Trinity River Authority Clean Rivers Program 2010 Basin Summary Report

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Additional cooperators include the cities of Arlington, Dallas, Fort Worth, Grand Prairie, and Irving, the Lake Livingston Project, Tarrant Regional Water District, as well as members of the Trinity River Authority's Clean Rivers Program Steering Committee.

References & Data Sources

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LCRA 2007 Basin Summary Report
http://waterquality.lcra.org/text/crplcbs2007.pdf

Region C Regional Planning Group
http://www.regioncwater.org/

TCEQ Bacteria TMDL Information
http://www.tceq.state.tx.us/implementation/water/tmdl/66-trinitybacteria.html

TCEQ Reservoir Trophic Status Report
http://www.tceq.state.tx.us/assets/public/compliance/monops/water/04twqi/04_reservoir_narrative.pdf

TCEQ Special Projects
http://cms.lcra.org/default.aspx

Texas Clean Rivers Program Resources, Maps, and Data
http://www.tceq.state.tx.us/compliance/monitoring/crp/data/crp-resources.html

TMDL Project for Legacy Pollutants in the Upper Trinity
http://www.tceq.com/implementation/water/tmdl/05-dalleg.html

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Foreword

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

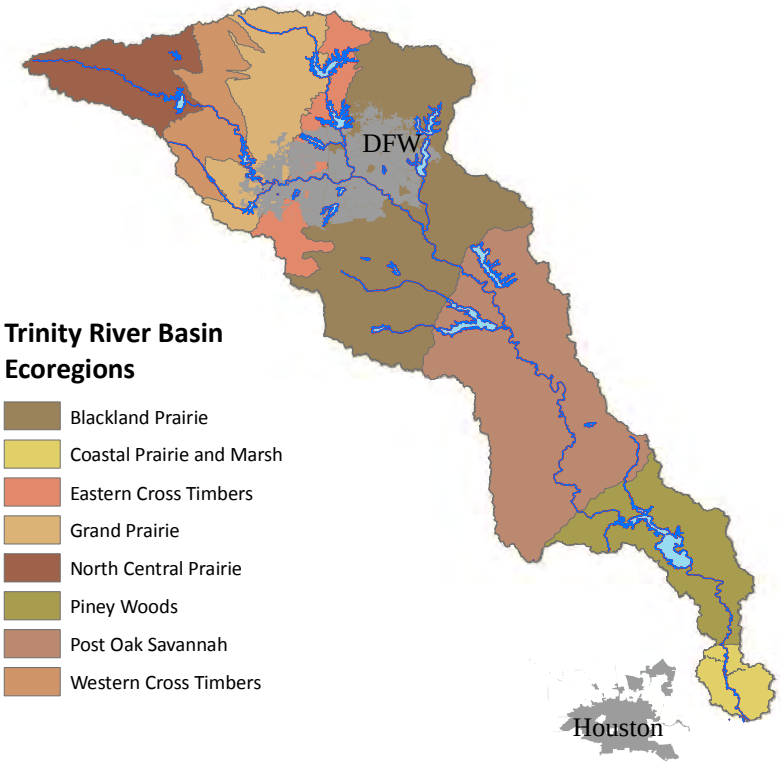


Figure A.1. Trinity River Basin Ecoregions Map.

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 overflows, rapid temperature swings, or a host of other natural and an-

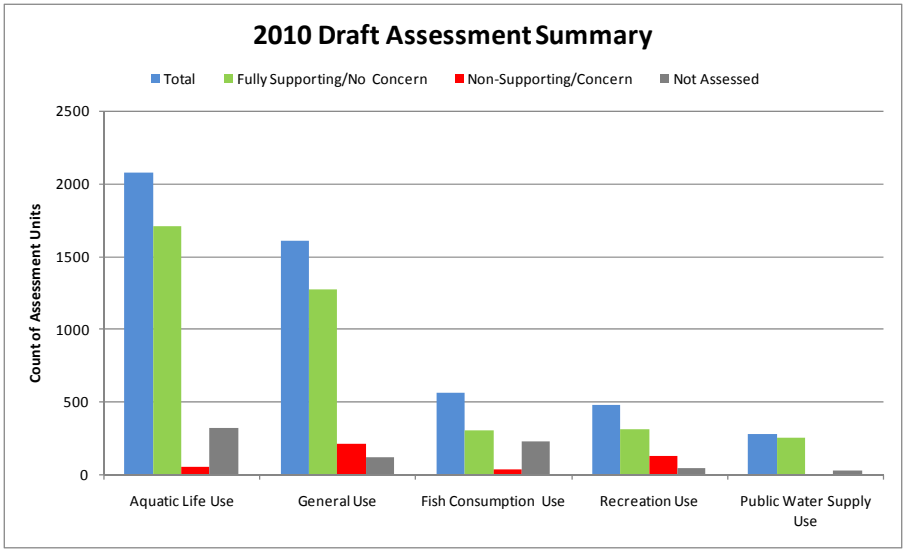


Figure A.2. 2010 Draft Assessment Summary for the Trinity River Basin.

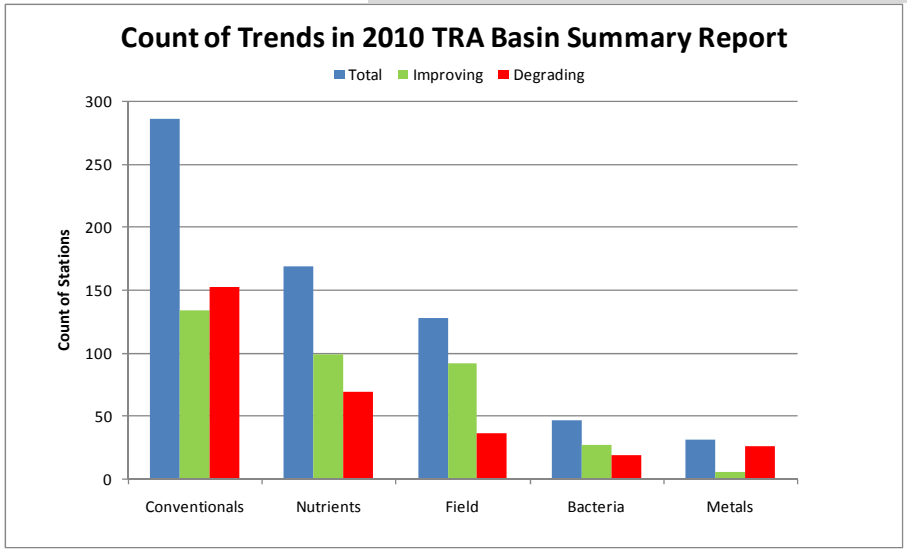


Figure A.3. Count of Trends in 2010 TRA Basin Summary Report.

thropogenic 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 consumption 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 leverages funds and maximize data collection.

Conclusions

Water quality in the Trinity River basin will continue to be a challenge as the pressures of population growth continue. The Trinity River basin provides drinking water to over 50% of the residents of Texas and the demands on these finite resources will only increase as populations in both the DFW and Houston areas swell.

Addressing the concerns of rural and large urban populations will be paramount in the decades to come. Additionally, issues related to water quality and water quantity are currently being addressed through the efforts of the Regional Planning Groups and the Environmental Flows process. There are no easy answers to these questions, but solutions must be found for basin residents to continue to thrive.

Generally, the major water quality issues in the Trinity River basin are legacy pollutants, bacteria impairments, non-point source runoff, and nutrient listings. Additionally, new concerns are developing based on recent studies of Personal Care Products (PCPs), endocrine disrupting pollutants, and other parameters classified together as "Emerging Contaminants".

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 are based on chemicals that have been banned since the early 1970s. Yet, they persist in the sediment and continue to cause problems over 30 years later.

Bacteria impairments occur for both natural and man-made reasons. Many of the of the listings for bacteria in the DFW area are due to wildlife and avian species living in and around the riparian zones. Other times, listings are caused by sanitary sewer overflows and improperly treated wastewater. It is likely that standard revisions expected in late 2010 will remove some of these listings.

Non-point source runoff is both an urban and rural issue. Over the last 30 years, most of the point source discharges have been cleaned to a level that they are no longer causing widespread listings. Many times, the effluent is much cleaner than the instream water quality that exists upstream of the discharge. Urban runoff typically consists of excessive nutrients from over-fertilization of lawns, bacteria, household chemicals, oils and greases, sanitary sewer overflows, illicit discharges, and a variety of other contaminants. Rural area runoff commonly contains excessive nutrients, bacteria, and pesticides. Both urban and rural areas are responsible for tens of thousands of tons of sediment that wash into basin waterbodies.

New sampling and analysis techniques have allowed scientists to detect smaller and smaller ratios of constituents in water. What is unknown are the effects on biota. We do not yet know if these constituents are causing problems or not. Additionally, what are the long-term, chronic effects? Do these tiny volumes of chemicals react with each other in a way that causes health concerns for humans? Right now, we simply do not know.

Overall, the current water quality in the Trinity River basin is quite good and there is a competitive market for wastewater effluent due to the high degree of treatment. The challenges ahead in tackling water quality issues are large and there are no easy fixes. It is likely that the legacy pollutant issue will persist for many decades to come. The Trinity River Authority's Clean Rivers Program will continue to work to find solutions through data collection and data quality assurance, watershed surveys, special studies, and public outreach programs.

Recommendations

From the beginning of the Texas Clean Rivers Program, there has been an emphasis on collection, quality assurance, and submittal of data to TCEQ. As the program progresses and matures, the emphasis needs to shift to a more targeted approach to data collection. In other words, the approach needs to shift from *data* gathering to *information* gathering. For example, is it more useful to continue to gather data across the basin at a site that has shown no changes for 15 years, or, should those resources be used to target data collection to help indentify specific pollutant sources or additional monitoring in watersheds that show changing water quality? These types of questions are important and are being addressed in the Trinity River basin.

There is a distinct lack of biological data collected in the Trinity River basin. DSHS, TPWD, USGS, and TCEQ collect biological samples, but the TRA CRP needs to add additional biological sampling evolutions throughout priority watersheds. Along these same lines, efforts should be made to tie biological samples to water quality results to help better classify the segments.

Additional efforts should be made to attract new partner cities into the TRA Clean Rivers Program. Currently, many of the cities in the DFW area are CRP partners, but no cities south of Grand Prairie are involved. The Middle Trinity River area needs additional coverage along the main stem, tributaries, and reservoirs. Additionally, efforts to expand the partner network to the northeast are underway. Partner entities enjoy a great number of benefits due to their involvement in the Clean Rivers Program and efforts to expand the program are needed.

Additional monitoring and watershed surveys need to be completed along the main stem of the Trinity River. A distinct lack of sediment transport and geomorphologic data was identified during the SB3 Environmental Flows process. Watershed surveys include habitat surveys, flow monitoring, channel mapping, and photographs. Because access to river along the main stem is quite difficult, little field work has been completed since the 1970s.

Background

The Texas Clean Rivers Program

In 1991, Texas Senate Bill 818 created the Clean Rivers Program (CRP). This program is administered by the Texas Commission on Environmental Quality (TCEQ) and is conducted in each of the major river basins by local planning agencies such as the Trinity River Authority. The CRP is funded, in part, by fees assessed to water and wastewater permits. The goals of the program are to protect the water resources of the state and to improve water quality.

Annual Reports

Each year, the local planning agencies produce a Basin Highlights Report which summarizes the CRP activities in their basin. This report may include information on events effecting water quality, a summary of water quality data, and an overview of public outreach activities and special projects. Every fifth year, a greatly expanded Basin Summary Report provides a detailed analysis of water quality data and potential sources, as well as offering recommendations for future basin activities. All past reports are available on TRA's website at http://www.trinityra.org/BasinPlan/CRP/tra_reports.html.

Goals and Objectives of the TRA CRP

The TRA CRP focuses on three main aspects of the program: water quality monitoring, special projects, and public outreach. Routine water quality monitoring data are vital to the success of the CRP. Data are used for regulatory purposes such as setting water quality standards and modeling for permit limits, as well as to assess the health of waterbodies. In the Trinity basin, monitoring is leveraged with the existing programs of several municipalities and other entities.

Special projects are typically geared toward short-term sampling activities focused on answering a specific water quality question. These may also include ongoing activities which maintain high standards of data quality, as well as in-depth analyses of existing data for various ends and compilation of historic data sources.

Public outreach involves annually updating the Steering Committee which helps guide the activities of the TRA CRP. Other outreach activities include sponsorship of trash clean-ups and volunteer monitoring programs. Education on the importance and protection of Trinity water resources is accomplished via participation in organized public and school events.

Trinity Basin and Water Quality Characteristics

The Trinity River extends approximately 715 miles and drains about 18,000 square miles before ending at Trinity Bay near Anahuac. A majority of the basin topography is flat to gently rolling. A large portion of the watershed flows through the Blackland Prairies which lends the river its characteristic muddy brown color. This ecoregion is made up of soil types that, while excellent for row crop agriculture, are highly erodible.

The northern portion of the basin is dominated by the DFW Metroplex. Legacy pollutants from long-lived banned chemicals are a concern. Other results of urban life include storm water runoff that is polluted by oil and grease, pesticides, fertilizers, and animal waste. During the summer months, the native flow of the river in this area is reduced to a trickle generally made up of seeps from groundwater and occasional rainfall events. The larger fraction of summer flow is made up of high quality effluent from wastewater dischargers. This allows the river to maintain a habitat far greater in flow and better water quality than historical levels.

The far northern and middle reaches of the basin are characterized by agriculture. These activities can result in elevated nutrient levels from fertilizer use, bacteria from confined animal feeding operations (CAFOs), and erosion. Many areas of the basin are also experiencing increased oil and gas drilling activities which can have negative impacts on water quality.

The TRA CRP is involved in several public involvement activities which range from trash clean-ups to public education events. Public interest in the welfare of local waterbodies is vital to improving water quality in the Trinity Basin.

The TRA Clean Rivers Steering Committee is made up of basin stakeholders and other interested parties, including city officials and the general public. The steering committee provides input and information that is used to guide the program. Annual meetings, which are open to the public, are held to update committee members on the activities of the program and to provide a forum to share ideas. If you are interested in participating in the Steering Committee, contact the TRA CRP at tra@trinityra.org.

Trash clean-ups are public events that are organized by cities and counties. The TRA CRP helps fund these events which include Trash Bash, Navarro County Clean-UP Day, and Walker County Proud. Volunteers at these events remove many tons of debris from waterbodies and waterways. In addition to the immediate benefit of the waste removal, volunteers become more aware of their impact on local waterbodies.

The Texas Stream Team utilizes a network of trained volunteers to monitor the quality of waterbodies in Texas. Texas State University administers this program in cooperation with the TCEQ and the EPA. The TRA CRP supports this program through funding for kits and supplies as well as a trainer for local volunteers.

Both the Waterborne Education Center in Anahuac and the River Legacy Park and Living Science Center in Arlington are educational facilities for the public. The Waterborne Education Center focuses on field labs for students that demonstrate the importance of the Trinity's tidal and coastal ecosystems. The River Legacy Park and Living Science Center is a 1,300 acre park, trail, and habitat area which includes an educational facility with interactive exhibits and classes.

The TRA CRP provides funding for each of these facilities for the purchase of educational supplies and equipment.

In addition to the activities discussed above, the TRA CRP participates in several organized public outreach and education events each year. These range from local Earth Day events to Gator Fest in Anahuac. At these events, information is presented on the Trinity basin as well as the Trinity River Authority. Educational materials are supplied in order to teach the public how they can take a personal role in reducing and preventing water pollution. To this end, a downloadable pamphlet (fig. B.1) has been developed which details ten simple things that can be done on an individual and/or daily basis. These activities include the proper application and use of pesticides and fertilizers; proper disposal of pet waste, used motor oil, expired and unused medications, and compact fluorescent lights; use of water hoses instead of sprinkler systems; rainwater harvesting; use of reusable shopping bags; removal of grass clippings from streets; and use of non-toxic soap to wash vehicles on the lawn.

Figure B.1. Pollution Prevention Pamphlet.

Special projects are typically studies or activities that look at a specific issues in-depth. These are either federally or locally funded and can range from short term to long term, depending on the needs of the project.

Federal Programs

There are several projects occurring in the Trinity River basin that are part of federal programs such as the EPA's Superfund, Brownfield, RCRA, and ECHO programs. In the subwatershed water quality chapters of this document, some of the federal programs in each subwatershed are mentioned. Information about those projects can be obtained from the embedded links to the EPA website.

Superfund sites are those abandoned sites and facilities that are determined to be contaminated and in need of cleanup. Funding for cleanup activities was established by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) in 1980 and the Superfund Amendments and Reauthorization Act (SARA) in 1986. The EPA can either cleanup a site or identify those responsible for the contamination. In cases where contamination can be tied to an individual, entity, or company, the EPA may require those responsible to clean the site or pay the EPA for their cleanup activities. The process of identifying sites to the end goal of cleanup or remediation can take many years or decades.

Brownfield sites are industrial or commercial facilities that are either abandoned or underutilized and which may have low level contamination. These sites differ from Superfund sites in the extent of contamination present. Brownfields are generally sites which can benefit the community, economy, and environment through their cleanup and redevelopment. Depending on the type and extent of contamination, as well as state laws, Brownfields are redeveloped for a wide variety of purposes ranging from residential and commercial to recreational. In addition, Brownfield redevelopment eases the pressure to destroy natural spaces for new development activities.

The Resource Conservation and Recovery Act (RCRA) of 1976 governs the disposal of solid and hazardous waste. In addition, the Act governs the tracking of hazardous waste from its creation to disposal. This is commonly known as the "cradle to grave" program. Other goals of the Act are to protect human and environmental health from improper waste disposal and reduce waste. Information provided by the RCRA program is available online.

The Enforcement and Compliance History Online (ECHO) database provides the public with information on facilities regulated by EPA. This includes information on inspections, violations, and enforcement actions. All facilities regulated by the Clean Air Act Stationary Source Program, Clean Water Act National Pollutant Elimination Discharge System, and RCRA are included in the ECHO database.

State Level Basin Programs

There are many state-wide and basin-wide special projects that are administered by TCEQ and other state agencies such as the Texas State Soil and Water Conservation Board (TSSWCB). Short descriptions of each project referenced in the watershed summary chapters can be found on the Coordinated Monitoring Schedule Special Projects website. In general, many of these projects are related to Total Maximum Daily Load (TMDL) activities. A TMDL determines the maximum amount of a pollutant that can be allowed to enter a waterbody while still meeting applicable standards. Therefore, it identifies the amount of pollutant reduction necessary to restore water quality to acceptable levels. A TMDL is scheduled when a waterbody has been found to be in exceedance of a standard and requires further action. After TMDL levels are determined for each pollutant and waterbody, implementation plans are developed for the steps necessary to reduce pollutant levels. Several of the current TMDL projects in the Trinity basin are for elevated bacteria levels in the water column and legacy pollutants such as PCBs.

TRA CRP Projects

The Trinity River Authority Clean Rivers Program either participates in or administers several special projects during the course of its biennial contracts with TCEQ. Final reports for past special projects are available on the TRA CRP website. Some current special projects include the DFW waste load allocation and an assessment of total dissolved solids in waterbodies.

The waste load allocation (WLA) is a calculation that determines the assimilative capacity of the river in relation to effluent from wastewater and other dischargers. Previous WLAs were based on models that utilized the assumption that maximum flows from permitted dischargers were occurring during periods of base flow in the river; two conditions which rarely occur simultaneously. Essentially, these assumptions did not include natural dilution effects. Maximum flows from dischargers occur during periods of high infiltration into sewer lines from heavy rainfall. Consequently, these are the same periods when rivers flows are elevated. Current WLA work has included updates to the models and alternative permit limits. The updates to the model have used more realistic discharge and river flows as well as reductions in flows due to reuse and withdrawal permits. Alternatives to standard permit limits include limits based on seasonal flow fluctuations in the river and joint probability analysis to determine the likelihood of maximum discharges occurring during base flow events. Work on this project is ongoing.

The assessment of total dissolved solids (TDS) involved a review of existing TDS data within the basin, as well as for those waterbodies outside of the basin that are either current or proposed sources of water imports. The goal of the project was to characterize the TDS quality of in- and out-of-basin waterbodies and to determine if water supply use and management could have an effect on TDS levels. It was determined that some waterbodies are nearing levels which could soon violate TDS standards. In addition, increasing population and associated activities, such as industry, power generation, wastewater treatment, household uses, imports, and reuse, have the potential to increase TDS levels. All of these activities need to be monitored and managed in such a way as to prevent increasing TDS levels and protect current designated uses.

Water Quality Review

Data Collection

A large portion of the data used in this report were generated by TRA CRP partners. Current partners include the cities of Dallas, Fort Worth, Grand Prairie, Arlington, and Irving, as well as Tarrant Regional Water District and the TRA Lake Livingston Project. These partner entities have monitoring programs that have been in place for many years for reasons such as storm water permitting and water supply protection. The entities have agreed to provide their data to the CRP on a voluntary basis. In return, TRA CRP staff provide the partner entities with data quality assurance, sampling supplies and equipment, funding for analytical costs, and additional manpower on an as-needed and negotiated basis. This voluntary partner network has allowed the TRA CRP to leverage funding for more than a four to one return on the dollar. The result has been the ability to collect a large amount of data covering a large portion of the basin which would be impossible using only in-house resources. Data are collected in compliance with both the biennial quality assurance project plans and the TCEQ Surface Water Quality Monitoring Procedures Manuals.

Assessments

The date range for the 2008 TCEQ Water Quality Inventory (Assessment) includes the seven-year period from December 1, 1999 to November 30, 2006. Where needed, data from an additional three years starting from December 1, 1996 were used. Unclassified segments were not assessed in 2008. The methods used for the assessment are described in the TCEQ document titled "2008 Guidance for Assessing and Reporting Surface Water Quality in Texas." At the time of writing, the Preliminary 2010 Assessment became available followed soon thereafter by the Draft 2010 Assessment. The methods used for this assessment are described in the "2010 Guidance for Assessing and Reporting Surface Water Quality in Texas." Data from December 1, 2001 to November 30, 2008 were included. On occasion, data back to December 1, 1998 were included when needed to obtain enough data to assess. The results of the Draft 2010 Assessment are used to track changes over assessment periods and to determine ongoing water quality issues. As the 2010 assessment results are still in draft form at the time of this writing, the results of the 2008 assessment are a focal point of this report.

Findings of the assessments are classified as Fully Supporting, No Concern, Use Concern, Screening Level Concern, and Nonsupport. To simplify data presentation in this report, the Use Concern and Screening Level Concern classifications were combined into a single "Concern" category. Use Concern findings are given for assessments against designated use standards such as dissolved oxygen and E. coli. Use Concerns can apply to limited datasets where the threshold number of exceedances are met or to adequate datasets where there are less than the threshold number of exceedances required for a Nonsupport finding. Screening Level Concerns apply to General Use nutrients and chlorophyll-a as well as a few other parameters for other designated uses. These parameters have screening levels rather than standards.

In order to determine the status of more recently collected data, TRA conducted an in-house assessment using the most recent available and complete data. This includes data collected between December 1, 2003 and November 30, 2008. Data were compared to standards and screening levels in a manner similar to TCEQ assessment methodologies. As with the results of the Draft 2010 Assessment discussed above, the results of the in-house assessment are used to track changes over time. In addition, the results can be used to confirm ongoing water quality issues as determined by the 2008 and 2010 assessments and to provide a snapshot of the most recent existing conditions. This may provide an idea of emerging issues.

Trend Analysis

Trend analyses were conducted on all datasets determined to be adequately normal. Those datasets that passed significance testing were determined to have trends that warranted further discussion and investigation. The methodology used for data preparation and trend analysis is discussed in further detail in the Data Review Methods appendix.

Based upon the general consensus of many basin water quality experts, nutrients are not causing wide-spread problems in the Trinity River basin. In an attempt to maintain the existing levels of use attainment, draft standards have been derived from existing main body chlorophyll-a data. It is very difficult to obtain meaningful correlations between any single constituent and phytoplankton. The data (10-year period of record averages for chlorophyll-a, TP, and Secchi depth) from Lake Livingston are a good example (fig. C.1).

As expected, the TP value is high and the chlorophyll-a and turbidity values are low in the riverine portion (10917) of the lake. However, the upper reaches (10913) of Lake Livingston shows the highest chlorophyll-a value, yet TP has decreased and the turbidity is still quite high, which should significantly limit phytoplankton production. Unexpectedly, in the middle section (10911), both chlorophyll-a values and TP values have decreased as turbidity decreases. Near the dam (10899), chlorophyll-a and TP should, in theory, be the highest due to the very low turbidity. However, both parameters are far lower than the middle portion of the lake.

Nutrients are essential for the productivity of aquatic ecosystems. Without the building blocks , or "food", that drives the system, there will be no plant and animal life. Conversely, an over abundance of nutrients within riverine and reservoir ecosystems may have detrimental effects in some instances. Clear reservoirs are more susceptible to nutrient enrichment than sediment-laden rivers and lakes. Algae require nutrients and light to grow; Trinity basin water bodies are generally turbid and as a result light can be more of a limiting factor than nutrients. The Trinity's two fairly clear reservoirs, Bridgeport and Amon G. Carter, should be more susceptible to nutrient enrichment but this was not demonstrated with Bridgeport. Much of the work showing nutrient correlations with excessive phytoplankton production were performed in very clear, northern lakes and may not apply.

