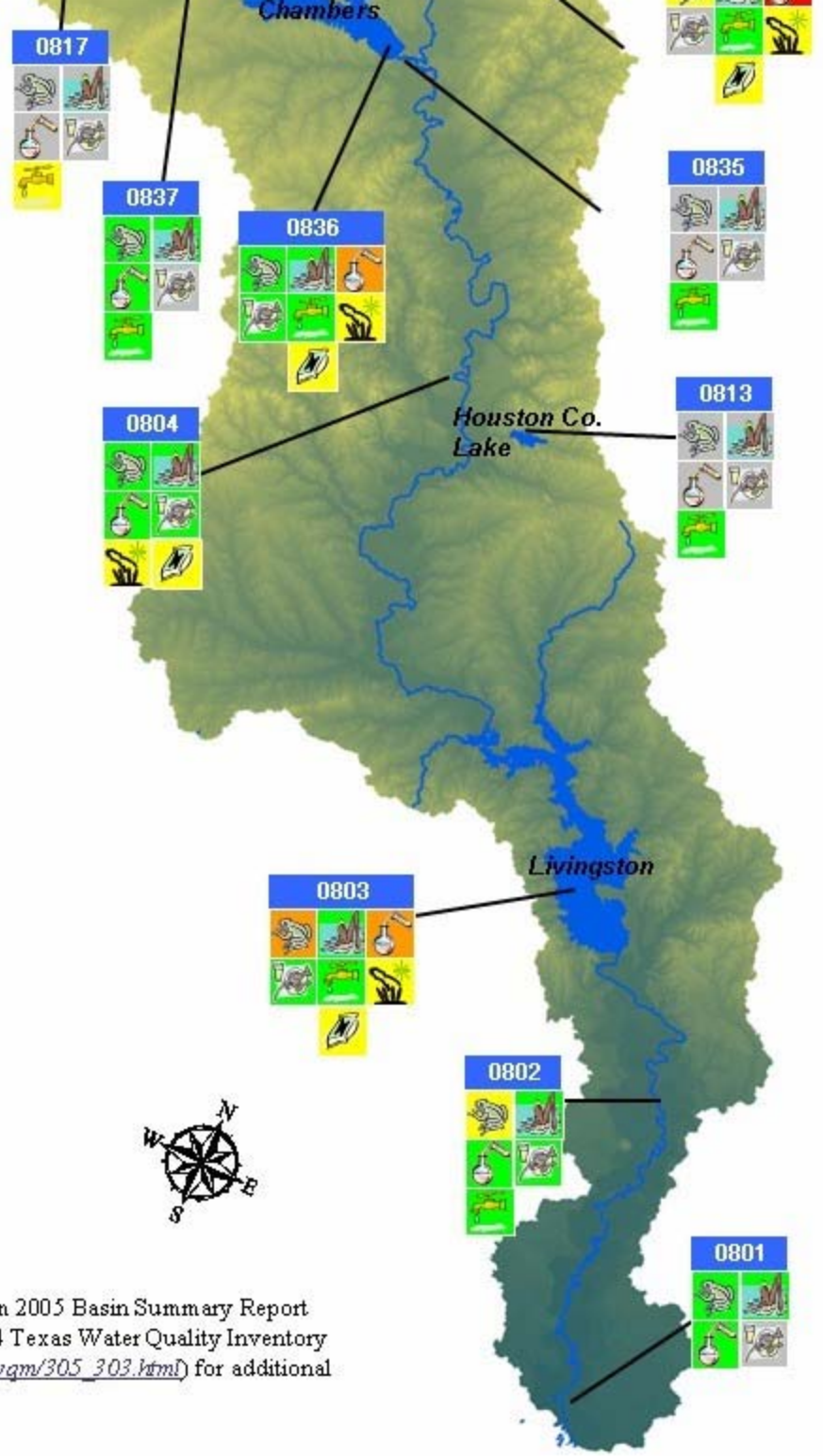
- Fully Supporting
- Threat, Concern, Use Concern, or Use Concern Limited Data
- Partially Supporting
- Non-Supporting



Non-Supporting

Not Assessed





*Only Classified Segments and Reservoirs shown. See the TRA's Clean Rivers Program 2005 Basin Summary Report (http://www.trinityra.org/BasinPlan/basin_highlight_2005.htm) and the 2004 Draft 2004 Texas Water Quality Inventory and 303(d) List (http://www.tceq.state.tx.us/compliance/monitoring/water/quality/data/wqm/305_303.html) for additional information.

