



Trinity River Authority Clean Rivers Program 2010 Basin Summary Report Overview

Trinity River Authority (TRA) operates and administers the Texas Clean Rivers Program (CRP) through a contract with the Texas Commission on Environmental Quality (TCEQ). The primary goal for the CRP is to acquire water quality data that is both accurate and of a comparable, known quality. Therefore, all Clean Rivers Program partners throughout Texas sample and handle data under similar Quality Assurance Project Plans. Additionally, data provided to TCEQ by the Clean Rivers Program is used in the Texas Water Quality Inventory.

CRP programs statewide are involved in other activities such as public outreach, watershed inventories, special projects, and data analysis and reporting. Every five years, a comprehensive Basin Summary Report is prepared for each river basin and is designed to examine the water quality of the basin. The *Trinity River Authority Clean Rivers Program 2010 Basin Summary Report* reviews the two most recent TCEQ assessments: the [2008 Water Quality Inventory](#) and [Draft 2010 Water Quality Inventory](#). In addition, two in-house data analyses were conducted: a trend analysis on a ten-year data set and a 5-year analysis to see a snapshot of recently collected data.

The Trinity River basin extends approximately 715 river miles and drains about 18,000 mi² before emptying into Trinity Bay near Anahuac. The basin transitions from sandy soils and rangeland in the northwest, to blackland prairies and row crop agriculture around the DFW Metroplex to piney forest along the middle portions of the basin, and finally to the coastal prairies near the mouth of the river. Additionally, the Trinity River supports the water needs of two major population centers; the DFW Metroplex in the upper reaches and the City of Houston in the south.

Generally, water quality in the Trinity River basin is of high quality. Detailed discussions of water quality for each subwatershed are found in the body of the full report. The major issues prevalent basin-wide are listings for bacteria (Contact Recreation Use),

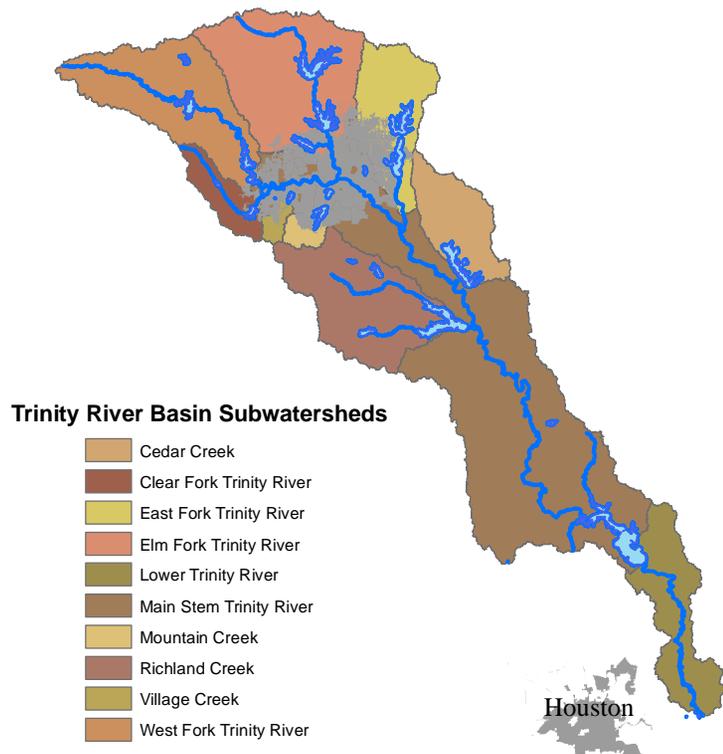


Figure A.1. Trinity River Basin Ecoregions Map.

low dissolved oxygen (Aquatic Life Use), and concerns for chlorophyll-a and nutrients (General Use).

Bacteria impairments are prevalent throughout much of the basin with 83% of the listings concentrated in the unclassified segments of the DFW Metroplex. High measurements of these bacteria can indicate improperly treated wastewater or illicit dischargers. However, much of the research has shown that the majority of sources are related to birds and other wildlife that live along the riparian corridor. A Total Maximum Daily Load (TMDL) for bacteria is underway in the DFW area, but controlling sources will be difficult at best.