Currently, there are no numeric nutrient standards in Texas, but site specific draft standards for chlorophyll-a have been proposed for major Texas reservoirs and should be adopted by summer 2010. Stream standards for chlorophyll-a and nutrients are anticipated sometime in the future.

Especially during dry weather, point sources dischargers can have local effects on streams and rivers. However, reservoir nutrient loadings are typically dominated by storm water runoff which is difficult to control. Many Trinity basin water bodies are nutrient saturated and exponential decreases in nutrients would be needed to limit phytoplankton growth. Watershed Protection Programs, extensive use of best management practices, and a cultural shift in both rural and urban communities are needed to measurably decrease nutrients in the Trinity basin.

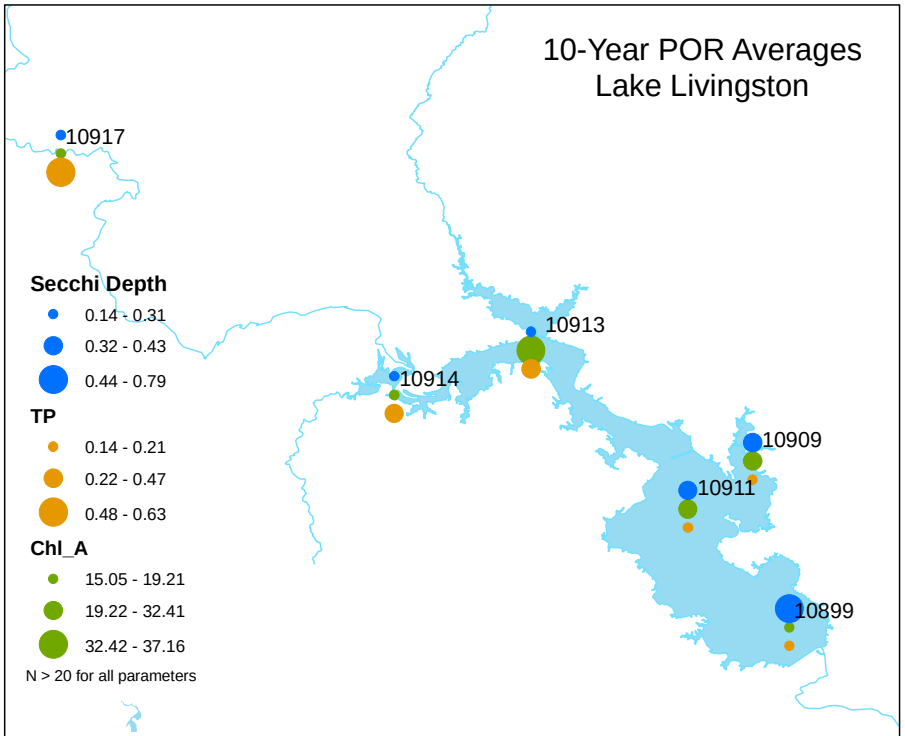


Figure C.1. 10-Year Period of Record Averages for Lake Livingston.

Bacteria Issues in the Trinity Basin

Enterococcus and Escherichia coli (E. coli) are bacteria commonly found in the intestines of animals and humans. These bacteria live in the waste products of these animals and can be washed into surface and ground water during rain events. High measurements of these bacteria can indicate improperly treated wastewater, illicit discharges, livestock and wildlife presence, and a host of other sources. Any warm blooded animal can be a source. Some of these bacteria produce powerful toxins and can cause severe illness if ingested. To protect public safety, CRP partners sample for bacteria throughout the basin. These samples are compared to a surface water quality standard determined by the Texas Commission on Environmental Quality and approved by the U.S. Environmental Protection Agency.

Fecal coliform and E. coli (freshwater) and Enterococcus (tidal waters) are three parameters used in assessing water bodies against the Contact Recreation use standard. The standards are based on two values: geometric mean of the sample set and single sample maximum (fig. C.2). In all, 27% (126 of 474 potential listings) were listed as non-supporting or concern for the Contact Recreation Use. Of the 126 listed, the majority, 83% (104 listings), were on unclassified segments which are generally small, intermittent urban streams. Many of the listings for E. coli are in the small urban streams of the DFW Metroplex (fig. C.3).

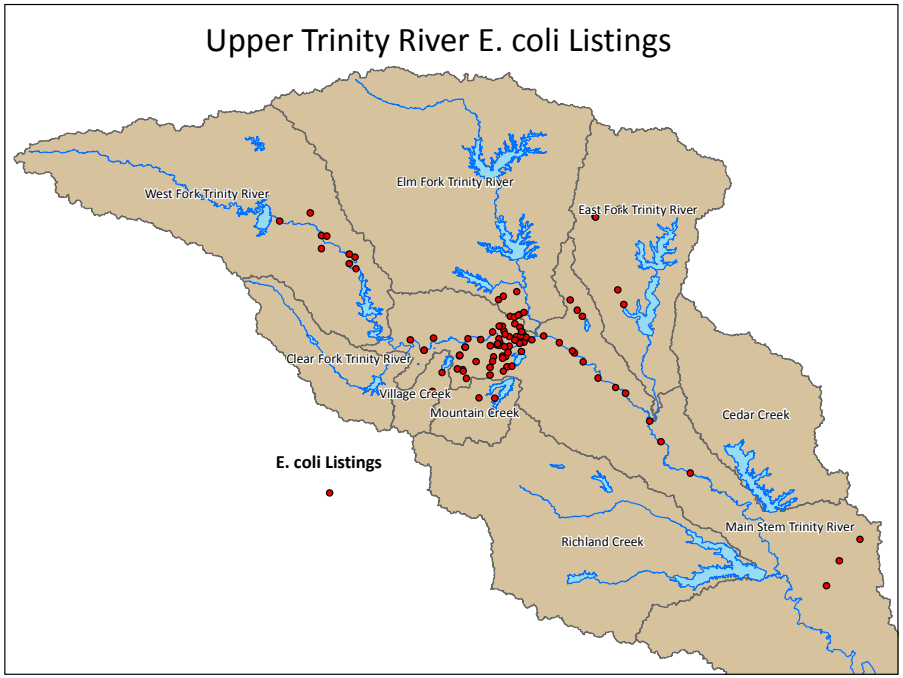


Figure C.3. Upper Trinity River E. coli Listings

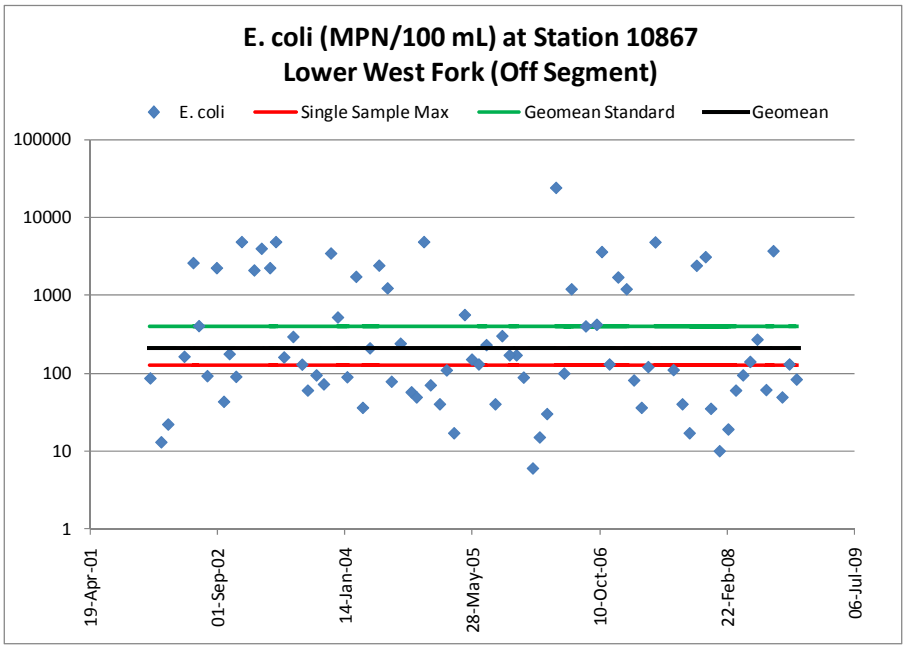


Figure C.2. E. coli at Station 10867.

The Clean Water Act requires that states perform a Total Maximum Daily Load (TMDL) for water bodies not meeting the water quality standards. TMDLs establish an allowable loading of a particular pollutant and allots a certain percentage to each source. There is currently a TMDL underway for much of the Upper Trinity River basin.

Implementing a bacteria TMDL in this area will be difficult at best. The sources are difficult to identify and nearly impossible to control.

In a 2006 Texas Institute for Applied Environmental Research (TIAER) report, *Monitoring Report for Bacterial Source Tracking Segments 0806, 0841, and 0805 of the Trinity River Bacteria TMDL*, researchers attempted to identify the sources of E. coli in the Upper Trinity River region. In general, they found that the E. coli sources were:

43-48% Mammalian Wildlife and Avian;
32-41% Combination of Human, Pet, and Livestock; and
15-19% Unknown.

During wet-weather sampling, E. coli values tend to spike at the beginning, or first flush, and then taper off as the rain event progresses. Instream routine water quality sampling generally shows the opposite, especially in the off-segment sites where extremely low flows are common. Bacteria values tend to increase because bacteria in the system is not washed out or assimilated.

Many current projects in the Upper Trinity River basin are designed to increase riparian buffer zones and create additional opportunities for the public to enjoy recreating in and around the Trinity River. It is possible that these projects designed to re-create the natural riparian vegetation and habitat may actually increase the E. coli values.

Although epidemiological data are difficult to determine, there is no evidence that these E. coli values are causing incidences of sickness in the Trinity River basin. Water quality is monitored regularly in all flow conditions and there are no known illnesses in sampling personnel attributed to bacteria ingestion or contact during sample collection.

How to deal with the E. coli listings will continue to be addressed throughout the next decade. Currently, a triennial review of the Texas Surface Water Quality Standards at TCEQ is underway that may result in an increase of allowable bacteria values based on actual rather than presumed levels of contact. If approved for the 2012 Assessment, some, though not all, segments may be delisted. It is likely that a Bacteria TMDL implemented in the Upper Trinity River basin will have no real effect on lowering bacteria values and the potential cost of implementation could be tremendous.

Chlorophyll-a is commonly used throughout the state as a surrogate for algal biomass. It is the pigment responsible for the green color of many algal species and is vital for photosynthesis. High levels of chlorophyll-a may indicate algal blooms have occurred or are occurring (fig. C.4). Typically nutrients, such as nitrogen and phosphorous species, are the limiting factors for algal growth. The most common limiting nutrients are the phosphates. Nutrients can enter waterbodies via runoff containing residential and agricultural fertilizers, as well as animal waste, atmospheric deposition, effluent from wastewater treatment plants, and sanitary sewer overflows.

In the Trinity basin, nutrients are not always the limiting factor for algal growth. In the naturally turbid waters of the river, light availability is commonly the limiting factor. High suspended sediment loads decrease light penetration into the water column. Therefore, algal productivity is limited to a narrow band at the surface of the water which can range from just a few inches to several feet depending on the turbidity of the water. In reservoirs, light can be the limiting factor in the turbid upper reaches and coves where sediments are still in suspension. As sediments settle out nearer to the main body of the reservoirs, nutrients can become the limiting factors.

Algal growth can affect levels of dissolved oxygen and pH. As algae cycle through photosynthesis and respiration during a 24-hour period, DO and pH levels rise and fall in response. Because chlorophyll-a is used as a surrogate for algal biomass, data analysis can show a strong correlation between chlorophyll-a, DO, and pH. The strength and direction of the correlation depends on the extent of the algal bloom and the time of day, as well as the time required for DO and pH levels to recover.

During sunny daylight hours, algae photosynthesize and respire. The process of photosynthesis uses light, carbon dioxide, and water to produce carbohydrates and oxygen. Therefore, oxygen levels can increase.

Figure C.4. Strong Green Color in a Reservoir due to an Algal Bloom.

At night or during cloudy weather, algal photosynthesis stops while respiration continues. Cellular respiration uses carbohydrates and oxygen to produce carbon dioxide and water. Carbon dioxide in the presence of water forms carbonic acid which reduces the pH of the water. Therefore, oxygen and pH levels can decrease.

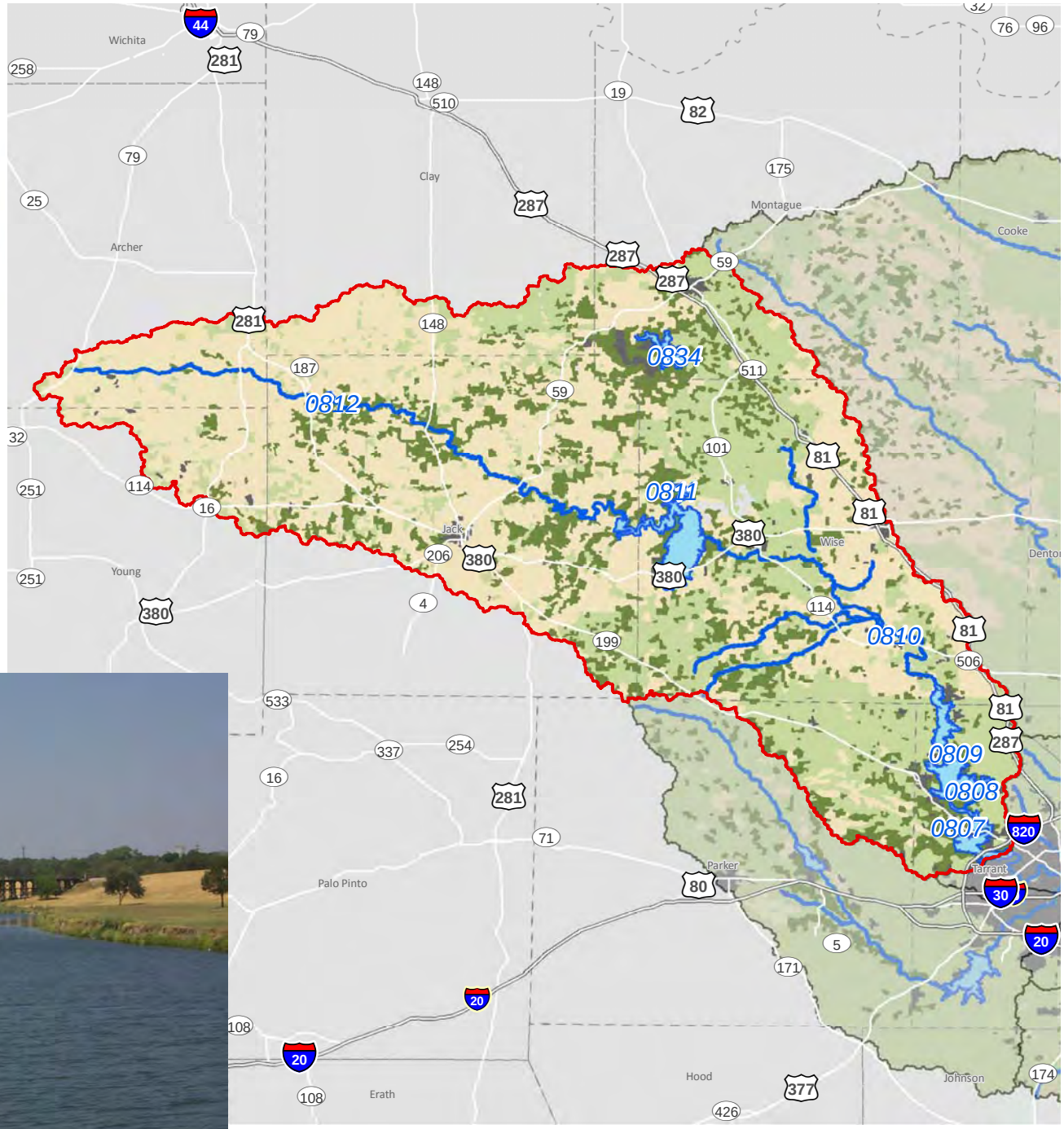
During an algal bloom, it is not uncommon for the water to become supersaturated with dissolved oxygen during the day. At night or during cloudy weather, DO and pH can drop to very low levels, occasionally causing fish kills. This rise and fall in DO and pH during a 24-hour period is called a diurnal swing. The severity of the diurnal swing and the resultant minimum and maximum DO and pH levels depend of the extent of the algal bloom.

Watershed Summaries

West Fork

Land Use Type

- Crop/Pasture/Other Agricultural
- Forest
- Rangeland
- Urban/Industrial/Residential



WEST FORK TRINITY RIVER

Classified Segments – 7
Unclassified Segments – 4

0812 – West Fork Trinity River Above Bridgeport
0811 – Bridgeport Reservoir
0810 – West Fork Trinity River Below Bridgeport
0810A – Big Sandy Creek
0810B – Garrett Creek
0810C – Martin Branch
0810D – Salt Creek
0809 – Eagle Mountain Reservoir
0808 – West Fork Trinity River Below Eagle Mountain Reservoir
0807 – Lake Worth
0834 – Lake Amon G. Carter

Sites Used for Analysis:

2008 Assessment	36
Draft 2010 Assessment	46
5-Year Analysis	37
Valid Trends	112

West Fork - Count of Discharges by Type and County

County	Cooling Water	Domestic Sewage <1mgd	Mining	Stormwater	Wastewater >1 mgd	CAFO	Total Dischargers
JACK		2					2
MONTAGUE		1			1	1	3
PARKER		1			1		2
TARRANT		3					3
WISE		12			5		17
Total		19			7	1	27

Table D.1. Count of Dischargers by Type in the West Fork Subwatershed.

The West Fork subwatershed extends approximately 150 river miles from the headwaters in Archer County to the Lake Worth Dam in Tarrant County. A majority of the subwatershed is rural with pastureland and row crop agriculture, however, the most downstream portion of the subwatershed becomes more urbanized. Major population centers include Bridgeport, Jacksboro, Bowie, Decatur, and Reno as well as the northwest communities of the DFW Metroplex. Bridgeport Reservoir, Eagle Mountain Reservoir, Lake Worth, and Lake Amon G. Carter are located in this subwatershed. Water rights permits for both Bridgeport and Eagle Mountain reservoirs are held by TRWD while those for lakes Worth and Amon G. Carter are held by the cities of Fort Worth and Bowie, respectively.

The subwatershed receives between 28 and 36 inches of precipitation annually. The West Fork flows through the North Central Prairies, Western Cross Timbers, and Grand Prairies.

The Air Force Plant 4-Lockheed Martin site at the Naval Air Station Joint Reserve Base Fort Worth in Fort Worth, south of Lake Worth, as and Sandy Beach Road Ground Water Plume site in Pelican Bay, west of Eagle Mountain Reservoir are Superfund sites. Contaminants at both sites include TCE which has been widely used as a solvent for degreasing metal parts. In the case of Air Force Plant 4, contamination has been detected in surface waters during past sampling events by EPA. Special projects in this subwatershed include Envirocast Phase II, the Statewide Fish Tissue Monitoring Program, Archer/Jack County Saltwater Minimization, Lake Worth-PCBs, Lake Worth-PCBs-Implementation Plan, Technical Assistance and Implementation in the West Fork of the Trinity River, and the West Fork Trinity River UAA. These projects are discussed in more detail in the Special Projects chapter.

Segment 0812 – West Fork Trinity River Above Bridgeport

Overview

This 85 mile segment begins immediately upstream of the confluence of Bear Hollow in Jack County and continues to State Highway 79 in Archer County. Segment 0812 is entirely within the North Central Prairie ecoregion and the vast majority of land use in this segment is rangeland.

Assessments (Classified Segments):

Aquatic Life Use: On the 2008 and Draft 2010 Assessments, the lower 25 miles of the segment is listed as Non-Support for dissolved oxygen and is a carry forward from previous assessments. The listing category recommends reassessing the standard prior to implementing a TMDL. Although the designation for this segment is High Aquatic Life, the average daily flow values from USGS Gage West Fork Trinity River Near Jacksboro were zero for 40% of the time between February 2000 and February 2010 (fig. D.1).

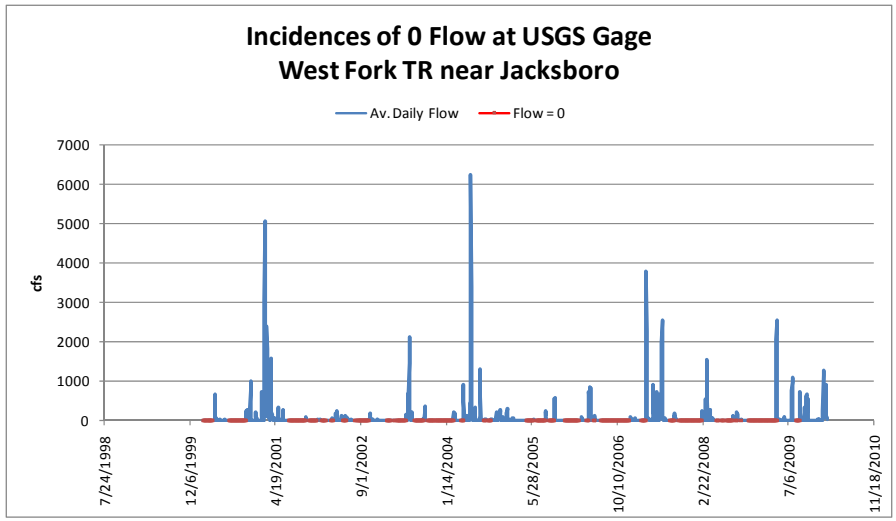


Figure D.1. Incidences of 0 Flow at West Fork Near Jacksboro.

Figure D.2. Map of Segment 0812.

General Use: The entire segment is listed as Non-Supporting for chloride on the 2008 Assessment. The dataset for the Draft 2010 Assessment consists of 7 samples and is Fully Supporting based on current data. This Non-Supporting listing is a carry forward and the listing category recommends reassessing the standards prior to implementing a TMDL.

Contact Recreation Use: No Concern

Public Water Supply Use: Fully Supporting

Fish Consumption Use: Not Assessed

Trend Analysis Overview

No trends identified.

Segment 0811 –Bridgeport Reservoir

Overview

This 13,000 acre segment impounds the West Fork Trinity River from the Bridgeport Dam in Wise County to the confluence of Bear Hollow in Jack County, up to a normal pool elevation of 836 feet. The majority of the land use in 0811 is classified as rangeland with large sections of urban development on the southwest side of the lake. The entire segment is within the North Central Prairie ecoregion.

Bridgeport Reservoir has been noted as being mesotrophic by the TCEQ report Trophic Classification of Texas Reservoirs. This report states that reservoirs become more eutrophic as they age due to a buildup of nutrients within the reservoir.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Fully Supporting, No Concern, or Not Assessed

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Fully Supporting, No Concern, or Not Assessed

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed

Trend Analysis Overview

34 Trends were identified in this segment. For additional detail on trend methods and results, see the Data Review Methods appendix.

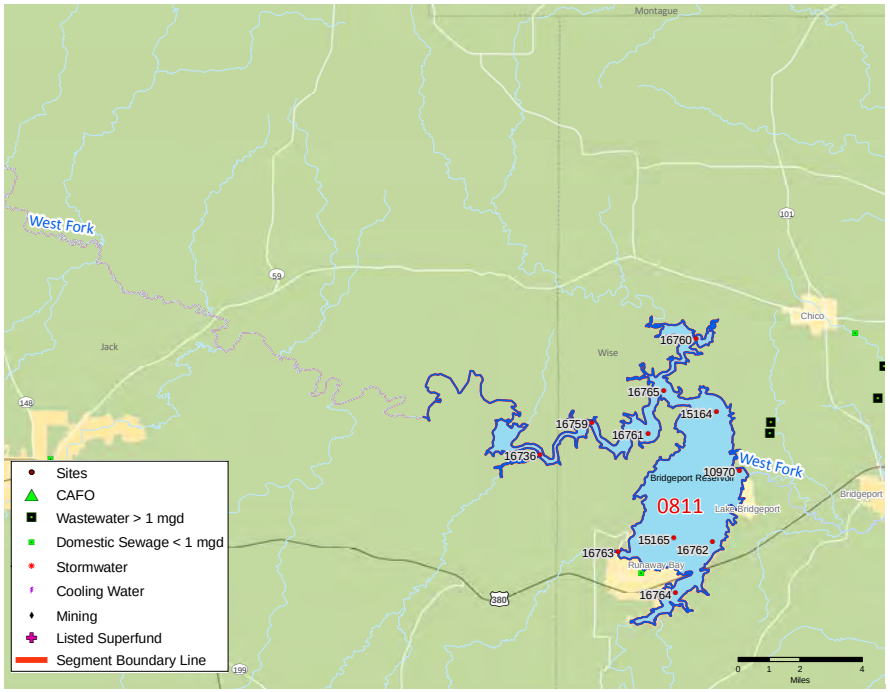


Figure D.3. Map of Segment 0811.