Water Quality Conditions

In July 2005, the TRA completed and published its Basin Summary Report; an in-depth analysis of the water quality within the Trinity River watershed. Because no new assessment data is available, only a brief summary and spatial overview (pp. 4 & 5) is included in this report. For additional information and a statistical summary of the data, please visit http://www.trinityra.org/BasinPlan/basin_highlight_2005.htm.

West Fork Trinity River

807, 808, 809, 810, 811, 812, & 834

From Lake Worth dam north into Archer and Montague Counties

Headwaters considered the start of the Trinity River. Predominant agriculture is cattle grazing with a significant amount of oil and gas mining. Urbanization increases as the West Fork approaches Fort Worth.

East Fork Trinity River

819, 820, 820A, 821, 821A, & 821B

From Lake Ray Hubbard dam NE into Grayson Co.

The landscape is mostly flat prairies and southern portion is heavily urbanized. In addition, the surface waters receive significant effluent. The northern reaches contain significant row-crop farming operations.

Main Stem Trinity River

803, 803A, 804, 805, 806, 806A, 806B, 813, 827, 835, & 841

From the Lake Livingston dam north to Fort Worth

Begins in the densely populated Dallas/Fort Worth Metroplex and meanders 200 miles. Development along the upper southeast portion is extensive and the public's perceptions of "The River of Death" are changing.

Village Creek

828 & 828A

From the Lake Arlington dam SW into Johnson Co.

Village Creek is the smallest of the subwatersheds. It begins in the rural sandy soils of the Eastern Cross Timbers and empties into Lake Arlington. The reservoir is an important water source for Arlington and NE Tarrant Co.

Richland-Chambers

814, 815, 816, 817, 836, & 837

From the Richland-Chambers dam NW into 1)Johnson Co. & 2) Hill Co.

Agriculture is predominant across the flat to gently rolling prairies of the subwatershed. Urbanization has been slow to this area and the population remains low. During the summer months, base flow is minimal.

Elm Fork Trinity River

822, 823, 823A, 823C, 824, 825, 826, 826A, 839, 840, & 840A

From Frasier dam in Dallas N into Montague Co.

Gently-rolling plains with patches of forest in lowlands. Predominant agriculture is row-crop, cattle grazing, and, in northern portion, dairy. Considerable urbanization in the southern half of the watershed.

Clear Fork Trinity

829, 829A, 830, 831, 832, & 833

From SH80 and Vickery in W Ft. Worth NW to Parker Co.

The terrain here is mostly flat with some gently rolling prairie. The southern reaches are heavily urbanized but, in general, the population is relatively low. Primary agriculture: cattle ranching and some row-crop.

Lower Trinity River

801 & 802

From Trinity Bay N to Livingston

South of the Livingston dam, the Lower Trinity gingerly traverses a the flat coastal prairie. Near the end of her voyage, Houston taps into this perennial water source. At last, the water passes through the Wallisville saltwater barrier and into Trinity Bay.

Mountain Creek

838

From Mt. Creek Lake dam W to Johnson Co.

The Blackland Prairie soils support an abundance of row-crop agriculture in this highly rural watershed. It is important to monitor the water quality of Mountain Creek because of the increasing urbanization.

Cedar Creek

838

From Cedar Creek Lake dam N into Rockwall Co.

Cedar Creek Reservoir was created to satisfy the water demands of Fort Worth and Tarrant County. Development has been intensive near the reservoir, but the watershed remains sparsely populated.