Dissolved oxygen (DO) in water is imperative for aquatic species to survive. Low DO can be caused by algal activity, sanitary sewer

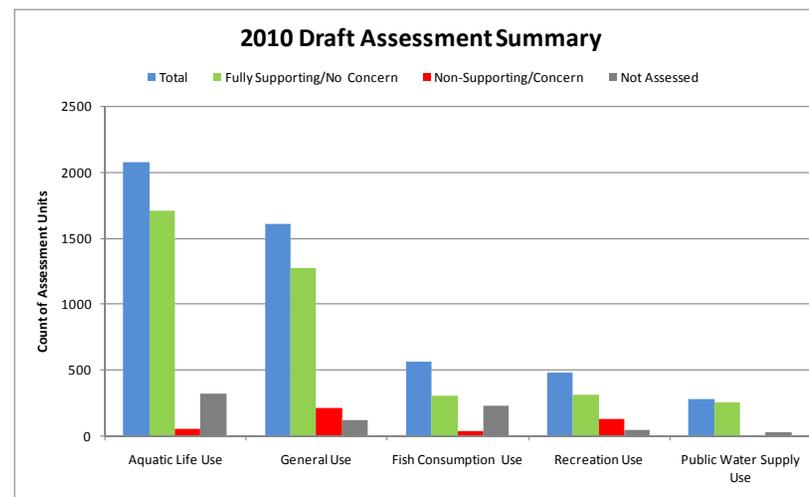


Figure A.2. 2010 Draft Assessment Summary for the Trinity River Basin.

overflows, rapid temperature swings, or a host of other natural and anthropogenic factors. The default standard for DO is 5 mg/L. Many of the listings for low DO are on high order streams with seasonal flows and the default standard is inappropriate. Additionally, some of the higher order streams that show low DO measurements are not experiencing fish kills and biological indicators show that the environment is healthy. DO is an important parameter and should continue to be closely monitored. Standard revisions should be considered prior to starting the TMDL process.

Based upon general consensus, nutrients are not causing widespread problems in the Trinity River basin and the majority of correlation analysis shows little relationship between nutrients and harmful algal blooms that can cause widespread fish kills. In the naturally turbid waters of the Trinity basin, the greatest limiting factor is likely light penetration into the water column. Additional study is ongoing and numeric chlorophyll-a standards will likely be adopted by the summer of 2010.

Legacy pollutants continue to be a problem in the upper basin and have caused much of that area to be under a fish consump-

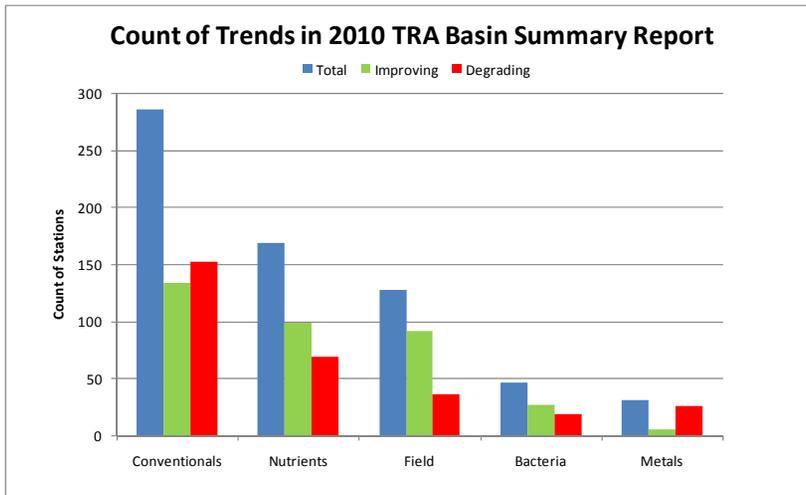


Figure A.3. Count of Trends in 2010 TRA Basin Summary Report.

tion advisory posted by the Texas Department of State Health Services. These legacy pollutants include chemicals like PCBs, chlordane, arsenic, and DDT that were identified in the edible portions of fish tissue. There are no realistic solutions for remediation. Most of these chemicals have been banned for decades, yet continue to persist in the sediments. Nationwide, efforts to remove contaminated sediments have resulted in exacerbating problems downstream. Unfortunately, consumption bans will remain in effect for the foreseeable future.

The 2010 Draft Assessment found a large number of issues related to General and Recreation Uses (fig. A.2). Importantly, there are no listings for Public Water Supply. TRA's trend analysis followed the same general pattern with conventionals and nutrients making up the majority of the parameters trending in an adverse direction (fig. A.3).

As populations continue to increase, water quality will become more important. It is imperative that planning agencies monitor water quality and focus on making monitoring programs as efficient and pertinent as possible. TRA partners with 7 other basin cities/entities to leverage funds and maximize data collection.