Trends (Classified Segments):

Three stations (16762, 10970, and 15164) showed upward trends in chlorophyll-a values. The R^2 values are low (R^2 < 0.33) indicating that the trends are weak at best. However, because three of the five assessment units showed increasing trends, it is possible that the trends may be real. It is interesting to note that TP has a possible, though very weak (R^2 < 0.2), increasing trend at two of these stations (15164 and 16762). Currently, values for TP and chlorophyll-a are well below the criteria. However, it is worth continuing to monitor these possible trends. If linear trends for chlorophyll-a values at

West Fork		Amm			ChlA			Chloride			pH			S.Depth			Sulfate			TDS Meas			TP		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0811_01	16762						UP	DN	DN	DN	DN	DN								DN	DN	DN		UP	
0811_03	10970		DN				UP	DN	DN	DN	DN	DN					DN	DN	DN	DN	DN	DN			
0811_04	15164				UP		UP	DN	DN	DN			DN		DN					DN	DN	DN		UP	

Table D.2. Trends in Segment 0811.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

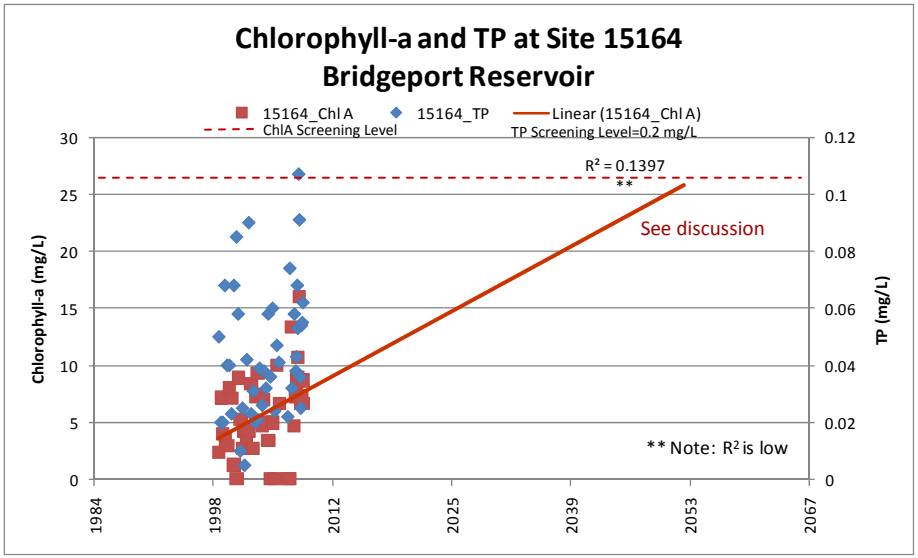


Figure D.4. Chlorophyll-a and TP at Site 15164.

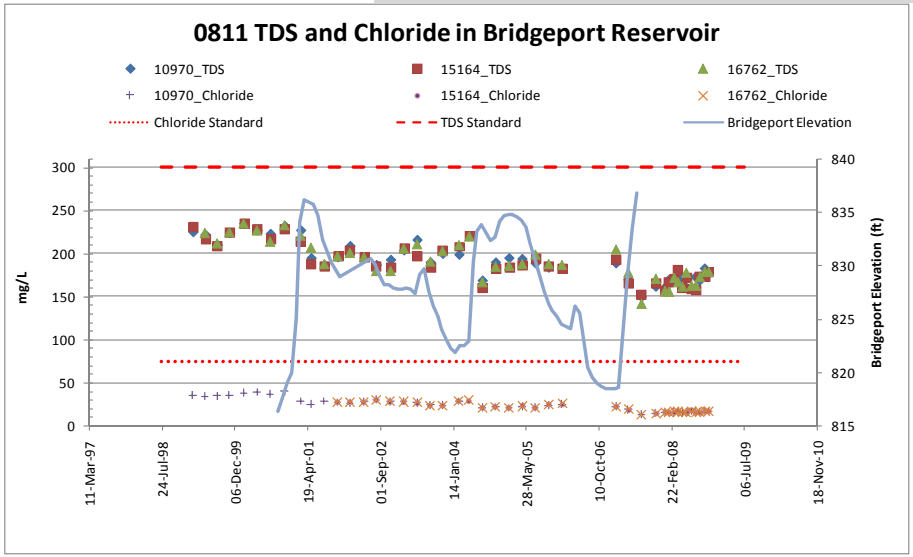


Figure D.5. TDS and Chloride in Bridgeport Reservoir (0811).

station 15164 continue at the predicted rate, values will exceed the standard around 2050 (fig. D.4).

A significant downward trend (R^2 =0.69) for POR sulfate was identified near the Bridgeport dam. Additionally, strong (R^2 > 0.63) downward trends for chloride and TDS measured were identified in the northern portion, southeastern portion, and near the dam of Bridgeport Reservoir (fig. D.5). Causes are unknown, but analysis agrees with a recent TRWD report regarding decreasing salts in their reservoirs. TRWD reports suggest that lack of inflow from tributaries over recent years has resulted in decreasing salts and other dissolved solids.

Segment 0810 –West Fork Trinity River Below Bridgeport

Overview

This 35 mile segment begins 0.4 miles downstream of the confluence of Oates Branch in Wise County and continues to the Bridgeport Dam in Wise County. The upper reaches are within the North Central Prairie and the middle and southern sections traverse the Western Cross Timbers ecoregions. Land use in this segment is a mixture of agriculture/pasture and rangeland.

Assessments (Classified Segments):

Aquatic Life Use: The 5-year analysis identified a Concern for DO when plotted against the 5 mg/L criteria. The dissolved oxygen values below the standard tend to be during the extreme drought of 2005 and 2006 (fig. D.6). No values since 2007 have been below the standard and there is no indication that the recent 5-year analysis foreshadows a future concern or listing for DO in this segment.

General Use: Fully Supporting, No Concern, or Not Assessed

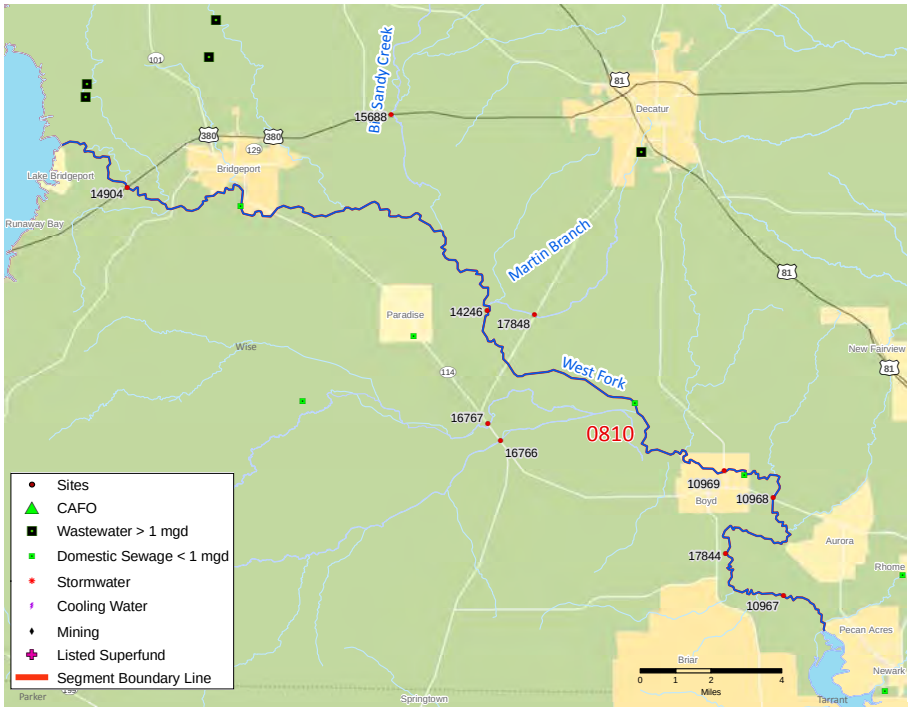


Figure D.7. Map of Segment 0810.

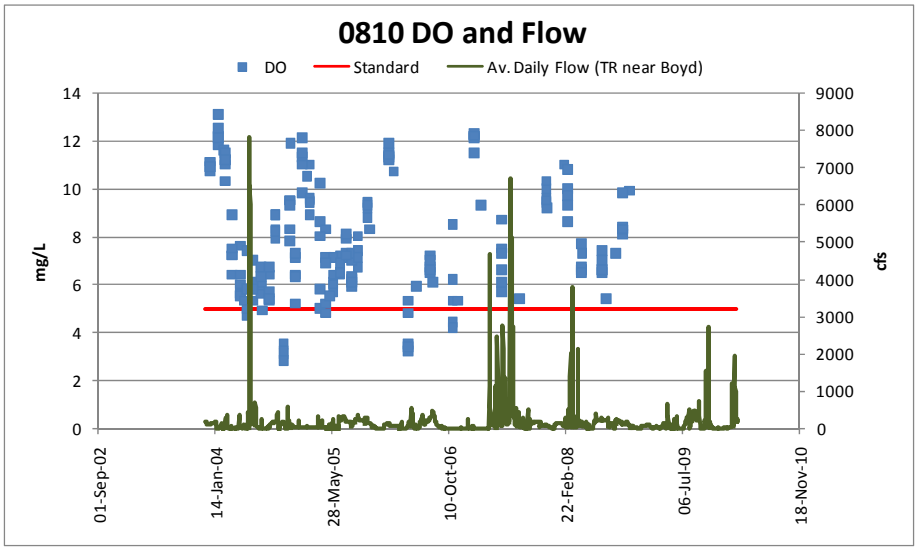


Figure D.6. DO and Flow in Segment 0810.

Contact Recreation Use: The lower 25 miles of this segment are listed as Non-Supporting for bacteria on both the 2008 and Draft 2010 Assessments. Exact sources and causes are unknown, but are likely NPS loadings. 0810 is generally undeveloped. See the Bacteria Issues section for additional information.

Public Water Supply Use: Fully Supporting

Assessments (Unclassified Segments):
Aquatic Life Use: Salt Creek is listed on the Draft 2010 Assessment and the 5-year analysis as a Concern for low dissolved oxygen. Only 3 flow values are available for this site; and each one shows zero flow.

General Use: Not Assessed

Contact Recreation Use: Big Sandy Creek, Garrett Creek, and Martin Branch are all listed as Non-Supporting for bacteria on the 2008 and Draft 2010 Assessments. Sources and causes are unknown and this segment is generally undeveloped. See the Bacteria Issues section for additional information.

Public Water Supply Use: Not Applicable

Trend Analysis Overview
8 trends were identified for this segment . For additional detail on trend methods and results, see the Data Review Methods appendix.

Trends (Classified Segments):
The possible trends for ammonia and flow are weak (R^2 < 0.24) and likely not real. The downward winter trend for fluoride is fairly strong (R^2 > 0.41), but the values are an order of magnitude different from the standard and are no concern.

Trends (Unclassified Segments):
Decreasing summer E. coli trends at site 16767 are quite robust (R^2 > 0.51) (fig. D.8). However, it is likely that the trends are a factor of sampling frequency and the erratic nature of bacteria results. Data are skewed by high values in the first half of the dataset and then a lower sampling frequency in the second half of the dataset. Likely, the lower frequency resulted in missing sporadic spikes of bacteria. The drainage basin for this segment is an even mix of rangeland, forest, and agriculture/pasture.

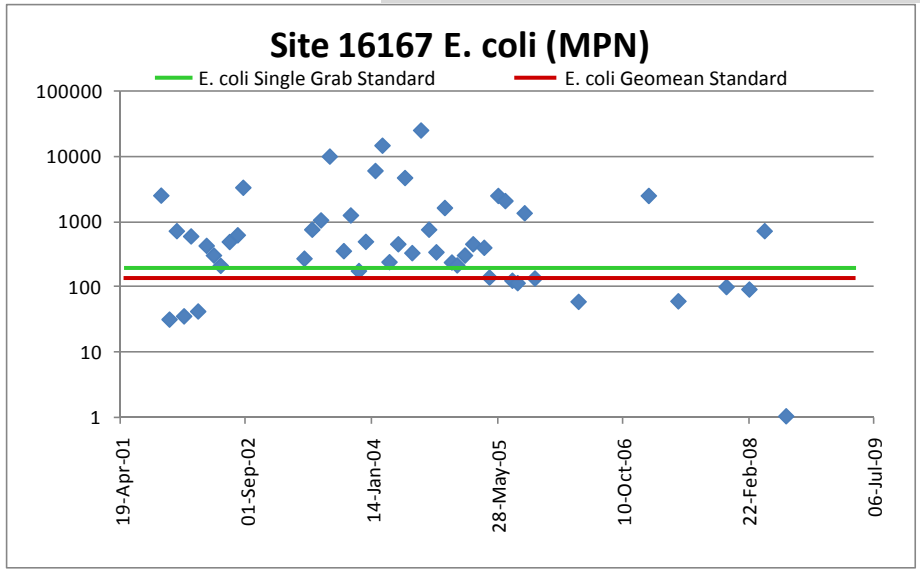


Figure D.8. E. coli at site 16167.

West Fork		Amm			DO			E.coli			Flow			Fluoride		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0810_01	10969	DN		DN								UP				DN
0810A_01	15688									DN						
0810B_01	16767								DN							
0810D_01	16766					DN			DN							

Table D.3. Trends in Segment 0810.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Segment 0809 –Eagle Mountain Reservoir

Overview

This segment covers 9,200 acres and stretches from Eagle Mountain Dam in Tarrant County to a point 0.4 miles downstream of the confluence of Oates Branch in Wise County, up to a normal pool elevation of 649.1 feet. The western portion of the watershed for Eagle Mountain Reservoir lies in the Western Cross Timbers ecoregion and the eastern portion lies in the Grand Prairie ecoregion. Large sections of land around the lake are classified as urban and the remainder is agriculture/pasture.

Assessments (Classified Segments):

Aquatic Life Use: The lowermost portion of the reservoir was listed in 2008 as a Concern for low dissolved oxygen. The designation was changed to Fully Supporting on the Draft 2010 Assessment and the 5-year analysis results agreed.

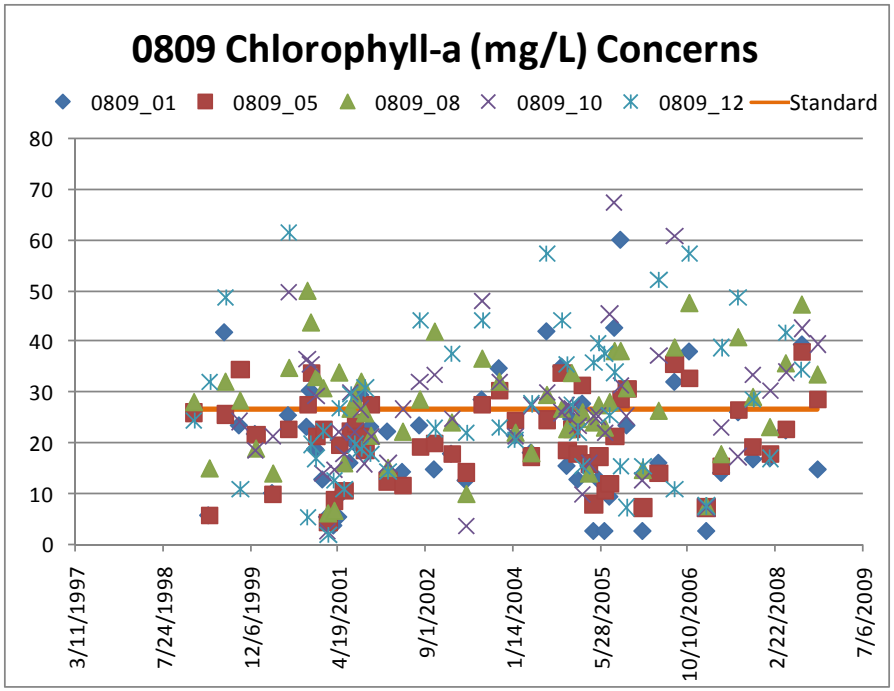


Figure D.9. Chlorophyll-a Concerns in Segment 0809.

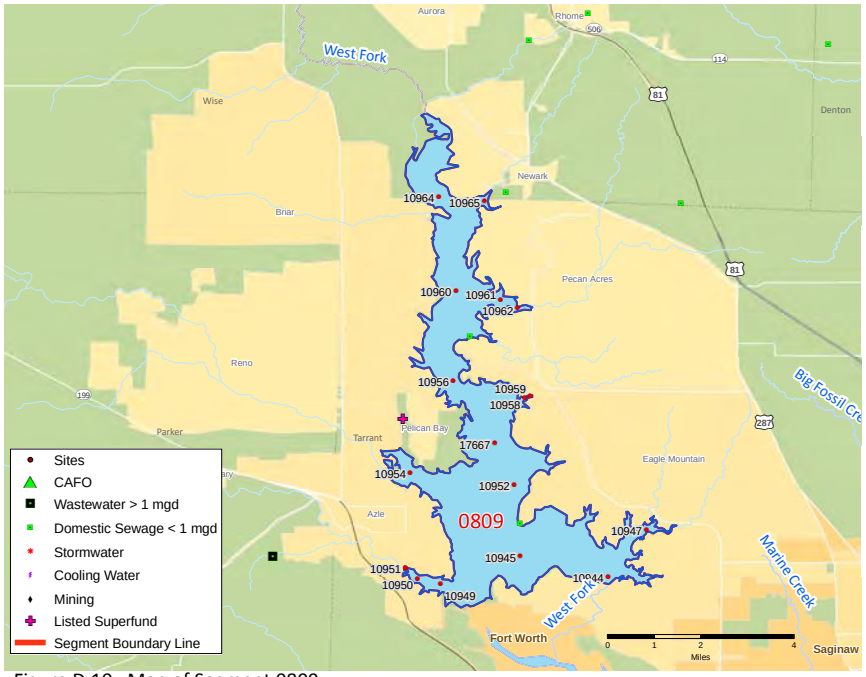


Figure D.10. Map of Segment 0809.

General Use: Most of the reservoir is listed as a Concern for chlorophyll-a on at least one assessment or analysis. Eagle Mountain Reservoir was designated hypereutrophic by the TCEQ report Trophic Classification of Texas Reservoirs. Although the values are above the standard, there is no evidence that suggests these values are leading to harmful algal blooms (fig.D.9). In such, only 3% (6 of the 231) of dissolved oxygen measurements analyzed for the Draft 2010 Assessment are below the standard of 5.0 mg/L.

Ash Creek Cove was listed as a Concern for ammonia on the 2008 Assessment and carried over to the Draft 2010 Assessment. Limited data is available for the site. All 10 data points collected since 2001 are below the standard of 0.11 mg/L. (fig. D.11).

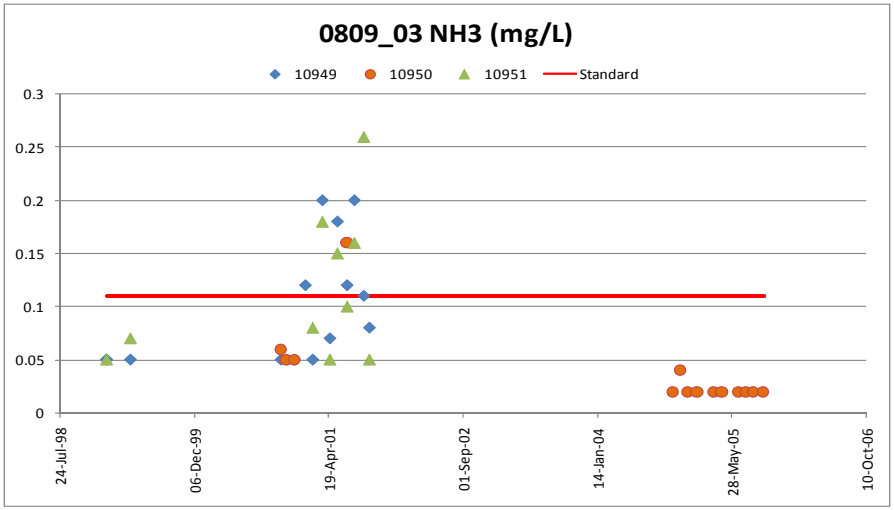


Figure D.11. Ammonia in Ash Creek Cove (0809_03).

Trends (Classified Segments):
All of the trends with R^2 values > 0.3 indicate improving water quality. Generally, these trends show that clarity is increasing and sulfate, chloride, and E. coli are decreasing. Causes are unknown, but analysis agrees with a recent TRWD report regarding decreasing salts in their reservoirs. TRWD reports suggest that lack of inflow from tributaries over the recent years has resulted in decreasing salts and other dissolved solids.

E. coli data are skewed by a few large values and the downward trend identified at site 10960 does not represent an actual decrease in the amount of bacteria present.

Contact Recreation Use: Fully Supporting or No Concern

Public Water Supply Use: Fully Supporting or No Concern

Fish Consumption Use: Not Assessed

Trend Analysis Overview
37 trends were indentified in this segment. For additional detail on trend methods and results, see the Data Review Methods appendix.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

West Fork		Amm			Chloride			DO			E.coli			OP			pH			S.Depth			Sulfate			TDS Meas			TP		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0809_01	10944		DN		DN	DN	DN															UP	DN	DN	DN	DN		DN		UP	
0809_05	10952				DN		DN		UP													UP				DN	DN	DN		UP	
0809_08	10956		DN	DN					UP																					UP	
0809_10	10960		DN									DN							DN								DN			UP	
0809_12	10964		DN						UP						UP							UP									
0809_14	17667				DN		DN		UP											UP		UP									

Table D.4. Trends Identified in Segment 0809.

Segment 0808 –West Fork Trinity River Below Eagle Mountain Reservoir

Overview

This 2 mile segment runs from 2.5 miles downstream of Eagle Mountain Dam in Tarrant County back up to Eagle Mountain Dam in Tarrant County. Land use in this watershed is split between forest and agriculture/pasture. Segment 0808 drains the Western Cross Timbers ecoregion from the west and the Grand Prairie ecoregion from the east.

Assessments (Classified Segments):

Aquatic Life Use: Not Assessed

General Use: Not Assessed

Contact Recreation Use: Not Assessed

Public Water Supply Use: Not Assessed

Fish Consumption Use: Not Assessed

Trend Analysis Overview

No trends identified in this segment.

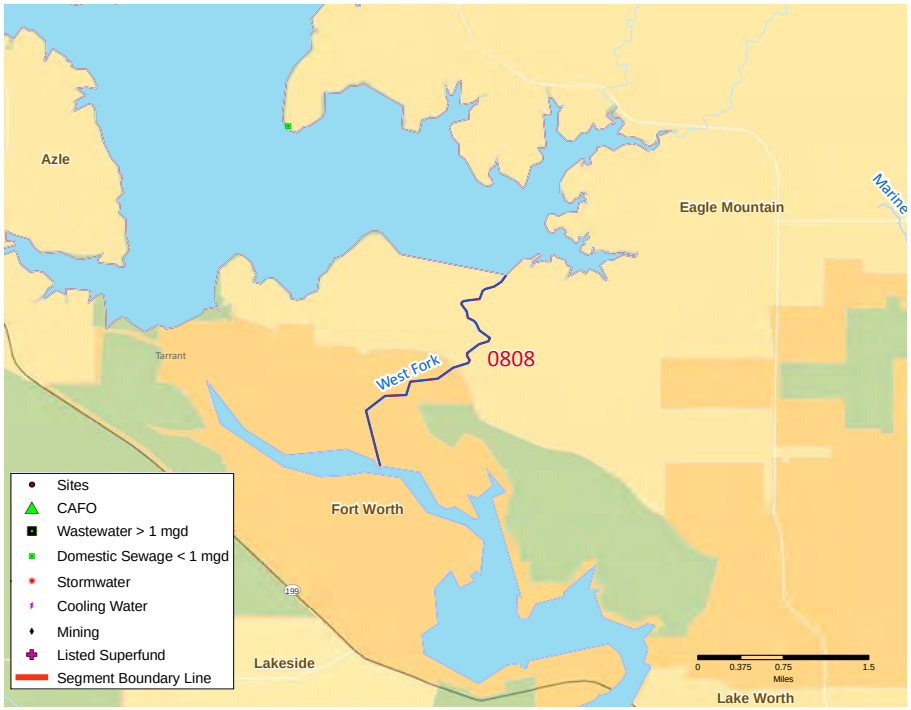


Figure D.12. Map of Segment 0808.

Segment 0807 –Lake Worth

Overview

This segment covers 3,560 acres from Lake Worth Dam in Tarrant County to a point 2.5 miles downstream of Eagle Mountain Dam in Tarrant County up to a normal pool elevation of 594.3 feet. The watershed for Lake Worth is highly urbanized to the south and east with the remainder split about evenly between rangeland, forest, and agriculture/pasture. The entire segment is located in the Grand Prairie ecoregion.