Water Quality Monitoring

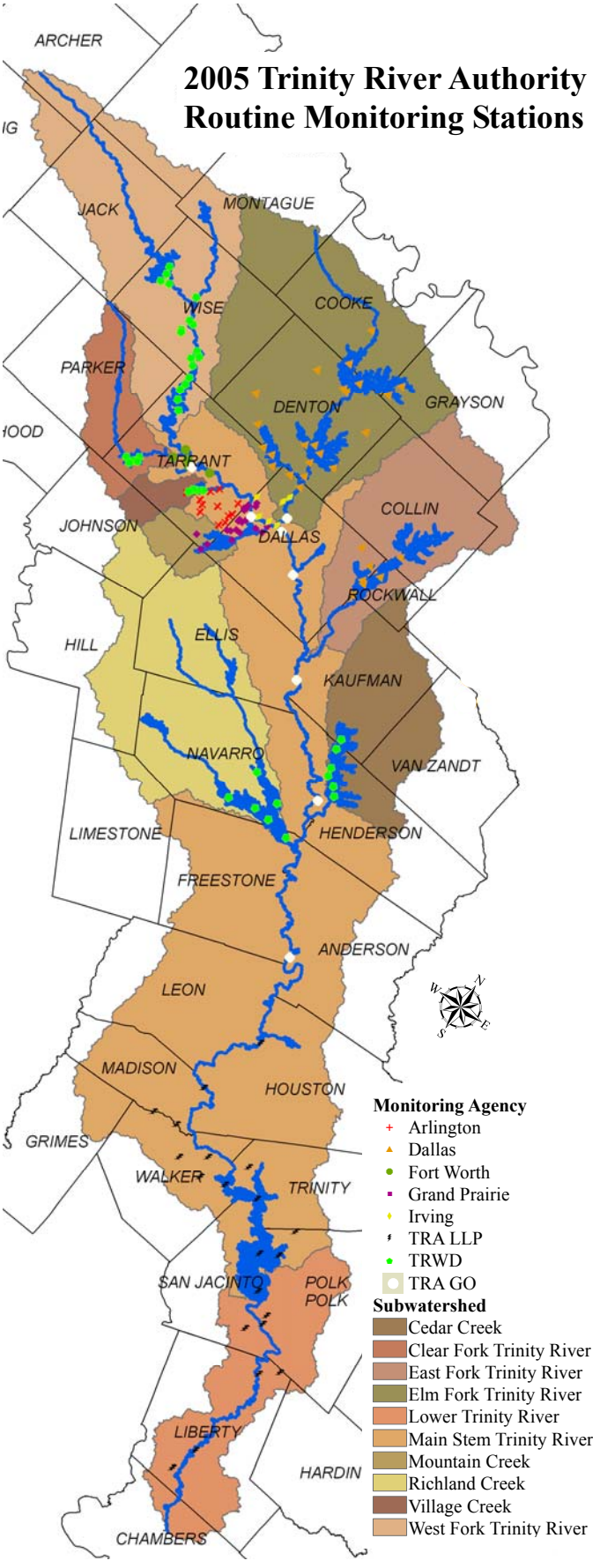
"During Fiscal year 2005, the TRA added 3370 Events and 32,000 Results to Texas' water quality database."

Water quality monitoring is one of the cornerstones of the Clean Rivers Program. Much of the data collected within the purview of the CRP is used to assess and manage the surface water within the Trinity River basin. The Texas Commission on Environmental Quality relies on water quality data, including CRP data, to assess stream segments on a bi-annual basis. Each classified waterbody is divided into assessment units and is evaluated to determine if it is meeting its designated use(s.)