WATERSHED SUMMARIES

West Fork

- The upper portions of the watershed have issues with dissolved oxygen (DO) levels most likely due to natural low/intermittent flow and inappropriate aquatic life use designations.
- Sulfate, chloride, and total dissolved solids (TDS) are decreasing in some of the reservoirs. A Tarrant Regional Water District study suggests this may be due to lack of inflow from tributaries.
- Chlorophyll-a is increasing in some reservoirs. However, there is no evidence to suggest that the increase is associated with harmful algal blooms.

Clear Fork

- The upper and middle portions of the watershed have issues with DO levels most likely due to low flow.
- A fish consumption ban is in place on the downstream portion of the watershed due to elevated levels of polychlorinated biphenyls in fish tissue.

Village Creek

- There are increasing levels of chlorides and TDS in Lake Arlington. The source of the increasing levels are unknown at this time.

Mountain Creek

- Decreasing trends for sulfate, TDS, and hardness were found in this watershed. This may be due to decreasing tributary inflows as suggested by a recent Tarrant Regional Water District study.
- Decreasing pH trends in Walnut Creek are approaching the minimum standard of 6.5 SU.

Elm Fork

- Concerns for nutrients on several reservoirs were carried forward from previous assessments due to lack of current data.
- Elevated TDS levels in some waterbodies coincide with the drought of 2005 and 2006.

Low DO levels in some portions of the watershed are most likely due to low flows and hot summertime temperatures.

East Fork

- Elevated nutrient levels in the reservoirs appear to be a result of runoff events. Nutrient levels increase when lake elevation is up and decrease when lake levels drop.
- DO concerns in unclassified segments are most likely due to low flows.
- Elevated levels of TDS, chloride, and sulfate may be due to the drought. Additional factors may include agricultural irrigation runoff and surface water evaporation.

Main Stem

- Fish consumption bans due to legacy pollutants are common throughout much of the main stem. Possible sources of legacy pollutants are their persistence in contaminated sediments, stockpiles, and improper disposal.
- Many of the small urban streams have been found to have Concerns or to be Not Supporting the Aquatic Life Use due to depressed DO. These issues are due to natural low/intermittent flow and hot summertime temperatures.
- Sulfate in Lake Livingston was found to be Not Supporting the General Use due to high measurements from the upper, riverine portions of the lake. The geography of Lake Livingston is unique and application of the main body reservoir standard to the entire reservoir is inappropriate.

Cedar Creek

- The reservoir is Not Supporting General Uses due to elevated pH levels. The standards are 6 SU minimum and 8.5 SU maximum compared to 6.5 - 9 SU for other basin reservoirs.
- Increasing nutrient trends appear to be related to higher flows and lake levels following the drought of 2005 and 2006.

Richland-Chambers

- Increasing trends in sulfate and TDS levels in the small reservoirs of this watershed may be related to agricultural irrigation runoff during dry weather periods.

Depressed DO levels which may lead to Concerns on future Water Quality Inventories occur in the reservoirs during times of low lake elevation and high water temperatures.

Lower Trinity River

- Levels of several nutrient and conventional parameters appear to be responding to reservoir levels in Lake Livingston during and after repairs to the dam. Peaks are seen during the time the reservoir was maintained at lower than normal elevations.
- Many parameters displayed a somewhat flat data pattern prior to the summer of 2004. After 2004, a sharp increasing trend can be seen. Further data analysis is ongoing to determine if this is an artifact of the period of record and if a source can be found.

Conclusions and Recommendations

- Addressing the concerns of rural and large urban populations will be paramount in the decades to come. Generally, the major water quality issues in the Trinity River basin are legacy pollutants, bacteria impairments, non-point source runoff, and nutrient listings.
- Legacy Pollutants cause many miles of the Trinity River to be Non-Supporting because of high values of toxic substances found in fish tissue samples. These listings will likely persist for many years.
- Bacteria listings are due to a combination of both man-made and natural loadings and inappropriate bacteria standards.
- Many nutrient measurements are above existing screening levels, but do not seem to be causing problems in the Trinity River basin.
- New concerns are developing based on recent studies of Personal Care Products (PCPs), endocrine disrupting pollutants, and other parameters classified together as "Emerging Contaminants".
- Overall, Trinity River water is of high quality. However, the challenges ahead in tackling water quality issues are large and there are no easy fixes.

The full *Trinity River Authority Clean Rivers Program 2010 Basin Summary Report* may be downloaded online www.trinityra.org