Lake Worth is designated as hypereutrophic by the TCEQ report Trophic Classification of Texas Reservoirs.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: The 2008 and Draft 2010 Assessment found this segment to be Fully Supporting, No Concern, or Not Assessed. The 5-year analysis identified a Concern for chlorophyll-a. Additionally, an upward trend (R^2 < 0.31) for chlorophyll-a was identified for this segment. It is likely that current conditions are showing increasing chlorophyll-a concentrations. It is important to note that chlorophyll-a values show no evidence of creating harmful algal blooms since only 1% (3 of 221) of the DO values for the entire segment are below the 5 mg/L standard.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

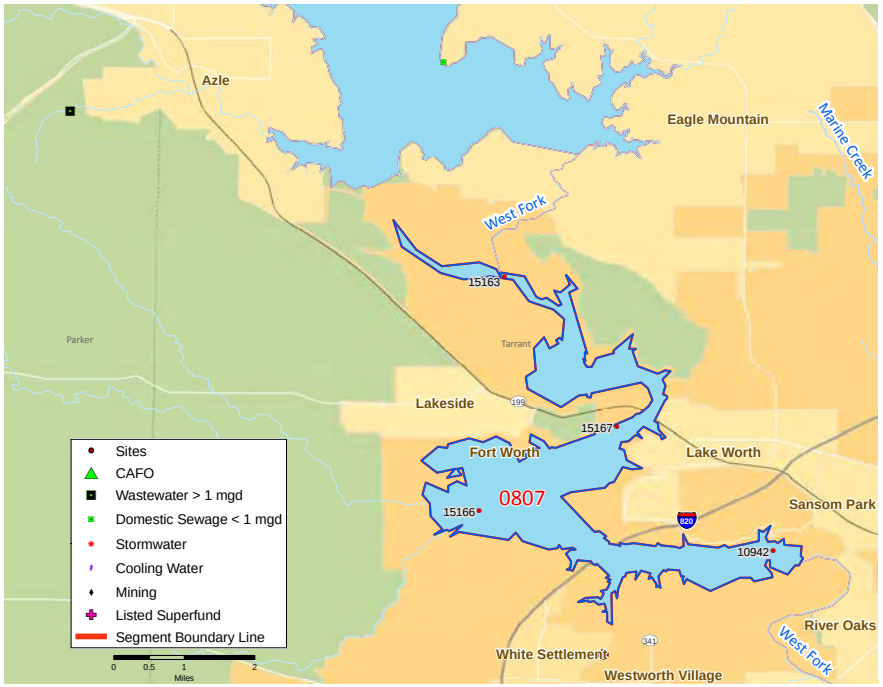


Figure D.13. Map of Segment 0807.

Public Water Supply Use: Fully Supporting, No Concern, or Not Assessed

Fish Consumption Use: The Non-Supporting listing for PCBs in fish tissue from the 2008 Assessment was removed after follow up testing of fish samples by the DSHS.

Trends Key

A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

West Fork		ChlA			Chloride			OP			pH			S.Depth			Sulfate			TDS Meas			TP		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0807_01	10942	UP	UP		DN			DN	DN	DN			DN				DN	DN	DN	DN		DN	UP	UP	
0807_01	15163							DN		DN	DN		DN												
0807_01	15166		UP		DN	DN					DN		DN		UP					DN	DN		UP		UP
0807_01	15167							DN			DN		DN									DN		UP	

Table D.5. Trends Identified in Segment 0807.

Trend Analysis Overview
33 trends were identified for this segment. Only particularly interesting or robust trends are discussed in this section. For additional detail on trend methods and results, see the Data Review Methods appendix.

Generally, a large number of trends suggests that water quality in the segment is changing and should be closely monitored. Only 9 of the 33 possible trends in 0807 have R^2 > 0.4.

Trends (Classified Segments):
pH trends are quite robust, but the values remain within the standards (fig. D.14). No correlation was found between pH, chlorophyll-a, and lake elevation. Reasons for the pH trends are unknown, but should be monitored closely.

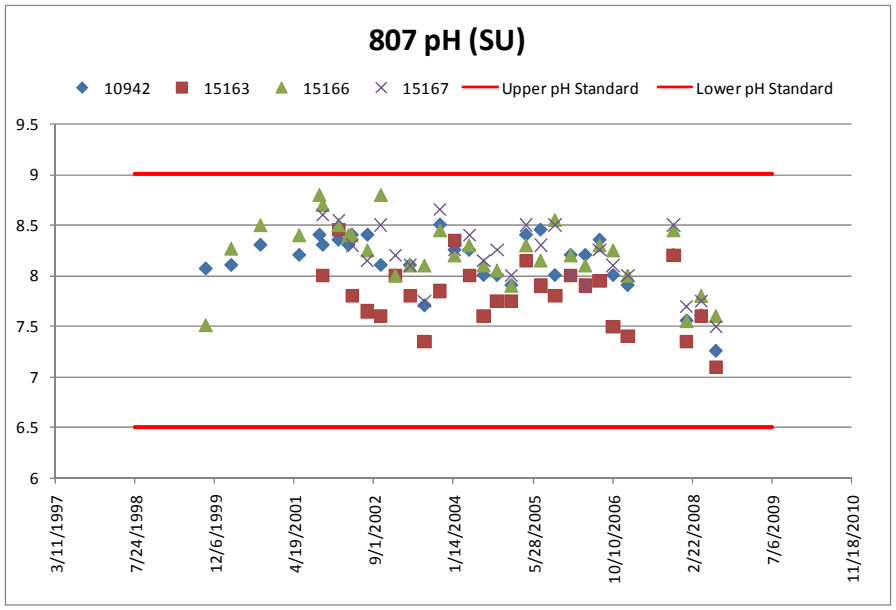


Figure D.14. Graph of pH in Segment 0807.

The remaining trends with R^2 > 0.4 all show negative trends which generally indicate improving water quality.

Segment 0834 –Lake Amon G. Carter

Overview

This 1,540 acre segment impounds Big Sandy Creek from Amon G. Carter Dam in Montague County up to the normal pool elevation of 920 feet. Much of the land use is classified as urban around and to the west of the lake. The remainder of the watershed is a mix of rangeland and agriculture/pasture with scattered sections of forest. This segment falls entirely within the North Central Prairie ecoregion. Lake Amon G. Carter has been noted as being eutrophic by the TCEQ report Trophic Classification of Texas Reservoirs.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Fully Supporting, No Concern, or Not Assessed.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Fully Supporting, No Concern, or Not Assessed

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed

Trend Analysis Overview

No trends identified in this segment.

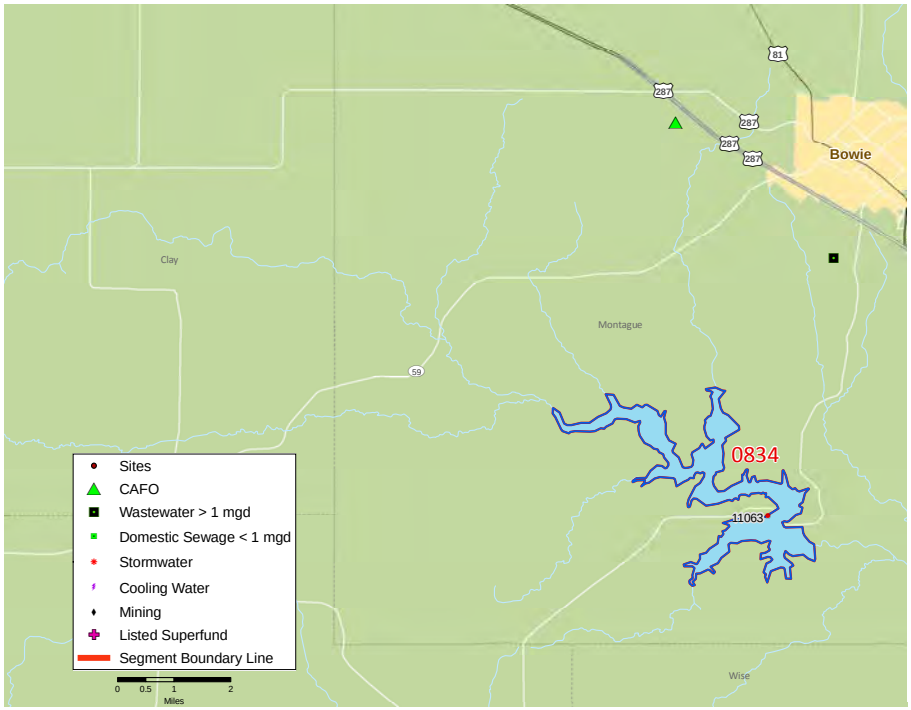
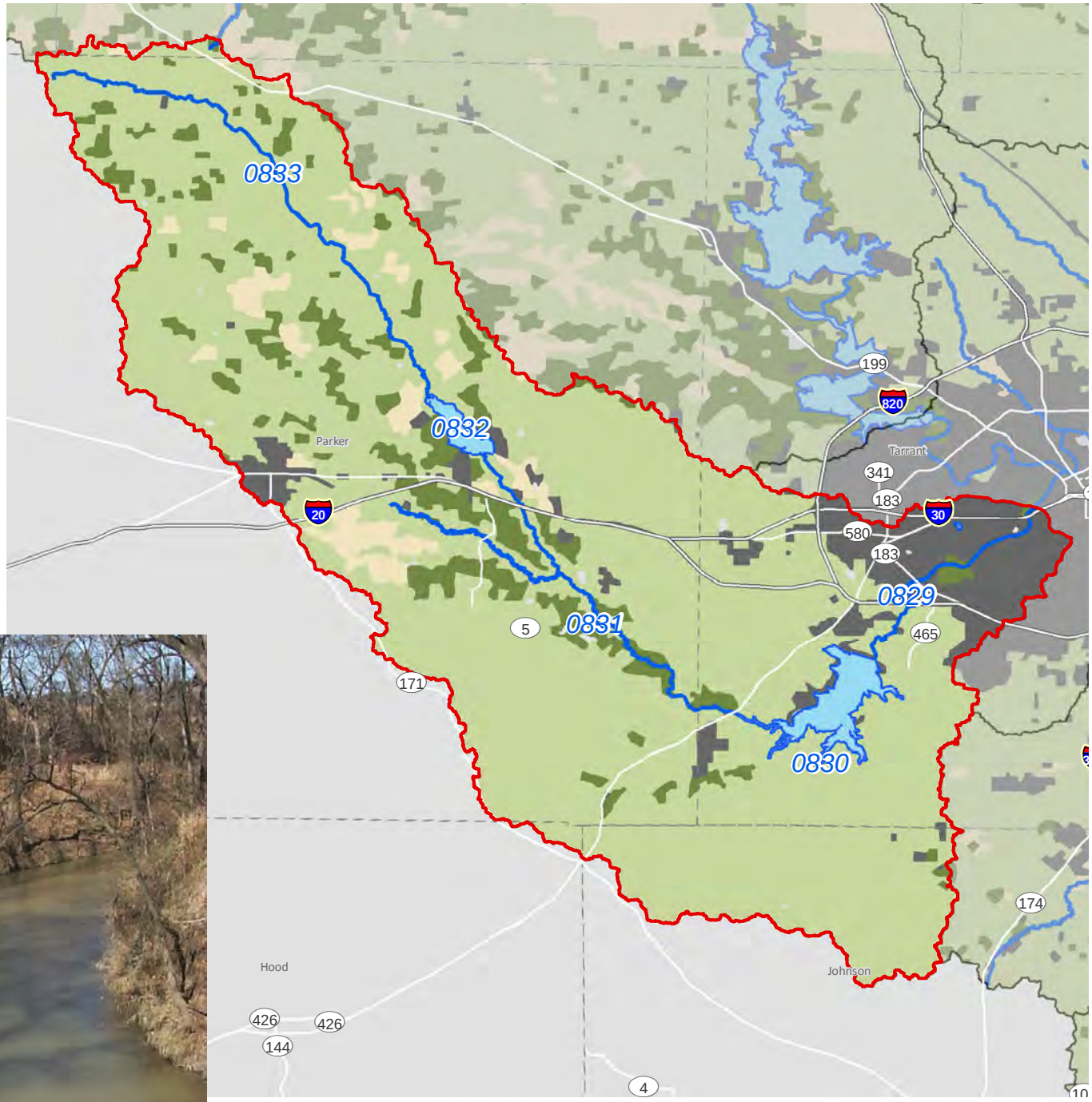


Figure D.15. Map of Segment 0834.

Clear Fork

Land Use Type

- Crop/Pasture/Other Agricultural
- Forest
- Rangeland
- Urban/Industrial/Residential



CLEAR FORK

Classified Segments – 5
Unclassified Segments – 4

0833 – Clear Fork Trinity River Above Lake Weatherford
0832 – Lake Weatherford
0831 – Clear Fork Trinity River Below Lake Weatherford
0831A – South Fork Trinity River
0831B – Rufe Evans Hollow
0831C – Town Creek
0830 – Benbrook Lake
0829 – Clear Fork Trinity River Below Benbrook Lake
0829A – Lake Como

Sites Used for Analysis:

2008 Assessment	19
Draft 2010 Assessment	32
5-Year Analysis	17
Valid Trends	6

Clear Fork - Count of Discharges by Type and County

County	Cooling Water	Domestic Sewage <1mgd	Mining	Stormwater	Wastewater >1 mgd	CAFO	Total Dischargers
JOHNSON		2					2
PARKER		3			6	1	10
TARRANT		2					2
Total		7			6	1	14

Table E.1. Count of Dischargers by Type in the Clear Fork Subwatershed.

The Clear Fork subwatershed extends approximately 65 river miles from Parker County to the confluence with the Lower West Fork in Tarrant County. Although a majority of the subwatershed is sparsely populated and rural, major population centers include Weatherford, Benbrook, and the communities of the southwest Dallas/Fort Worth Metroplex. Lake Weatherford and Benbrook Lake are located in this subwatershed. Water rights permits for Lake Weatherford and Benbrook Lake are the City of Weatherford and TRWD, respectively.

The subwatershed generally receives between 32 and 36 inches of precipitation annually. The terrain consists of flat land and rolling prairies which are mostly used for cattle grazing. The downstream reaches of the subwatershed become more urbanized as they approach the Metroplex.

The Benbrook Municipal Landfill was assessed by the EPA under the Brownfields Program and determined that cleanup was not necessary. Special projects that have been conducted or are underway in this subwatershed include Envirocast Phase II, Clear Fork Trinity-DO, Fort Worth-Legacy-Fish Tissue Sampling, Fort Worth-Legacy Pollutants, Fort Worth-Legacy Pollutants-Implementation Plan, and Trinity River-PCBs in Tissue. These projects are discussed in more detail in the Special Projects chapter.

Segment 0833 – Clear Fork Trinity River Above Lake Weatherford

Overview

This 30 mile segment runs from 1.9 miles upstream of FM 1707 in Parker County to FM 3107 in Parker County. The vast majority of this rural watershed is classified as agriculture/pasture. The upper 90% of the segment is located within the Western Cross Timbers with the remaining 10% in the Grand Prairie ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: Many portions of this segment were found to be Non-Supporting of the aquatic life used due to depressed DO in the 2008 Assessment. Limited data for the Draft 2010 Assessment supports these findings for the upper reach of the segment, while the 2008 findings for the other reaches were carried forward into the Draft 2010 Assessment. The 5-year analysis did not result in any findings for this segment. It appears that the low DO issues are due to periods of low stream flow (fig. E.1). The river above Lake Weatherford may be intermittent, resulting in low DO measurements. More investigation is needed to determine the flow status of the river in this area.

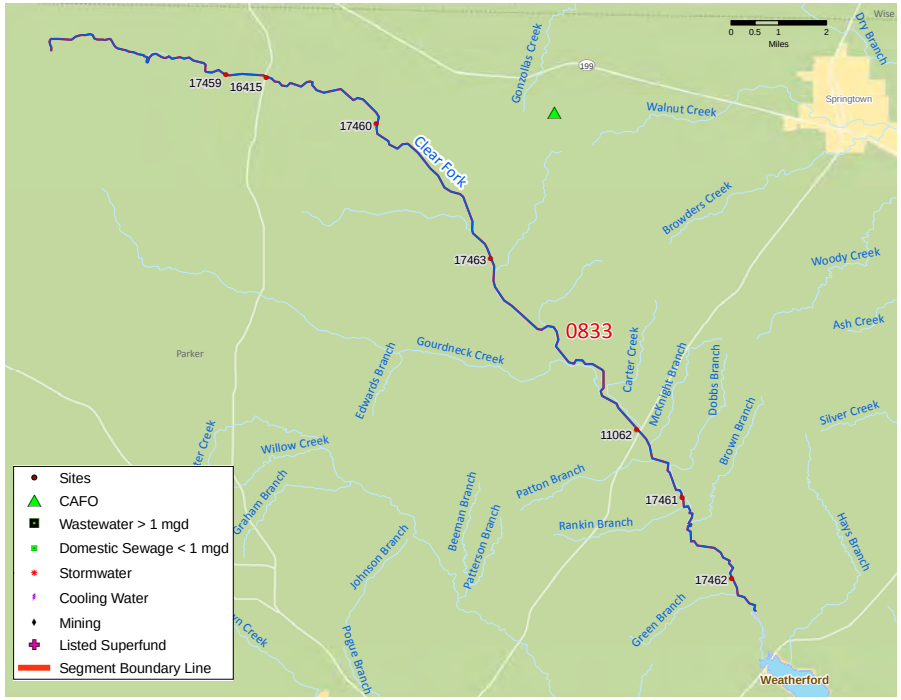


Figure E.2. Map of Segment 0833.

General Use: Chlorophyll-a was found to be a concern in the upper reach on the 2008 Assessment. This Concern was carried forward into the Draft 2010 Assessment.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply: Fully Supporting, No Concern, or Not Assessed

Fish Consumption: Not Assessed

Trend Analysis

No significant trends were identified for this segment.

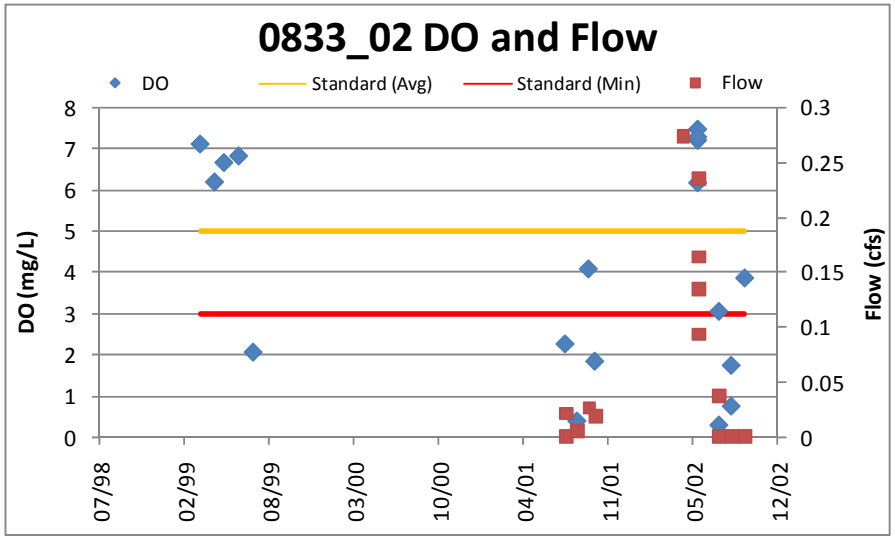


Figure E.1. Dissolved Oxygen and Flow in Segment 0833_02.

Segment 0832 – Lake Weatherford

Overview

This 1,200 acre segment impounds the Clear Fork Trinity River from the Lake Weatherford dam in Parker County, to a point 1.9 miles upstream of FM 1707 in Parker County, up to a normal pool elevation of 896 feet. The watershed area around the lake is about evenly split among the urban, forest, and agriculture/pasture land use classifications. The watershed area to the west of Lake Weatherford is in the Western Cross Timbers ecoregion while the east side is in the Grand Prairie ecoregion.

Lake Weatherford was designated as hypereutrophic in the TCEQ report Trophic Classification of Texas Reservoirs.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Fully Supporting, No Concern, or Not Assessed

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply: Fully Supporting, No Concern, or Not Assessed

Fish Consumption: Not Assessed

Trend Analysis Overview

Three trends were identified in 0832. For additional detail on trend methods and results, see the Data Review Methods appendix.

Clear Fork		Chloride		
Seg_AU	Site	A	S	W
0832_01	11061	DN	DN	DN

Table E.2. Trends identified in Segment 0832.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

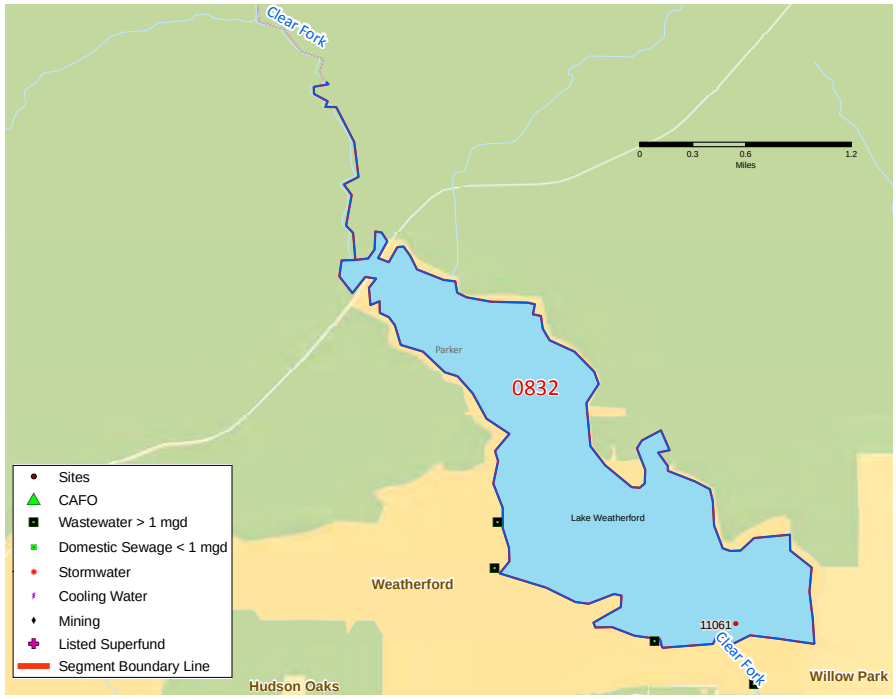


Figure E.3. Map of Segment 0832.

Trends (Classified Segments):

Significant decreasing trends in chloride ($R^2 < 0.58$) were identified in the reservoir (fig. E.4). There appears to be a slight correlation between chloride values and rainfall amounts (fig. E.4) collected at a gage in Weatherford. Data suggests that chloride increases during extended periods of dry weather.

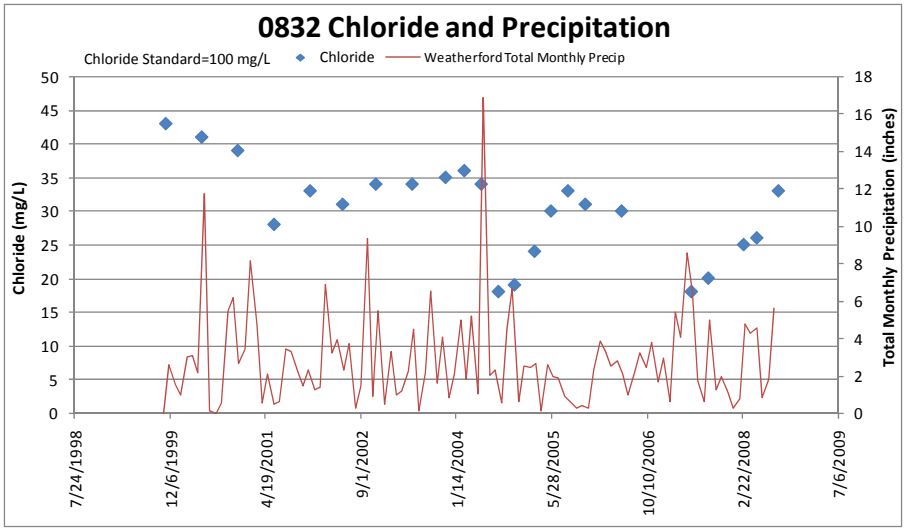


Figure E.4. Chloride and Precipitation in Segment 0832.

Segment 0831 – Clear Fork Trinity River Below Lake Weatherford

Overview

This 19 mile segment runs from 220 yards downstream of US 377 in Tarrant County to the Lake Weatherford dam in Parker County. The majority of the land use in 0831 is classified as agriculture/pasture. The upper half of the segment is located in the Western Cross Timbers ecoregion and the lower half is in the Grand Prairie ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: The two upper reaches of this segment (0831_05 and 0831_04), were found to be Non-Supporting due to depressed dissolved oxygen on both the 2008 and Draft 2010 Assessments. The majority of the values in 0831_05 below the average DO standard came from site 17637 (fig. E.5). Site 17446 is located 300 m downstream of the Lake Weatherford dam while site 17637 is located approximately 2.5 km downstream.