Since the program's inception, efforts to develop and maintain partnerships with existing agencies have been a focus of the TRA's Clean Rivers Program. Sustaining a monitoring network for the 18,000 mi² Trinity River basin would not be possible without the cities of Arlington, Dallas, Grand Prairie, Fort Worth, and Irving, the Tarrant Regional Water District, and the Trinity River Authority's Lake Livingston Project. Together, the basin is covered by a network of 150 routine sites monitored at various intervals for an array of parameters. For more specific information, see the Coordinated Monitoring Schedule online at http://cms.lcra.org/schedule.asp?basin=8&FY=2006.

After the data is received from each partner entity, it is converted, formatted, quality assured (QA/QC,) and submitted to TCEQ. TCEQ performs additional checks on the data and posts it to Texas' water quality database where it is made available to the public. To download TRA CRP water quality data, visit http://www.trinityra.org/BasinPlan/CRP/viewer/viewer.asp.

Entity	Sites	Parameters
Dallas	37	Field and Metals
Fort Worth	6	Field and Bacteria
Arlington	12	Field, Bacteria, Nutrients/ Conventionals, and Metals
Grand Prairie	22	Field, Bacteria, Organics, and Metals, Nutrients/Conventionals
Irving	6	Field, Bacteria, Conventionals, and Metals
TRA GO	8	Field, Bacteria, and Nutrients/ Conventionals
TRA LL	21	Field, Bacteria, Nutrients/ Conventionals, Organics, and Metals
TRWD	39	Field, Bacteria, Nutrients/ Conventionals, and Metals



Public Outreach & Special Studies

The Trinity River Authority's Clean Rivers Program is involved in a myriad of public outreach and educational activities. In 2005, the TRA staff continued its participation in Gatorfest in Anahuac, Texas Watch, the University of Texas at Arlington's Earth Day event, and presented to over 300 people at Brookhaven College's GIS Day. In addition, the TRA funded the clean-up of debris from the White Rock Creek cove of Lake Livingston.

Trinity County cleanup, September 2005. The clean up was aided by the drawdown of Lake Livingston due to damage sustained from Hurricane Rita.

The TRA continued its support of the Waterborne Education Center—a non-profit organization that educates citizens on the conservation and preservation of Texas' coastal resources. The WBEC maintains floating classrooms built from modified Coast Guard buoy tenders which create a unique perspective for students to learn about wetlands, marshes, and estuaries. If you would like more information regarding the WBEC tour and field trips, please call (409) 267-3547.

A modest amount of financial assistance was given to the River Legacy Foundation for the purchase of computers and software for Geographical Information Systems (GIS.) These tools are used for hands-on environmental education.

Stakeholder Participation

The 2005 stakeholder meeting was held in August. TRA personnel presented an overview of current activities and stakeholders gave feedback, ideas, and suggestions about upcoming special studies. Stakeholder meetings occur once a year and all interested parties are welcome. Visit our website for more information about the stakeholder process and what *you* can do to improve water quality in *your* watershed!

For a comprehensive look at TRA's ongoing and completed Special Studies, see the 2005 Basin Summary Report online: *http://www.trinityra.org/BasinPlan/basin_highlight_2005.htm*.

Recently Completed Special Studies

Low Dissolved Oxygen in Johnson Lake

The City of Jacksboro applied to renew their discharge permit in July, 2000. During permit review, TCEQ utilized a *new* model to evaluate receiving waters and determined that, even if there was no effluent discharged in to the stream, the dissolved oxygen (DO) standards could not be met. This study used historical analysis, new data collection, analysis of system hydraulics and lake levels, a review of existing Surface Water Quality Standards, and a new modeling system to conclude that the *previous* TCEQ model was the appropriate standard from which to evaluate the City of Jacksboro's permit renewal request. The study concluded that, due to natural environmental factors, lake arms should not be evaluated against the same "high aquatic life" (5.0 mg/L) use standards as the lake.

Water Quality Standards Evaluation: Richland Chambers

This study was initiated due to a concern about the DO levels in backwater areas of Post Oak Creek. The study found that backwater DO concentrations were depressed regardless of whether they received discharges. Visual inspection of the data showed that naturally occurring DO levels are influenced by the width to depth ratio and climatic factors.