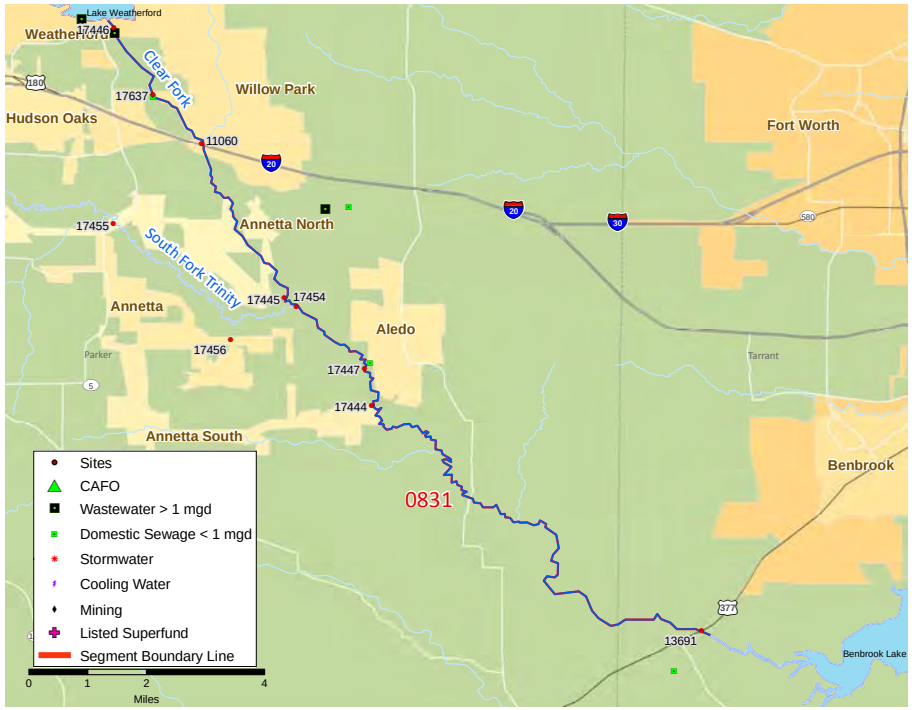


Figure E.6. Map of Segment 0831.

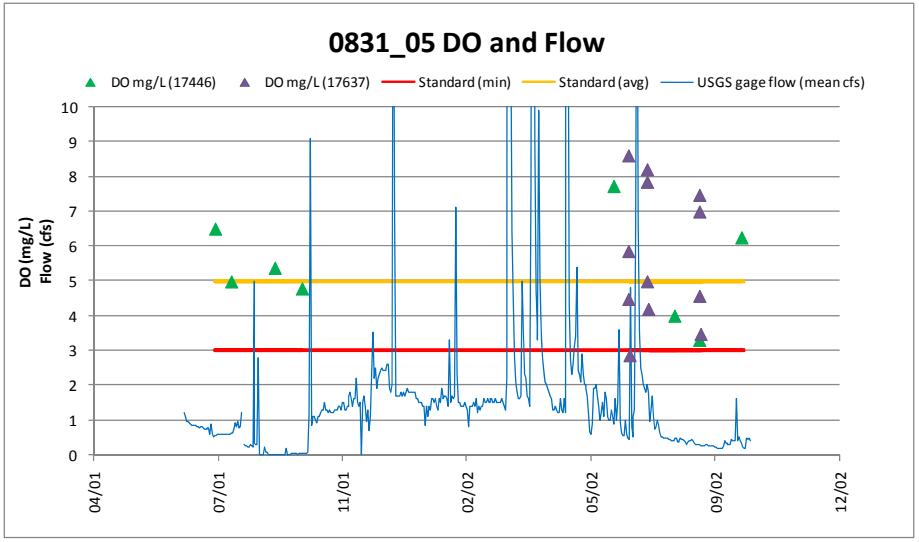


Figure E.5. Dissolved Oxygen and Flow in Segment 0831.

A Use Attainability Analysis (UAA) was completed on this segment in 2003 and found that the low DO values are likely caused by low streamflow as a result of the lake Weatherford dam just upstream. The UAA was submitted to EPA in 2003 but has yet to be approved. The Non-Supporting listing is designated as 5b; the standard may be inappropriate for the segment and that further investigation is necessary.

General Use: Concerns for OP and TP were identified in the lower reach of the segment (0831_01) on both the 2008 and Draft 2010 Assessment. Flow, TP and OP are positively correlated (fig. E.7). A majority of the values exceeding the screening levels came from the site just downstream of the confluence with the South Fork Trinity River (17444). The City of Weatherford's wastewater treatment plant (WWTP) discharges into Town Creek which flows into the South

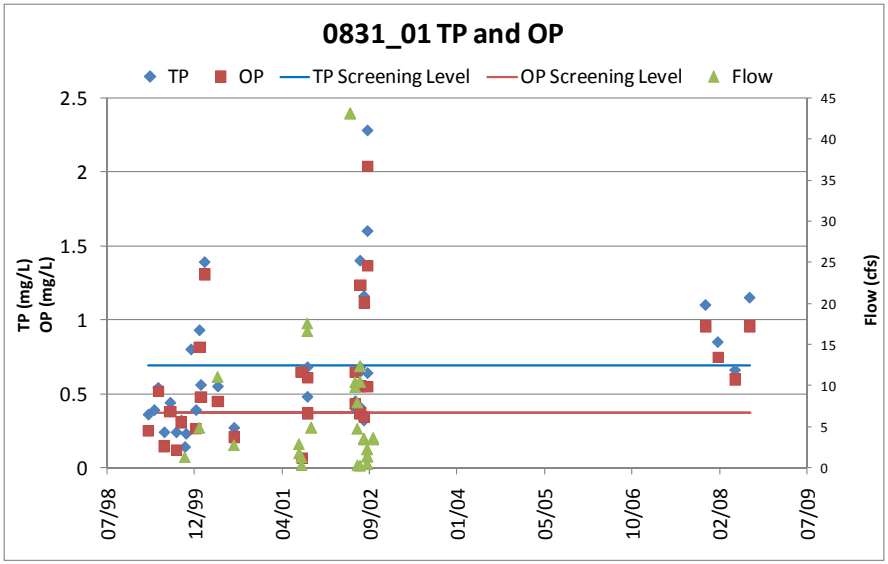


Figure E.7. TP and OP in Segment 0831.

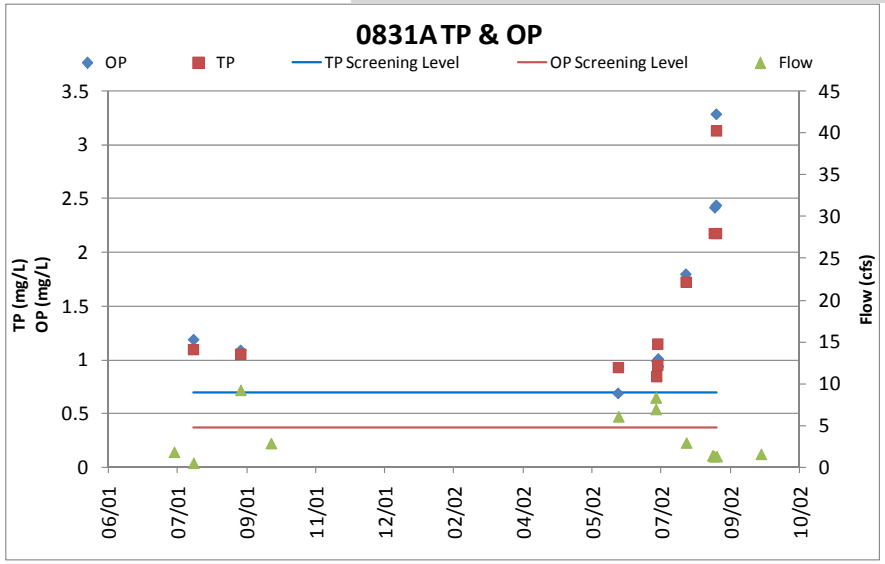


Figure E.8. TP and OP in Segment 0831A (Site 17444).

Fork. In addition, the City of Aledo's WWTP discharges into the Clear Fork above site 17444 (fig. E.8). The TP and OP data from the South Fork do not correlate with flow in the same manner as in 0831_01. However, the high values seen in the South Fork may be contributing to the concerns found in 0831_01. More investigation will be needed to determine if the sources of the high TP and OP values in these assessment units are from the upstream treatment plants.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply: Fully Supporting, No Concern, or Not Assessed

Fish Consumption: Not Assessed

Assessments (Unclassified Segments):
Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Concerns for OP and TP were identified in the South Fork Trinity River tributary (Segment 0831A) on both the 2008 and Draft 2010 Assessments. DO values are within normal limits and adequate chlorophyll-a data is unavailable.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply: Not Applicable

Fish Consumption: Not Assessed

Trend Analysis Overview
Two decreasing trends in E. coli were identified at site 17445 located just upstream of the confluence with the South Fork.

Clear Fork		E.coli		
Seg_AU	Site	A	S	W
0831_03	17445	DN	DN	

Table E.3. Trends identified in Segment 0831.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Segment 0830 – Benbrook Lake

Overview

This 3,770 acre segment impounds the Clear Fork Trinity River from the Benbrook Lake dam in Tarrant County to 220 yards downstream of US 377 in Tarrant County, up to a normal pool elevation of 694 feet. The majority of the watershed is classified as agriculture/ pasture with significant urban development on the north side of the lake. The entire segment is located within the Grand Prairie ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: For a majority of the reservoir, this segment showed concerns for chlorophyll-a and ammonia on the 2008 Assessment. The 5-year analysis supports the concerns for chlorophyll-a. The Draft 2010 Assessment showed a Concern for only chlorophyll-a, and approximately half of the chlorophyll-a values are above the screening level (fig. E.9). A report by the TCEQ titled Trophic Classification of Texas Reservoirs characterized Benbrook Lake as being hypereutrophic. This report notes that reservoirs "become more eutrophic as they age" due to the build-up of nutrients in the reservoir. This is a possible reason for the chlorophyll-a concerns in the reservoir as it is approaching 60 years old.

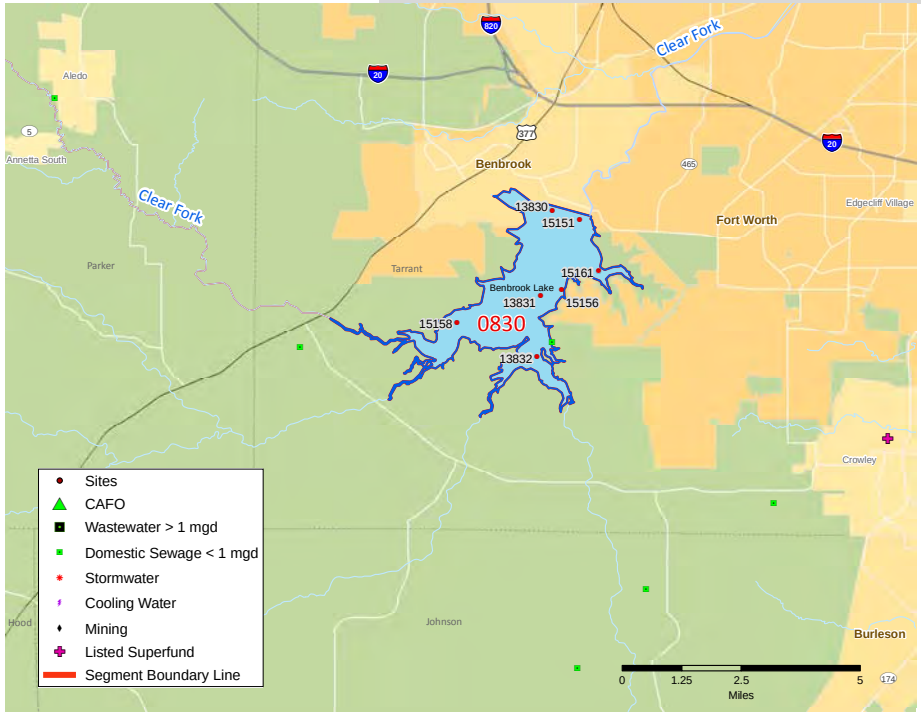


Figure E.10. Map of Segment 0830.

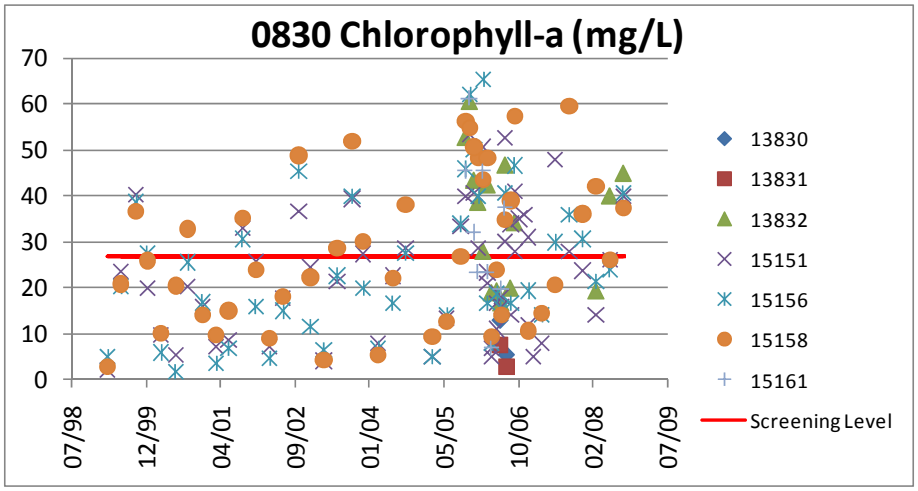


Figure E.9. Chlorophyll-a in Segment 0830.

Contact Recreation Use: Fully Supporting or No Concern

Public Water Supply: Fully Supporting

Fish Consumption: Fully Supporting or Not Assessed

Clear Fork		Amm			ChlA			Chloride			pH			Sulfate			TDS Meas			TP		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0830_01	15151							UP					DN	DN	DN	DN		UP			UP	
0830_02	15156			DN	UP			UP	UP	UP			DN								UP	
0830_03	15158	DN		DN	UP		UP	UP	UP	UP												UP

Table E.5. Trends identified in Segment 0830.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Trend Analysis Overview
21 trends were identified for this segment. Only particularly interesting or robust trends are discussed in this section. For additional detail on trend methods and results, see the Data Review Methods appendix.

Trends (Classified Segments):
There were decreasing trends for ammonia in the middle (0830_02) and upper (0830_03) portions of the reservoir. This supports the lack of concerns found on the Draft 2010 Assessment and 5-year analysis. Increasing trends in chlorophyll-a for these same portions of the reservoir support the presumption that the hypereutrophic nature of the reservoir will continue.

Increasing chloride trends throughout much of the reservoir were identified. In addition, increasing TDS trends were found in the summer months in the lower portion of the reservoir. Potential sources of chloride and TDS may include natural geology, seeps from oil and gas drilling, and irrigation runoff, however, no conclusions can be made at this time. Figures E.11 and E.12 show the chloride and TDS data for the affected assessment units. There is a good correlation between lake elevation and chloride. The correlation for TDS is not as good. Data for both parameters are well below their respective standards. These parameters should be closely monitored in the future to ensure that the trends do not increase above standards and to determine sources.

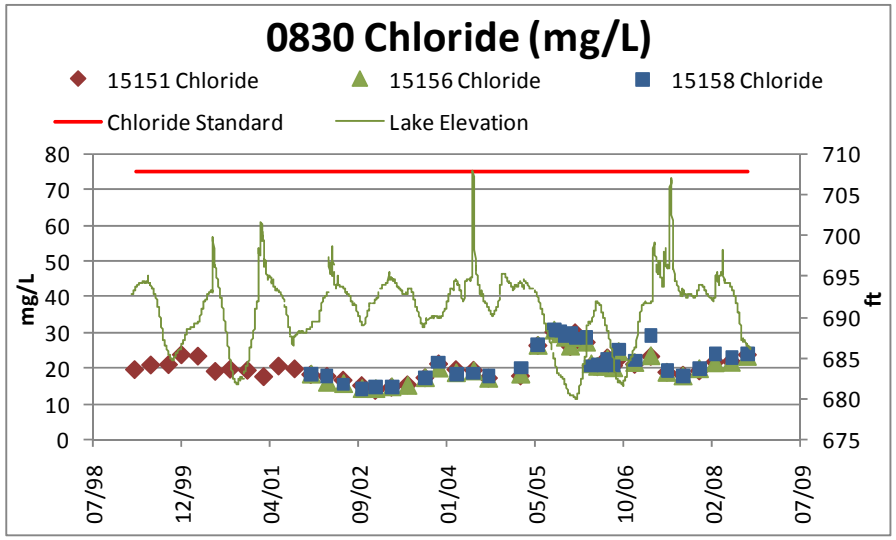


Figure E.11. Chloride trends identified in Segment 0830.

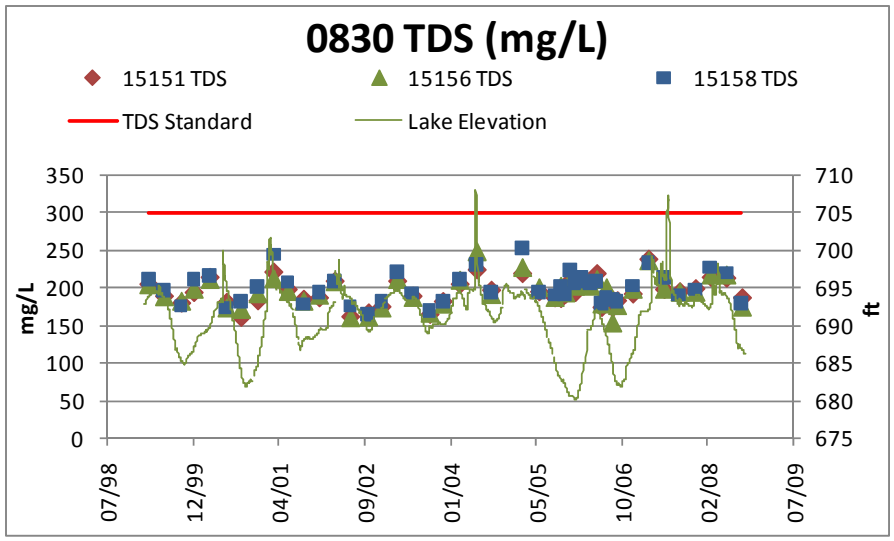


Figure E.12. TDS Trends Identified in Segment 0830.

There are decreasing trends in sulfate in the lower portion of the reservoir (fig. E.13). Causes are unknown, but analysis agrees with a recent TRWD report regarding decreasing salts in their reservoirs. TRWD reports suggest that lack of inflow from tributaries over the recent years has resulted in decreasing salts and other dissolved solids.

There are decreasing trends in pH during the winter months for the lower and middle portions of the reservoir. Based on the premise that pH drops when photosynthetic organisms respire, algal blooms in this hypereutrophic lake may account for these decreasing trends (fig. E.14).

Increasing trends in TP in a majority of the reservoir as shown in Table E.5 also support the hypereutrophic status of the reservoir as discussed above.

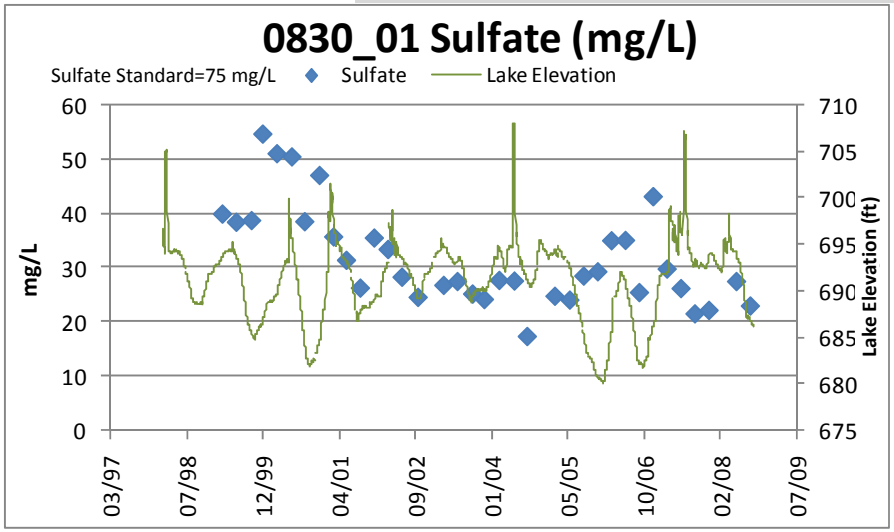


Figure E.13. Sulfate Trends in Segment 0830_01.

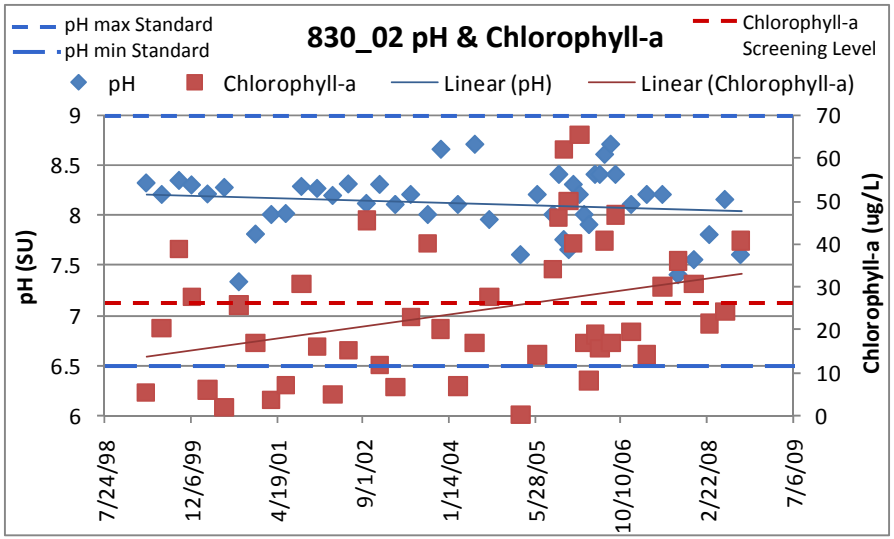


Figure E.14. Chlorophyll-a and pH Trends in Segment 0830_02.

Segment 0829 – Clear Fork Trinity River Below Benbrook Lake

Overview

This segment runs 14 miles from the confluence of the West Fork Trinity River in Tarrant County to the Benbrook Lake dam in Tarrant County. The watershed here is nearly 100% urban and the entire segment is in the Grand Prairie ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Fully Supporting, No Concern, or Not Assessed

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply: Fully Supporting

Fish Consumption: In the 2008 Assessment, the lower portion of the segment was Not Supporting the fish consumption use due to elevated levels of PCBs in fish tissue. This listing was removed in the Draft 2010 Assessment. Additionally, concerns for elevated arsenic in fish tissue were found by the Draft 2010 Assessment in Lake Como (Segment 0829A), a small off-channel urban reservoir in Fort Worth. There is currently a TMDL underway for legacy pollutants in these waterbodies.

Assessments (Unclassified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Fully Supporting, No Concern, or Not Assessed

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

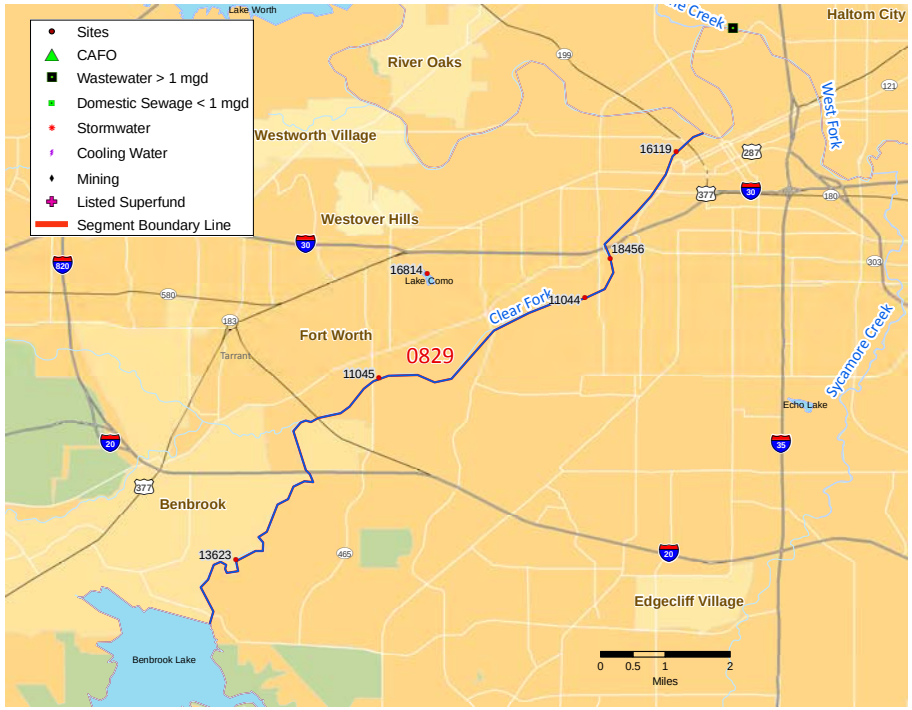


Figure E.15. Map of Segment 0829.

Public Water Supply: Not Applicable

Fish Consumption: A Concern for elevated Arsenic in fish tissue was found by the Draft 2010 Assessment in Lake Como (Segment 0829A), a small off channel urban reservoir in Fort Worth. There is currently a TMDL underway for legacy pollutants in these waterbodies.

Trend Analysis Overview

Four trends were identified in this segment. Only particularly interesting or robust trends are discussed in this section. For additional detail on trend methods and results, see the Data Review Methods appendix.

Clear Fork		Amm			Chloride			Sulfate		
Seg_AU	Site	A	S	W	A	S	W	A	S	W
0829_02	11045		UP	DN			UP		DN	

Table E.6. Trends Identified in Segment 0829_02.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Trends (Classified Segments):

Increasing trends in ammonia (fig. E.16) during the summer months and decreasing trends in the winter months were found in the middle portion of the segment (0829_02). Elevated ammonia could be caused by non-point sources such as wildlife and urban runoff contaminated by pet waste and fertilizers. However, it can also be caused by sewer overflows. The Clear Fork flows past a golf course and through a large residential area just upstream of assessment unit 0829_02. The increasing trend in the summer and decreasing trend in the winter suggests that they are the result of fertilizer runoff, although more investigation is needed to determine the actual sources of the ammonia findings.

Further trend analysis for assessment unit 0829_02 found increasing chloride trends in the winter months and decreasing sulfate trends in the summer months.

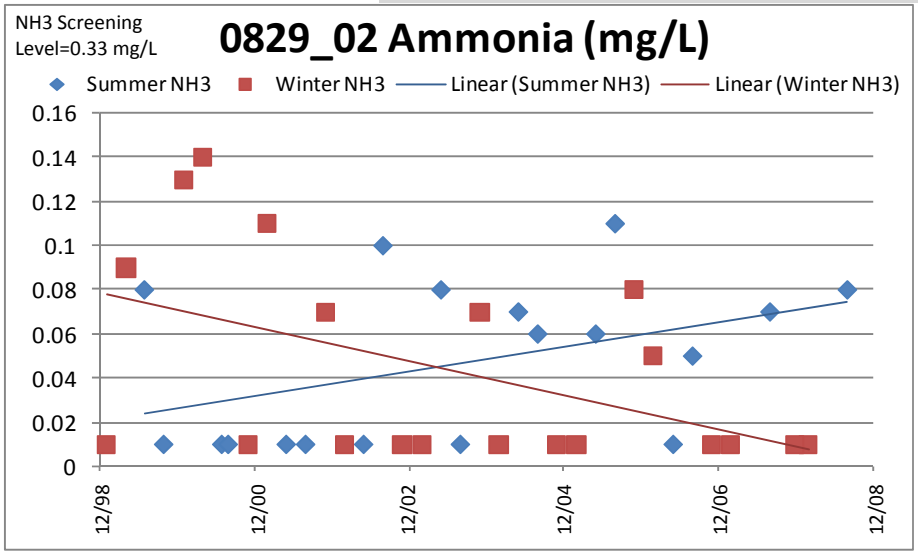
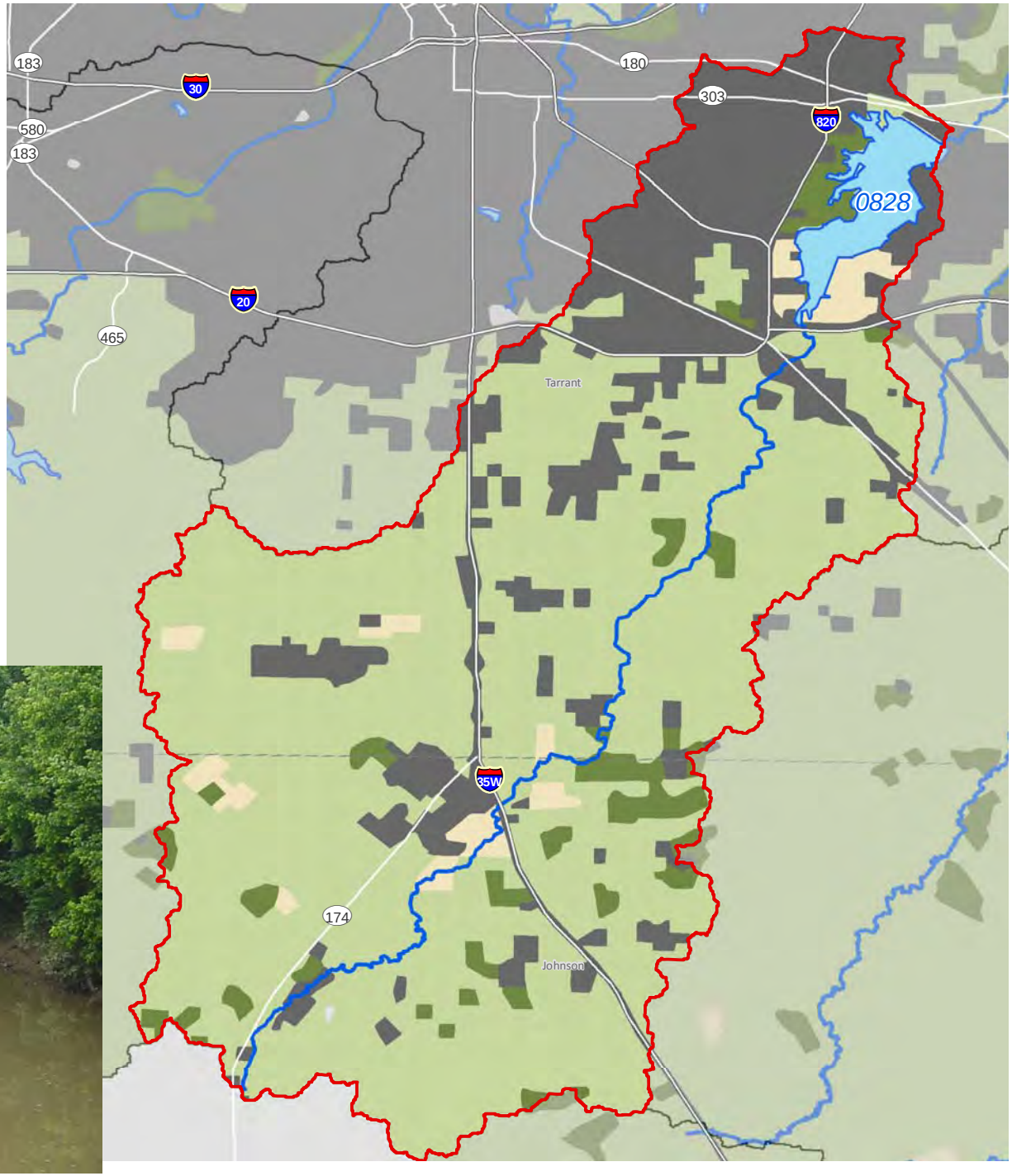


Figure E.16. Ammonia in Segment 0829_02.

Village Creek

Land Use Type

- Crop/Pasture/Other Agricultural
- Forest
- Rangeland
- Urban/Industrial/Residential



VILLAGE CREEK

Classified Segments – 1
Unclassified Segments – 1

0828 – Lake Arlington
0828A – Village Creek

Sites Used for Analysis:

2008 Assessment	8
Draft 2010 Assessment	11
5-Year Analysis	6
Valid Trends	5

Village Creek - Count of Discharges by Type and County							
County	Cooling Water	Domestic Sewage <1mgd	Mining	Stormwater	Wastewater >1 mgd	CAFO	Total Dischargers
JOHNSON		6			1		7
TARRANT		1			1		2
Total		7			2		9

Table F.1. Village Creek Dischargers by Type and County .

The Village Creek subwatershed extends approximately 28 river miles from Johnson County to the Lake Arlington dam in Tarrant County. The downstream portions of the subwatershed have undergone urbanization while the upstream portions of the subwatershed have remained rural with some pastureland and row-crop agriculture. Major population centers include the City of Burleson and the communities of the southwest DFW Metroplex. Lake Arlington supplies water to the City of Arlington as well as a portion of Tarrant County. Water rights permits for Lake Arlington are held by the City of Arlington and TXU Electric. Yields of the reservoir are supplemented by water imported from the Cedar Creek and Richland-Chambers reservoirs. This subwatershed receives between 32 and 36 inches of precipitation annually and is located within the iron-rich sandy soils of the Eastern Cross Timbers ecoregion.

The UP Railroad was assessed by the EPA under the Brownfields Program. It is unknown at this time if a cleanup is necessary. Special projects that have been conducted or are underway in this subwatershed include the Statewide Fish Tissue Monitoring Program. Special projects are discussed in more detail in the Special Projects chapter.

Segment 0828 – Lake Arlington

Overview

This segment covers 2,275 acres and impounds Village Creek from the Arlington dam in Tarrant County up to a normal pool elevation of 550 feet. The land use around the lake and in the lower portion of the watershed is nearly all classified as urban, and the upper reaches of the segment are agriculture/pasture. All of segment 0828 is located in the Eastern Cross Timbers ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: The upper eastern (0828_06) and western (0828_05) portions of the lake, as well as the eastern portion of the lake near the dam (0828_02), were found to have Concerns for chlorophyll-a with all three methodologies. Additionally, the 5-year analysis identified a Concern for TP in the upper portion of the lake (0828_07).

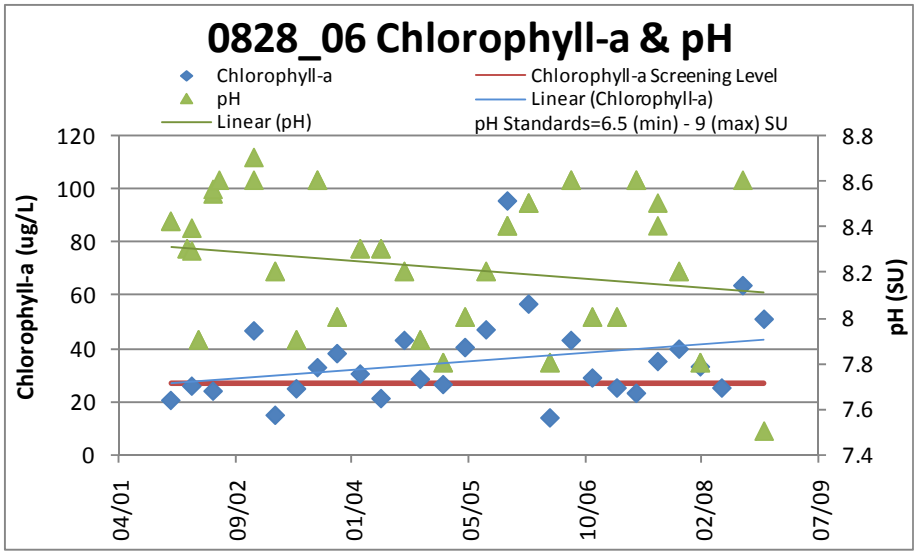


Figure F.1. Chlorophyll-a and pH in Segment 0828_06.

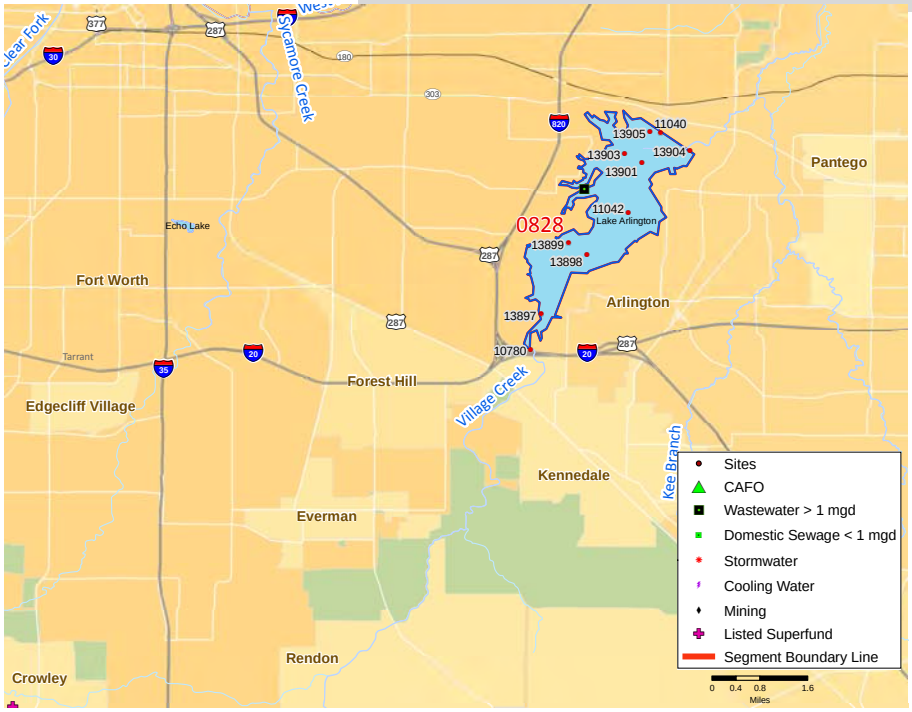


Figure F.2. Map of Segment 0828.

Each portion of the lake identified to have the Concerns listed above show similar patterns. Chlorophyll-a trends are increasing while the pH trends are decreasing (fig. F.1). The reason for this is discussed in the Chlorophyll-a section.

There is a possible correlation between increasing TP levels and chlorophyll-a levels (fig. F.3). This phenomenon occurred at one site (13904) and the correlation coefficient is < 0.5 (n=27). However, additional study should be completed to see if a relationship exists.

The shores of Lake Arlington are highly urbanized with large residential developments. Figure F.3 shows a rise and fall in chlorophyll-a and TP over the years, with higher values in the warmer months and lower values in the cooler months. Concerns for both parameters may be due to residential fertilizer runoff or higher concentrations of

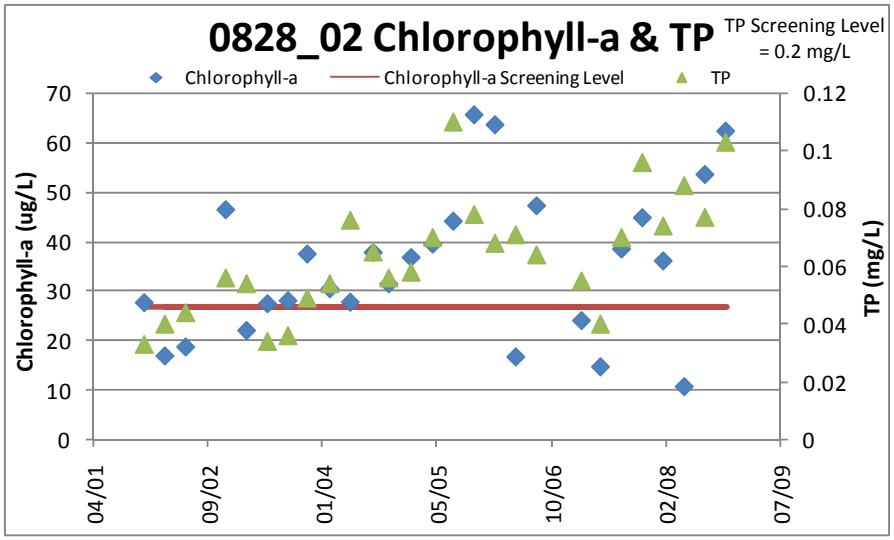


Figure F.3. Chlorophyll-a and TP in Segment 0828_02 (Station 13904).

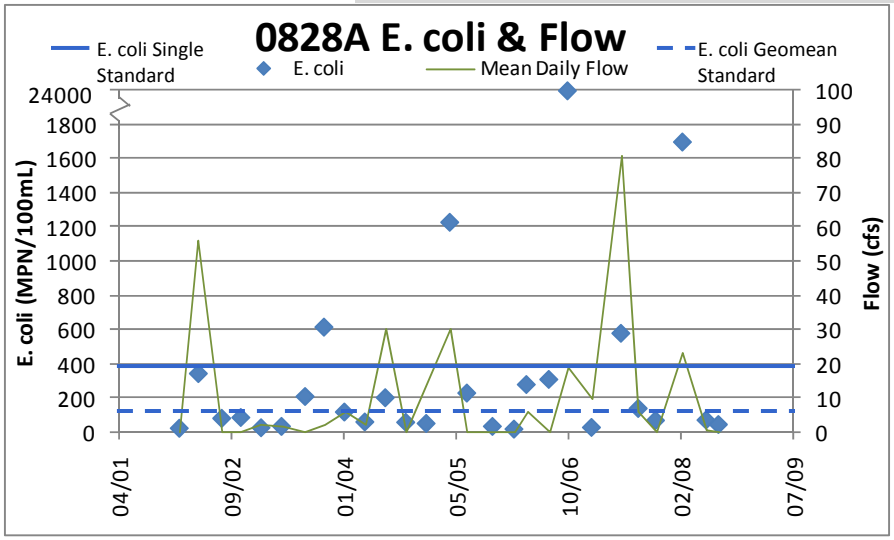


Figure F.4. E. coli and Flow in Segment 0828A.

phytoplankton in the summer months. Further sampling of runoff in the area around the lake with concurrent lake samples would be needed to confirm either of these hypotheses.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Fully Supporting, No Concern, or Not Assessed

Fish Consumption Use: Fully Supporting or Not Assessed

Assessments (Unclassified Segments):
Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Fully Supporting, No Concern, or Not Assessed

Contact Recreation Use: The Draft 2010 Assessment designated this segment as Non-Supporting due to elevated levels of E. coli. Current standards for E. coli are a geomean of 126 MPN/100mL and 394 MPN/100mL for single grab samples. Exceedances typically occur during peaks in streamflow (fig. F.4). Areas surrounding Village Creek upstream of Lake Arlington are classified as industrial and residential. Watershed survey visits with sampling entities will be necessary to better understand the surrounding land uses and sources of E. coli.

Public Water Supply Use: Fully Supporting, No Concern, or Not Assessed

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed

Trend Analysis Overview

Village Creek		ChlA			Chloride			DO			E.coli			OP			pH			S.Depth			Sulfate			TDS Calc			TP			W.Temp		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0828_02	13904			UP	UP	UP	UP												DN				UP	UP					UP	UP	UP			
0828_05	13899																		DN			DN												
0828_06	11042	UP					UP						UP						DN												UP			
0828_07	13897				UP		UP						UP	UP			DN	DN	DN												UP			
0828A_01	10780							UP	UP	UP																UP								DN

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Table F.2. Trends in Segment 0828.

There were 30 trends identified for this subwatershed. For additional detail on trend methods and results, see the Data Review Methods appendix.

Trends (Classified Segments):
Trends for chlorophyll-a, pH, and TP are discussed in the General Use section above. Correlation between chloride and lake levels is weak (fig. F.5) and indicates that low flows and increasingly saline irrigation runoff are not the source of the increasing values. The observed levels are well below the standard of 100 mg/L, however, further investigation should be undertaken to determine the sources of chloride into the lake. Similarly, there is little correlation between the lake elevations and the increasing sulfate levels. Sulfate levels are well below the standard of 100 mg/L and the trends are quite weak (R^2<0.22).

Trends in winter E. coli levels appear to be due to increases in lake levels after extended dry periods (fig. F.6). This fits with the assumption that E. coli builds up on land and is washed into the lake during precipitation events. As there is a large amount of residential development around the lake, as well as a wooded area on the west side of the lake, the most probable sources of E. coli are pets and wildlife.

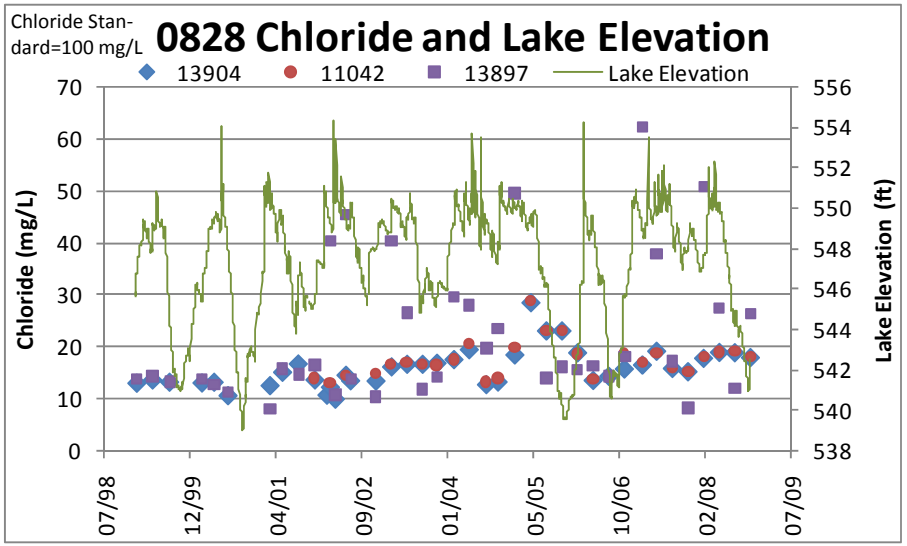


Figure F.5. Chloride and Lake Elevation in Segment 0828.

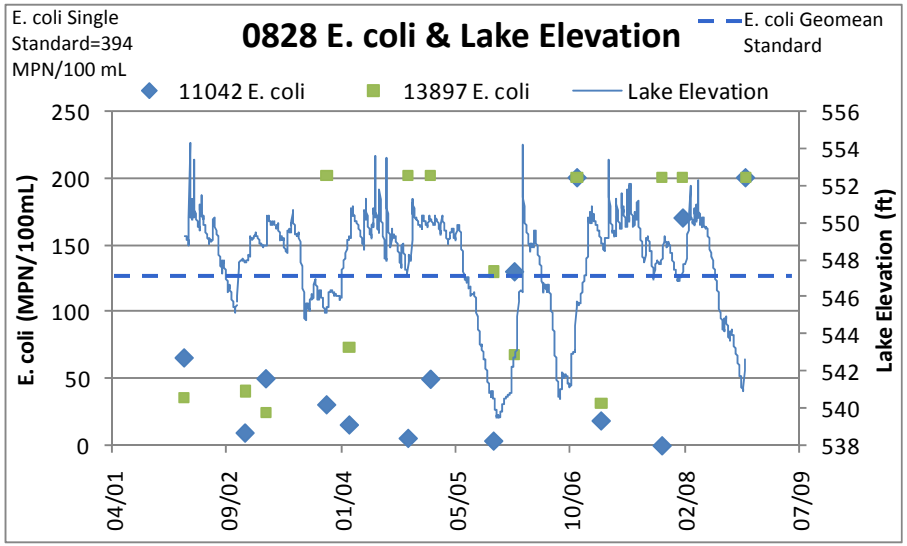


Figure F.6. E. coli in Segment 0828.

Trends for OP in the upper portion of the lake (0828_07) are approaching the screening level (fig. F.7). At the current rate of increase, OP levels are predicted to exceed the screening level within 10 years.

Trends (Unclassified Segments):
Trends in 0828A include increasing DO and decreasing temperature (fig. F.8). In the absence of oxygen demanding processes, the amount of oxygen that can be dissolved in water increases as the water gets colder.

Additionally, there was a trend for calculated TDS. This value is calculated from specific conductivity and a conversion factor of 0.65. Taken with the increasing trends in chloride in the upper portion of Lake Arlington, it may be beneficial to begin monitoring solids and chlorides in the creek to determine whether the issues are originating from the shores of the lake or in the watershed above the lake.

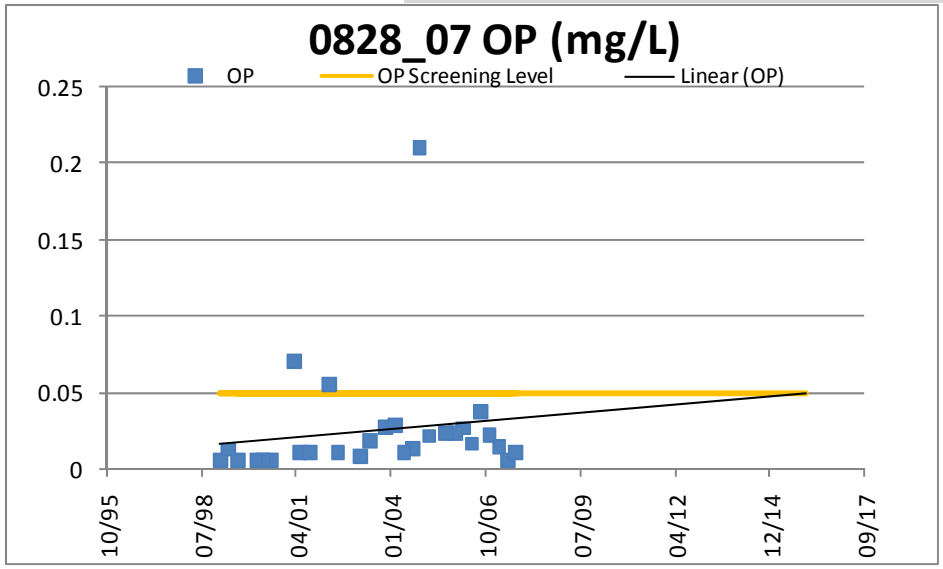


Figure F.7. Orthophosphate in Segment 0828_07.

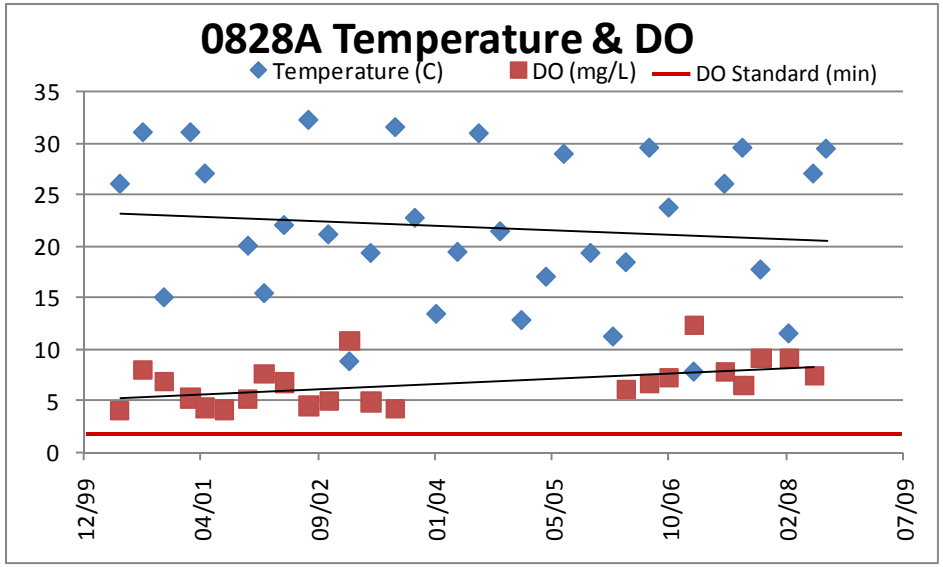


Figure F.8. Temperature and DO in Segment 0828A

Mountain Creek

Land Use Type

- Crop/Pasture/Other Agricultural
- Forest
- Rangeland
- Urban/Industrial/Residential

MOUNTAIN CREEK

Classified Segments – 1
Unclassified Segments – 3

0838 – Joe Pool Lake
0838A – Mountain Creek
0838B – Sugar Creek
0838C – Walnut Creek

Sites Used for Analysis:

2008 Assessment	11
Draft 2010 Assessment	13
5-Year Analysis	13
Valid Trends	3

Mountain Creek - Count of Discharges by Type and County							
County	Cooling Water	Domestic Sewage <1mgd	Mining	Stormwater	Wastewater >1 mgd	CAFO	Total Dischargers
ELLIS		2			2		4
JOHNSON		4					4
Total		6			2		8

Table G.1. Mountain Creek Dischargers.

The Mountain Creek subwatershed extends approximately 28 river miles from Johnson County to the Joe Pool Lake dam in Dallas County. A majority of the subwatershed is rural with row-crop agriculture in the upstream portions. The downstream section around Joe Pool Lake has seen a significant increase in urbanization in recent years. Major population centers include the cities of Mansfield, Midlothian, and Cedar Hill as well as the communities of the southern DFW Metroplex. Water rights permits for Joe Pool Lake are held by TRA.

This subwatershed receives between 34 and 36 inches of precipitation annually and lies almost entirely within the Blackland Prairie ecoregion. A majority of this subwatershed is flat, however, the eastern edge is lifted by the Austin Chalk escarpment.

There are several locations in Mansfield associated with steel and cement manufacturing being monitored for compliance by EPA as part of the Resource Conservation and Recovery Act (RCRA). These include the Chaparral Steel Midlothian Plant, Ash Grove Texas LP, and TXI Operations. RCRA regulates the disposal of solid and hazardous waste which includes both on-site and off-site disposal. As part of the monitoring by EPA, information is collected on compounds released or transferred as waste. Compounds at these facilities include heavy metals and volatile chemicals.

Special projects in this subwatershed have included The Seven Lakes Atrazine Project. Special projects are discussed in more detail in the Special Projects chapter.

Segment 0838 – Joe Pool Lake

Overview

This segment covers 7,500 acres and impounds Mountain Creek from the Joe Pool dam in Dallas County up to the normal pool elevation of 522 feet. The majority of the watershed for Joe Pool Lake is classified as agriculture/pasture with some sections of urbanization and rangeland. The majority of the watershed is located in the Blackland Prairie ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: The 5-year analysis identified Concerns for low DO in the Mountain Creek arm of Joe Pool Lake. These low values coincide with a period of intense drought and low lake levels and do not seem to suggest a current or upcoming problem.

General Use: The Draft 2010 Assessment identified a Concern for nitrate in the Mountain Creek arm of the reservoir. All other parameters and portions of the reservoir were found to be Fully Supporting or have No Concern. The 5-year analysis identified Concerns for elevated levels of chlorophyll-a in the Mountain Creek arm of Joe Pool Lake. Correlation analysis showed no relationship between chlorophyll-a and low dissolved oxygen measurements identified in the 5-year analysis discussed in the Aquatic Life Use section.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Fully Supporting

Fish Consumption Use: Fully Supporting or No Concern

Assessments (Unclassified Segments):

Aquatic Life Use: The 5-year analysis identified Concerns for low DO in Sugar Creek (0838B) (fig. G.2).

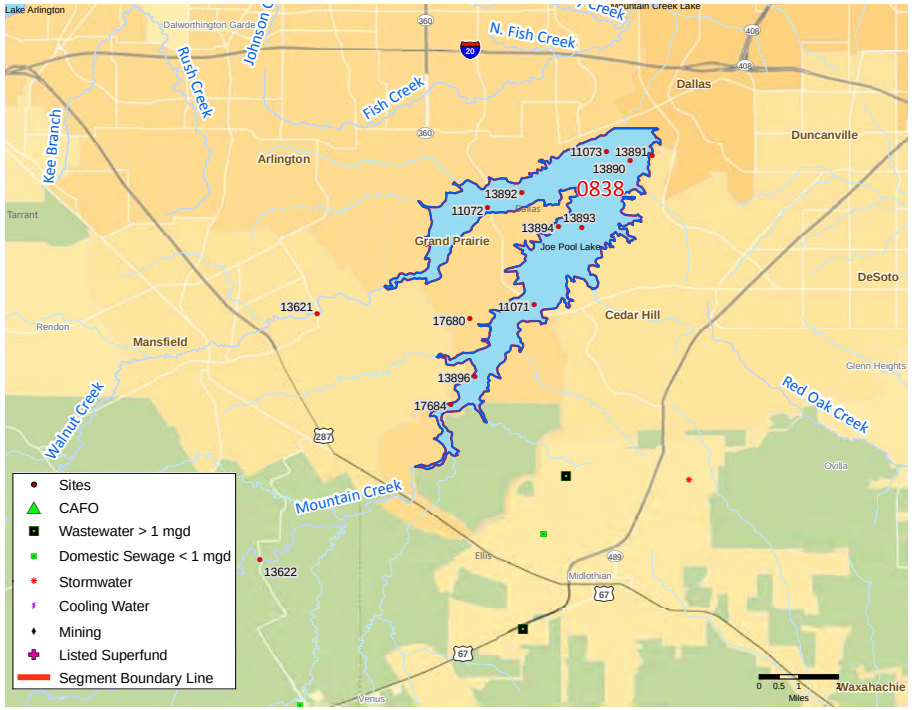


Figure G.1. Map of Segment 0838.

General Use: These segments were Fully Supporting on both the 2008 and Draft 2010 Assessments. The 5-year analysis identified Concerns for elevated levels of chlorophyll-a in Sugar Creek (0838B) (fig. G.2).

Contact Recreation Use: Walnut Creek (0838C) was found to have issues with elevated bacteria levels. Figure G.3 shows bacteria and flow data from the Walnut Creek area. Values above 2000/100mL for bacteria and flows above 1000 cfs have been cut from the graph to better visualize the data. It appears that elevated bacteria levels are due to increased flow events after precipitation. Possible sources of bacteria in these rural areas include wildlife and livestock animals. Sugar Creek (0838B) was delisted for bacteria on the Draft 2010 Assessment.

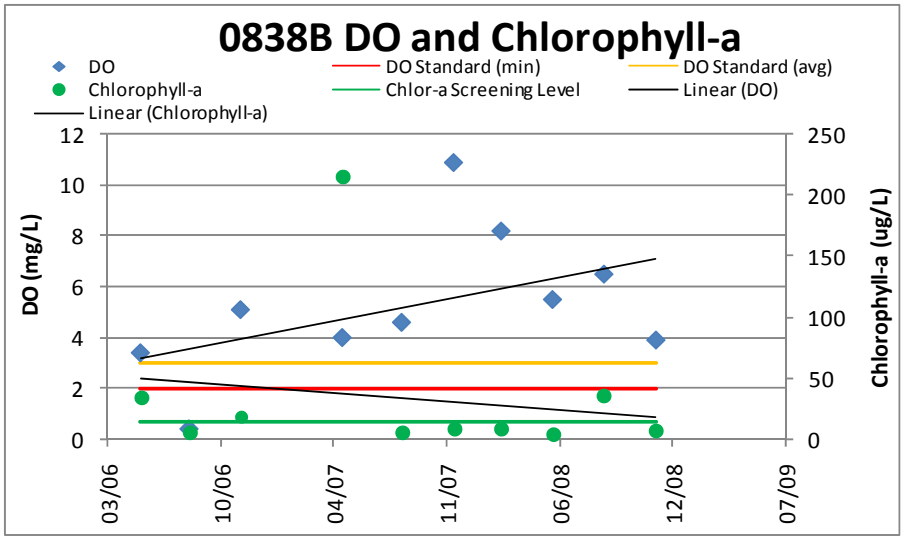


Figure G.2. Graph of DO and Chlorophyll-a in Segment 0838_02.

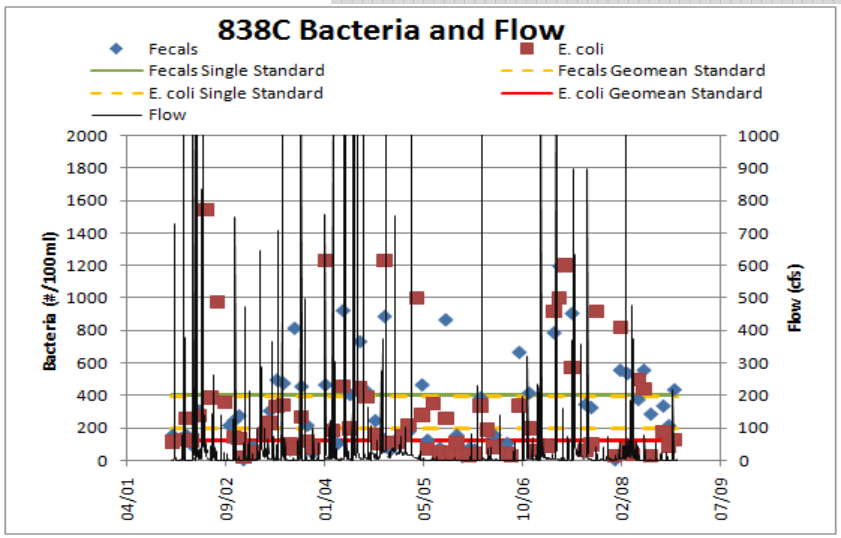


Figure G.3. Bacteria and Flow in Segment 0838C.

Public Water Supply Use: Not Assessed

Fish Consumption Use: Not Assessed

Trend Analysis Overview

There were 26 trends identified in this subwatershed. For additional detail on methods and results, see the Data Review Methods appendix.

Trends (Classified Segments):

The average values for winter TDS measured and sulfate are well below the standards and are of No Concern. Trends, or possible trends, identified for pH and chlorophyll-a are weak (R^2<0.16) and likely not real.

Trends (Unclassified Segments):

There are several decreasing trends and two increasing trends in Sugar Creek (0838B_01). The downward trends for TDS measured, sulfate, and hardness are quite robust (R^2 > 0.62). Decreasing trends for these parameters are quite common in the Trinity River basin. One reason may be a marked decrease of tributary inflow. Changing patterns of irrigation and other agricultural activities in the Mountain Creek watershed may be affecting the TDS and sulfate lev-

Mountain Creek		Amm			ChlA			Chloride			Hard			pH			Sulfate			TDS Meas			TP		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0838_02	17684				UP											DN	UP		UP			UP			
0838B_01	17680						UP	DN	DN	DN	DN	DN	DN				DN	DN	DN	DN	DN	DN			UP
0838C_01	13621	DN	DN	DN			DN							DN	DN	DN									

Table G.2. Trends in Segment 0838.

Trends Key

A-All Months

S-Summer/Growing Season (May-October)

W-Winter/Dormant Season (November-April)

UP Increasing Trends

DN Decreasing Trends

els in this portion of the lake. More investigation is necessary to determine if this is the case.

Although the sample location on this creek is in a rural area, it is possible that physical features at the site are contributing to these decreasing trends. There is an elevation drop along the creek bed of approximately eight feet from one side of the road to the other. The downstream side of the road is lake backwater when the lake is full and is expected to have similar water quality characteristics to those found in 0838_02. The upstream side of the road is pooled behind the bridge culvert during low flow conditions and very little water passes through to the downstream side. Concurrent samples taken from both the upstream and downstream sides of the bridge would further define the water quality in this area.

There are decreasing trends for ammonia, chlorophyll-a, and pH in Walnut Creek (0838C). The decreasing trend (R^2 <0.31) for pH is concerning as the trend is approaching the minimum standard of 6.5 SU. At the current rate of decline, pH is projected to fall below the standard within four years (fig. G.4).

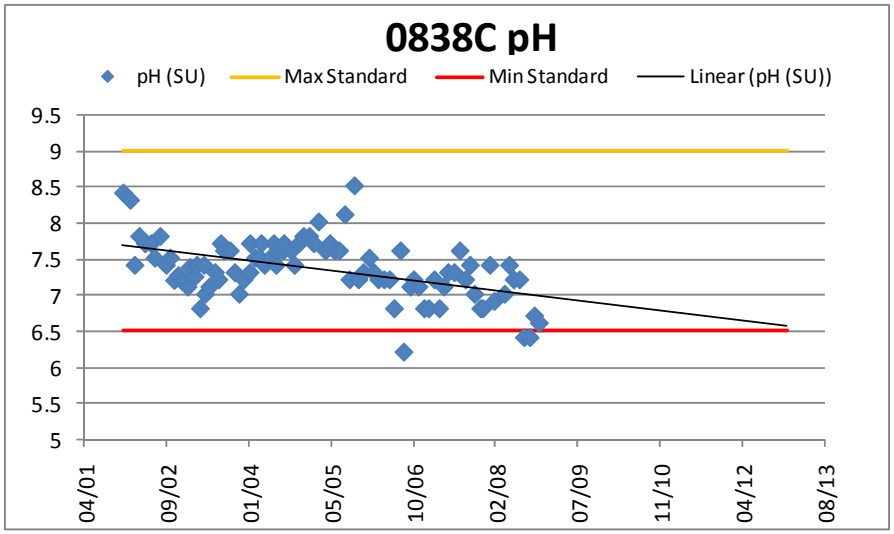
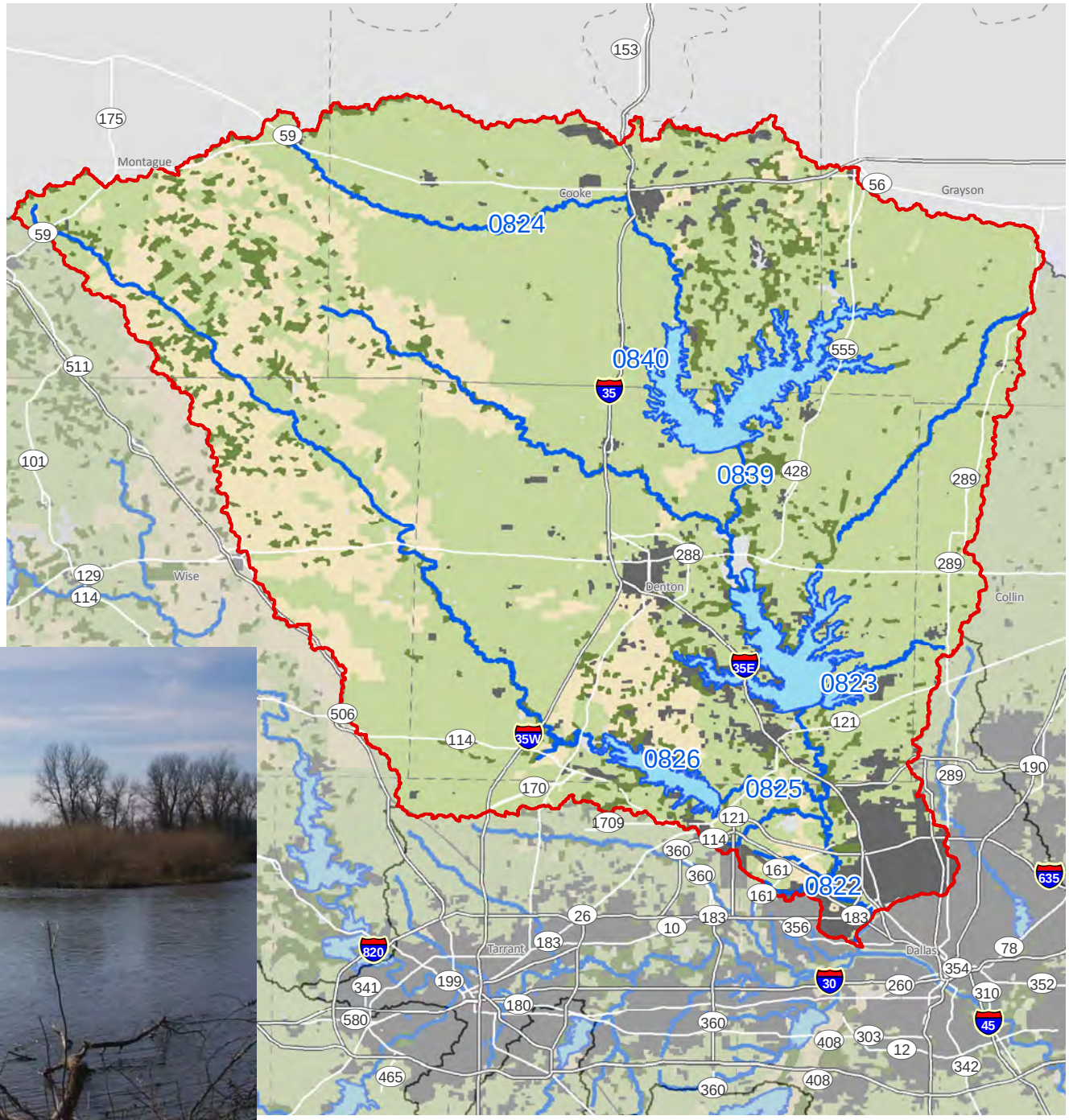


Figure G.4. Graph of pH Values in Segment 0838C.

Elm Fork

Land Use Type

- Crop/Pasture/Other Agricultural
- Forest
- Rangeland
- Urban/Industrial/Residential



ELM FORK

Classified Segments – 7
Unclassified Segments – 13

0824 – Elm Fork Trinity River Above Ray Roberts
0839 – Elm Fork Trinity River Below Ray Roberts
0839A – Clear Creek
0840 – Ray Roberts Lake
0840A – Unnamed Tributary of Jordan Creek
0823 – Lewisville Lake
0823A – Little Elm Creek
0823B – Stewart Creek
0823C – Clear Creek
0823D – Doe Branch
0825 – Denton Creek
0822 – Elm Fork TR Below Lewisville
0822A – Cottonwood Branch
0822B – Grapevine Creek
0822C – Hackberry Creek
0822D – Ski Lake
0826 – Grapevine Lake
0826A – Denton Creek
0826B – Trail Creek
0826C – Henrietta Creek

Sites Used for Analysis:

2008 Assessment	57
Draft 2010 Assessment	86
5-Year Analysis	48
Valid Trends	22

Elm Fork - Count of Discharges by Type and County

County	Cooling Water	Domestic Sewage <1mgd	Mining	Stormwater	Wastewater >1 mgd	CAFO	Total Dischargers
COLLIN		2		1	2		5
COOKE		8			1		9
DALLAS				2	3		5
DENTON		22	3	1	15	2	43
GRAYSON		3			1		4
MONTAGUE		1					1
TARRANT				1	2		3
WISE		1					1
Total		37	3	5	24	2	71

Table H.1. Count of Dischargers for Elm Fork Subwatershed.

The Elm Fork subwatershed is the northernmost watershed in the basin stretching to within a few miles of the Oklahoma border. The headwaters of the Elm Fork begin in Montague County and extend approximately 118 miles to the confluence with the Main Stem in Dallas County. The majority of the subwatershed is rural and becomes more urbanized as it approaches the DFW Metroplex, around the City of Denton and the shores of Lake Lewisville. The rural northern portion of the subwatershed includes row crop agriculture, cattle grazing, and a dairy industry.

Ray Roberts Lake, Lake Lewisville, and Lake Grapevine are located in this subwatershed. Water rights permits for Ray Roberts Lake and Lake Lewisville are held by the cities of Dallas and Denton. Water rights permits for Lake Grapevine are held by the Park Cities MUD as well as the cities of Dallas and Grapevine.

The subwatershed receives between 32 and 42 inches of precipitation annually. The northern portion of the subwatershed lies within the Grand Prairies with gently rolling plains while the southern, urbanized portion lie within the Eastern Cross Timbers.

There are several Brownfield and RCRA/ECHO sites located in this subwatershed. Some of these include the former Farmers Branch Fire Training Center and Keenan Bridge Road Property sites which now contain sports fields and the 10501 Shady Trail site which contains a parking lot in an industrial complex. Special Projects in this subwatershed include Reservoir Research; Envirocast Phase II; the Statewide Fish Tissue Monitoring Program; Control of NPS Pollution in Hickory Creek; Cottonwood Branch and Grapevine Creek-Bacteria; Nutrient Monitoring on Grapevine Lake; the Study of DO Concentration in Transition Zones of Grapevine Lake, Lewisville Lake, and Ray Roberts Lake; Dirunal DO Dynamics; Trinity River-Bacteria, and the National Rivers and Streams Assessment. These projects are discussed in more detail in the Special Projects chapter.

Segment 0824- Elm Fork TR above Ray Roberts

Overview

This 86 mile segment runs from 5.9 miles downstream of the confluence of Pecan Creek in Cooke County to US 82 in Montague County. The entire segment runs through the Grand Prairie ecoregion with almost all land use classified as agriculture/pasture. Oil production has been heavy in the area over the last century and natural gas drilling has increased tremendously in the last 20 years.

Assessments

Aquatic Life Use: Except for a 3.5 mile reach near SH 51, this segment is Fully Supporting or Not Assessed. AU 0824_03 shows a Concern for dissolved oxygen according to both the 2008 and Draft 2010 Assessments. DO values for this segment are negatively correlated to OP and positively correlated to total nitrate and nitrate+nitrite. There is no correlation to chlorophyll-a (fig. H.1) suggesting that nutrients are not resulting in algal blooms. Interestingly, DO in 0824_03 shows no correlation with flow.

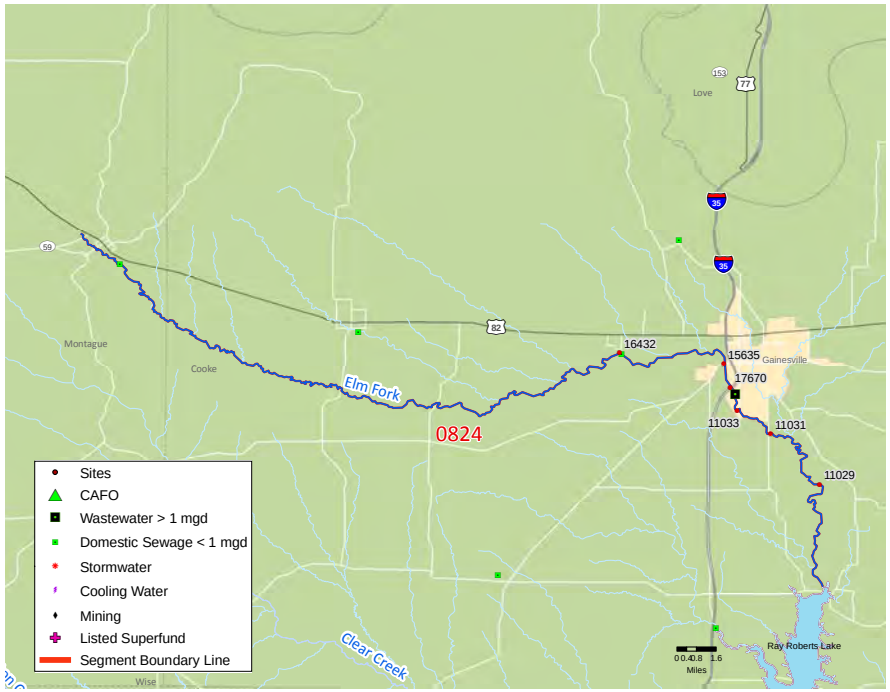


Figure H.2. Map of Segment 0824.

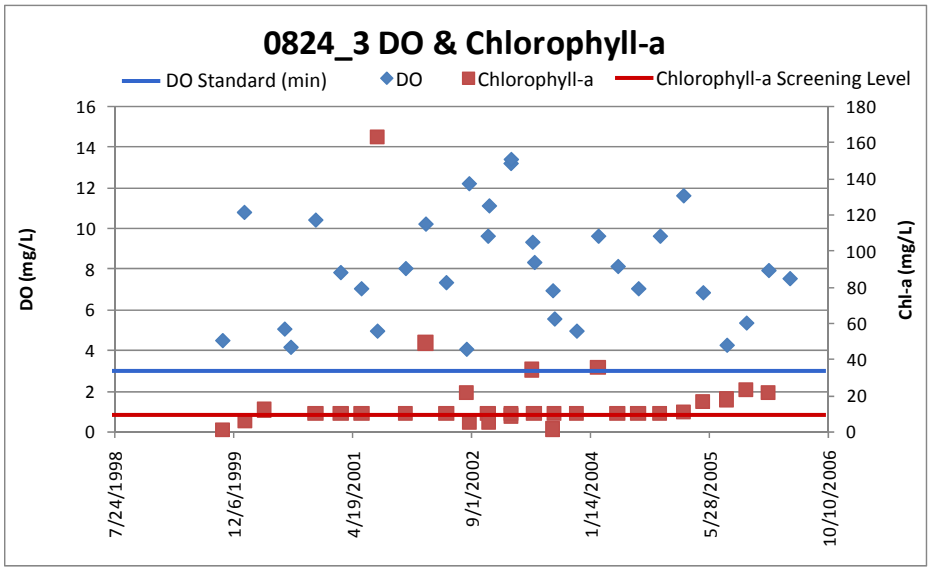


Figure H.1. DO and Chlorophyll-a in Segment 0824_3.

General Use: Portions of the lower and middle sections of 0824 show Concerns for chlorophyll-a, TP, OP, and nitrate in both the 2008 and Draft 2010 Assessments. As discussed in the Aquatic Life Use section above, these values are not resulting in excessive chlorophyll-a values. The 5-year analysis showed Concerns for both total phosphorous and orthophosphorus only in the lower 7.5 miles of the segment. Nutrient sources are likely non-point source runoff from the extensive farming operations located within 0824's watershed and wastewater dischargers.

Contact Recreation Use: All of 0824 was delisted based on E. coli data available for the Draft 2010 Assessment and this segment is Fully Supporting the Contact Recreation Use.

Public Water Supply: Fully Supporting or No Concern

Fish Consumption Use: Not Assessed

Trend Analysis Overview

3 trends were identified in this segment. For additional detail on trend methods and results, see the Data Review Methods appendix.

Trends (Classified Segments):

Trends for decreasing winter fluoride are strong, but the values are an order of magnitude lower than the standard. The downward trend, or possible trend, for flow is quite weak (R^2 < 0.19) and likely not real.

Elm Fork		Flow			Fluoride		
Seg_AU	Site	A	S	W	A	S	W
0824_03	15635			DN	DN		DN

Table H.2. Trends for Segment 0824.

Trends Key

A-All Months

S-Summer/Growing Season (May-October)

W-Winter/Dormant Season (November-April)

UP Increasing Trends

DN Decreasing Trends

Segment 0839- Elm Fork Trinity River Below Ray Roberts Lake

Overview

This 12 mile segment stretches from 110 yards upstream of US 380 in Denton County to Ray Roberts Dam in Denton County. 0839 is essentially the boundary line between the Grand Prairie and Eastern Cross Timbers ecoregions. Land use in the watershed is generally classified as agriculture/pasture with large sections of rangeland to the south and urban to the southwest.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Fully Supporting, No Concern, or Not Assessed

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Not Applicable

Fish Consumption Use: Fully Supporting

Assessments (Unclassified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Fully Supporting, No Concern, or Not Assessed

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Not Applicable

Fish Consumption Use: Fully Supporting

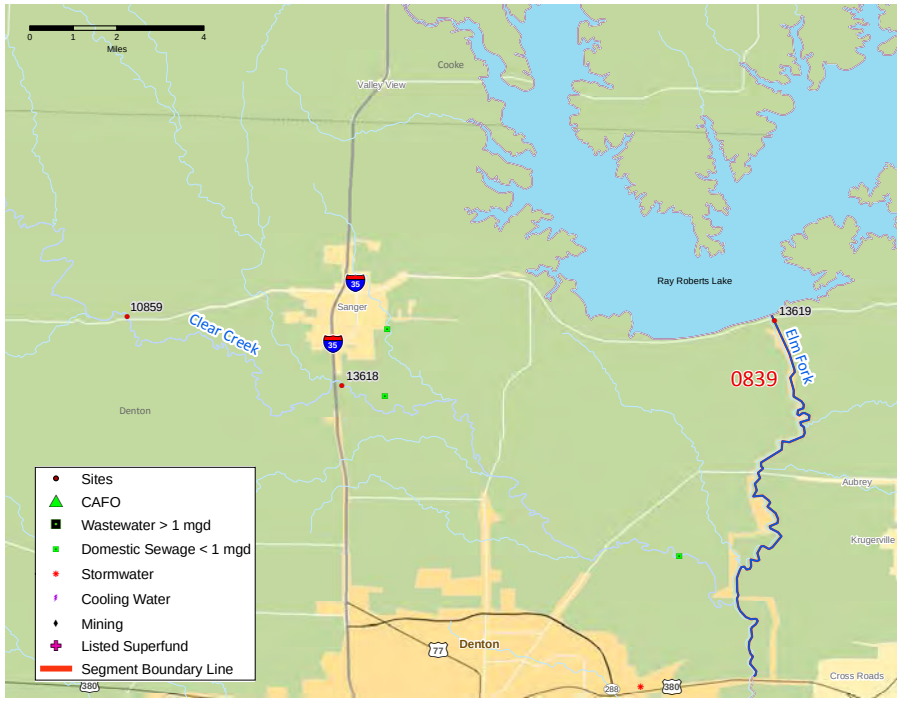


Figure H.3. Map of Segment 0839.

Trend Analysis Overview

No trends were indentified for this segment.

Segment 0840- Ray Roberts Lake

Overview

This 29,350 acre reservoir impounds the Elm Fork Trinity River from Ray Roberts Dam in Denton County to a point 5.9 miles upstream of the confluence of Pecan Creek in Cooke County up to the normal pool elevation of 632.5 feet. Land use in this segment is nearly all classified as agriculture/pasture. The eastern portion of the watershed is in the Eastern Cross Timbers ecoregion and the western portion is in the Grand Prairie ecoregion.

The TCEQ report titled Trophic Classification of Texas Reservoirs classified Ray Roberts Lake as being eutrophic, which notes that reservoirs become more eutrophic as they age due to the buildup of nutrients in the reservoir.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting or Not Assessed

Fish Consumption Use: No Concern or Not Assessed

General Use: There are Concerns for nutrients in the 2008 Assessment and those are carried forward to the Draft 2010 Assessment. The most recent data submitted and used for assessment is from 2001. Additional quality assurance protocols required since the 2002 Quality Assurance Project Plan prevent the partner monitoring in this segment from submitting additional data to the CRP. Specific sources are unknown, but the watershed is mainly cropland with portions of deciduous forest. In addition, three municipalities discharge < 1 mgd each directly into the reservoir.

Public Water Supply Use: Fully Supporting

Contact Recreation Use: In the 2008 Assessment, there was a Concern for fecal coliform in the upper portion of the Jordan Creek arm which was delisted on the Draft 2010 Assessment.

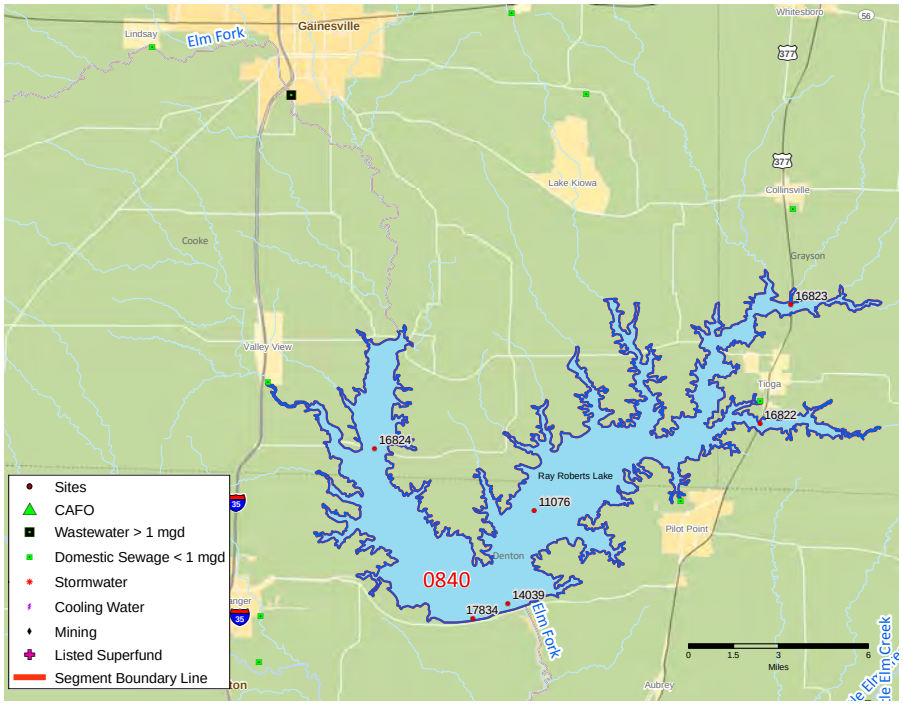


Figure H.4. Map of Segment 0840.

Assessments (Unclassified Segments):

Aquatic Life Use: Not Assessed

General Use: Not Assessed

Contact Recreation Use: Not Assessed

Public Water Supply Use: Not Applicable

Fish Consumption Use: Not Assessed

Trend Analysis Overview

No trends were indentified for this segment.

Segment 0823- Lewisville Lake

Overview

This 23,280 acre reservoir impounds the Elm Fork Trinity River from Lewisville Dam in Denton County to a point 110 yards upstream of US 380 in Denton County up to normal pool elevation of 515 feet. Land use to the east of the segment is generally classified as agriculture/ pasture and urban or rangeland to the west. Moving from northwest to southeast, the watershed covers portions of the Grand Prairie, Eastern Cross Timbers, and Blackland Prairie ecoregions respectively. Over the last 20 years, the Lake Lewisville watershed has seen tremendous urbanization.

Assessment (Classified Segment):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

Fish Consumption Use: Fully Supporting or Not Assessed

General Use: Concerns for nutrients were identified in the 2008 Assessment and carried forward to the Draft 2010 Assessment in the Stewart Creek and Little Elm Creek arms of Lewisville Lake. Additional quality assurance protocols required since the 2002 Quality Assurance Project Plan prevent additional data from this segment being submitted to TCEQ by the TRA CRP monitoring program. A review of more recent data (2007 and 2008) for Lake Lewisville which is not CRP QA/QC approved show that nutrient levels are still above the screening levels.

Public Water Supply Use: Fully Supporting or Not Assessed

Contact Recreation Use: Fully Supporting. The Stewart Creek Arm Concern on the 2008 Assessment was removed on Draft 2010 Assessment.

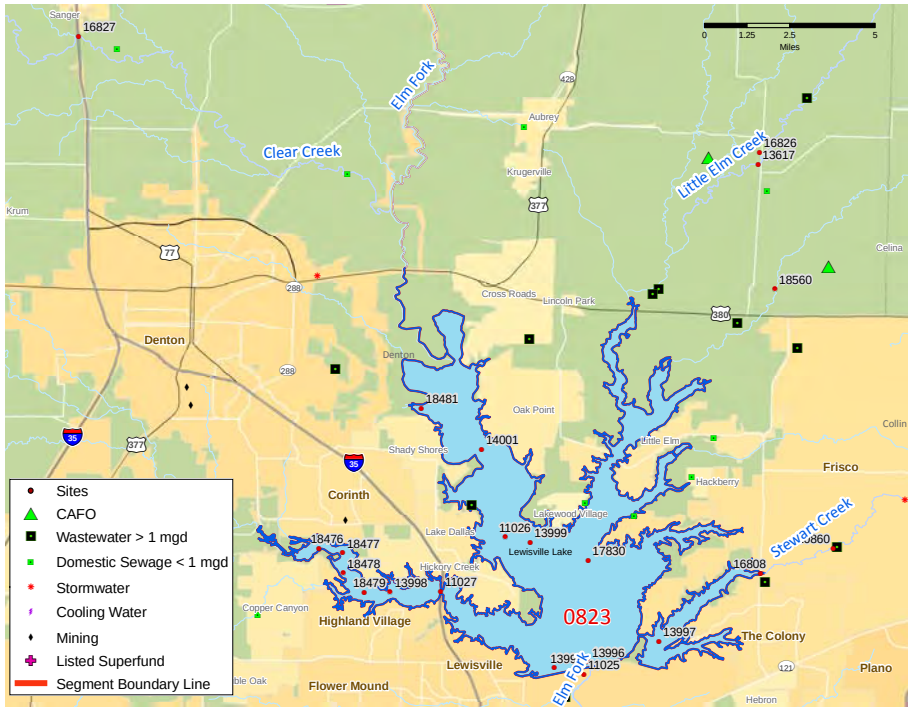


Figure H.5. Map of Segment 0823.

Assessment (Unclassified Segments):

Aquatic Life Use: There is a Concern for DO on Stewart Creek (0823B) using all three methodologies. This watershed is mostly agriculture/ pasture and there are three upstream dischargers of which two are permitted above 1 mgd. Causes for the Concerns are likely elevated temperatures and generally lower flows during the summer months. All 20 values below the 5 mg/L criteria occurred in the hottest half of the year which are likely times of low flow. No data is available for this site to determine if low DO values correlate to high chlorophyll-a measurements.

Fish Consumption Use: Fully Supporting, Not Assessed, or No Concern

General Use: Stewart Creek (0823B) was found to be Non-Supporting for TP, dissolved orthophosphate, and nitrate on both the 2008 and Draft 2010 Assessments. In addition, the 5-year analysis resulted in a Non-Supporting designation for chloride, sulfate, and TDS as well as a Concern for OP and TP. These values are considerably higher than the screening levels.

The station on Stewart Creek used in the assessments (10860) is located approximately 625 feet downstream of the North Texas Municipal Water District's Stewart Creek plant. According to the TCEQ's General Monitoring Guidelines, routine samples should not be collected less than 300 feet from an outfall into a perennial stream. Although station 10860 is outside of the default mixing zone, many times, this effluent provides the only flow in Stewart Creek and it does not have time to assimilate prior to being sampled. The high values here are likely exaggerated due to the site location.

Doe Branch (0823D) is listed as having a Concern for nitrate on the Draft 2010 Assessment. This Concern is based on a limited dataset (n=5) of dissolved nitrate nitrogen all taken in 2003 and 2004.

Trend Analysis Overview

22 trends were identified in this segment. For additional trend methods and results, see the Data Review Methods appendix.

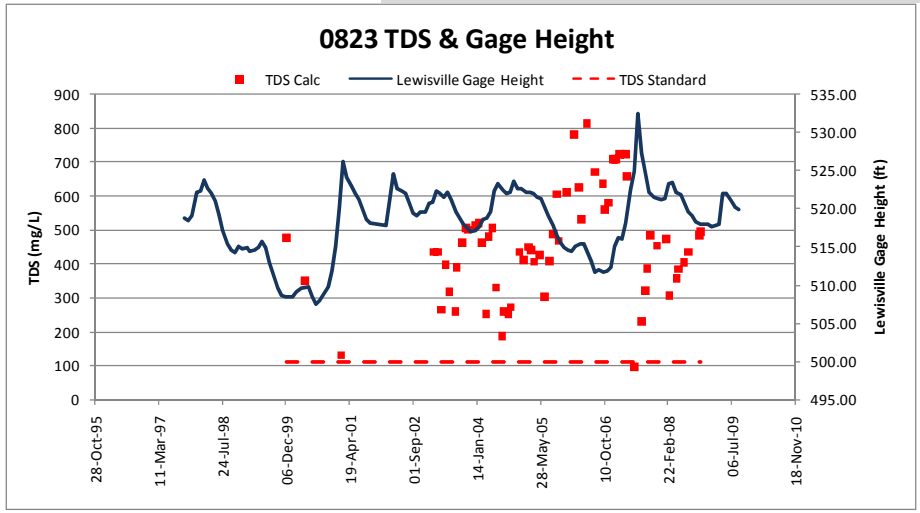


Figure H.6. TDS and Gage Height in Segment 0823.

Trends (Classified Segments):

Secchi depth is increasing at 2 sites for winter and the period of record (POR) and is generally an indicator of increasing water quality. The increasing winter trends for TDS are likely an artifact based on the inverse relationship between reservoir volume (gage height) and TDS values, rather than increasing TDS over time. Elevated TDS measurements coincide with a significant drought in 2005 and 2006 (fig. H.6).

Trends (Unclassified Segments):

Site 16826 located on Little Elm Creek showed weak ($R^2 < 0.2$) decreasing trends for pH for the POR and Winter. Although these decreases are statistically significant, the values still remain in the mid-

Elm Fork		Chloride			Flow			Fluoride			pH			S.Depth			Sulfate			TDS Calc			TDS Meas			TP		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0823_02	16808																					UP						
0823_03	11027													UP		UP						UP						
0823_04	17830													UP		UP												
0823A_01	16826										DN		DN															
0823B_01	10860	UP	UP			UP			DN	UP								UP	UP				UP	UP	UP	UP	UP	UP
0823C_01	16827																				UP							

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Table H.3. Trends identified in segment 0823.

dle range of the standard set for Lewisville Lake (6.5 – 9). Reasons for the possible decreases are unknown.

Site 10860 located on Stewart Creek showed 12 increasing trends and one decreasing trend. Taken together, a large number of trends at one location tend to indicate that there may be real changes taking place in the water quality at that specific location. As stated before, this site is just downstream of a major discharger and the increasing trends are likely caused by an increasing population resulting in increasing wastewater flows from the NTMWD Stewart Creek WWTP. Existing data supports this assumption because an increasing trend for Summer Flow was identified. Figure H.7 shows how the increases in these constituents coincide with increasing flows.

Trends for fluoride were identified but all values are significantly below the standard and the trend is of no concern.

Site 16827 located on Clear Creek showed a weak ($R^2 < 0.23$) possible upward trend for summer TDS Calculated. Possible causes and sources are unknown.

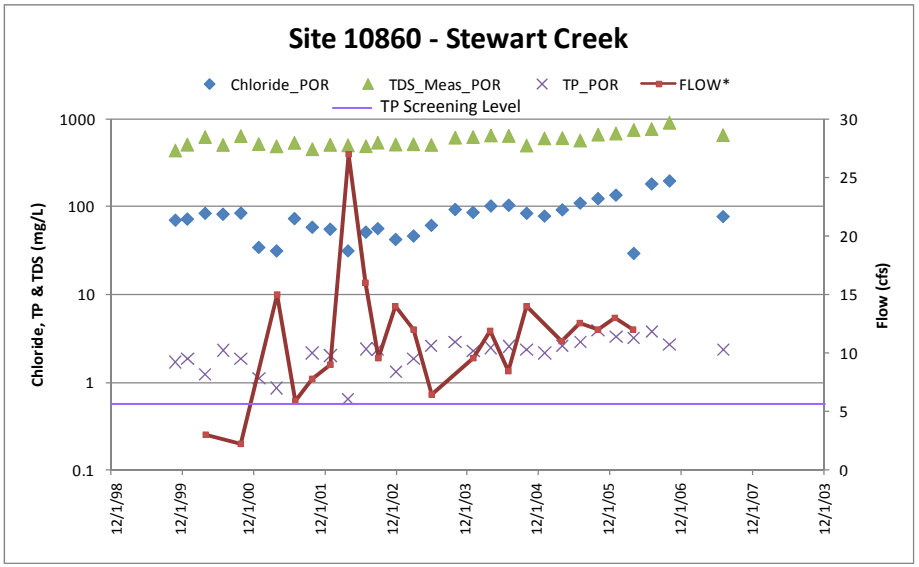


Figure H.7. Selected Parameters at Stewart Creek .

Segment 0825- Denton Creek

Overview

This 12 mile segment runs from the confluence with the Elm Fork Trinity River in Dallas County to Grapevine Dam in Tarrant County. Although this is in the heart of one of the fastest growing areas in the state, this segment traverses land mostly classified as agriculture/ pasture. Segment 0825 is located entirely within the Blackland Prairie ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting or No Concern

General Use: Fully Supporting or No Concern

Contact Recreation Use: Fully Supporting or No Concern

Public Water Supply Use: Fully Supporting

Fish Consumption Use: Fully Supporting

Trends Analysis Overview

6 trends were identified for this segment. For additional trend methods and results, see the Data Review Methods appendix.

Trends (Classified Segments):

A strong downward trend for fluoride was identified, but it should be noted that the mean fluoride level is over an order of magnitude lower that the criteria.

Upward winter trends in TDS Measured, TP, and sulfate were found at this site and do not track well with the average monthly flows. The sources and causes of these trends are unknown.

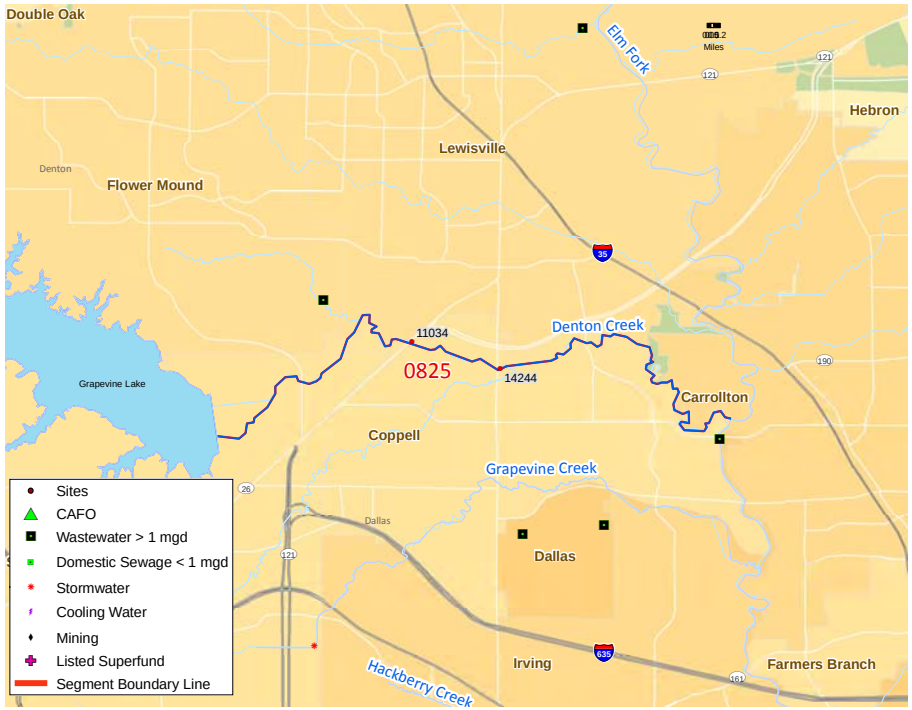


Figure H.8. Map of Segment 0825.

A weak increasing trend (R^2 < 0.2) for DO was identified with a maximum value of 9.6 mg/L. This, taken with the lack of concerns for chlorophyll-a, indicates there is little concern for super-saturation. Increasing DO is generally seen as improving water quality.

Elm Fork		Amm			DO			Fluoride			Sulfate			TDS Meas			TP		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0825_01	14244			UP		UP			DN				UP			UP			UP

Table H.4. Trends in Segment 0825.

Trends Key

A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Segment 0822- Elm Fork Trinity River Below Lewisville Lake

Overview

This 30 mile segment begins at the confluence with the West Fork Trinity River in Dallas County and runs to Lewisville Lake in Denton County. The northeastern portion of the watershed is generally classified as agriculture/pasture. The middle and lower portions are highly urbanized and include DFW International Airport. Segment 0822 falls completely within the Blackland Prairie ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: The lower 11 miles of this segment show a Concern for low dissolved oxygen using all three assessment methodologies. Sources and causes are unknown but are likely a combination of low flows and hot summertime temperatures. Channel dams along this stretch can impound water and create periods of zero flow.

AU 0822_02, a 7.5 mile stretch centering on the Dallas Water Utilities intake, was identified in the 5-year analysis as having a Concern for low dissolved oxygen. The low values in this dataset are generally in the hot summer months. Although no water volume or velocity data is available prior to 2007, field observations note that it is not uncommon to have zero flow during the summer in this segment due to a channel dam further downstream.

General Use: The lower 11 miles and upper 1.5 miles of 0822 have a Concern for chlorophyll-a on the 2008 and Draft 2010 Assessments. Additionally, the upper 1.5 miles showed a Concern on the 5-year analysis . For the Draft 2010 Assessment, half (44) of the 86 values assessed were above the screening level of 14.1 µg/L.

Contact Recreation Use: This segment was Non-Supporting for fecal coliform in the 2008 Assessment. On the Draft 2010 Assessment, analysis of E. coli samples resulted in a Fully Supporting designation and a delisting for bacteria.

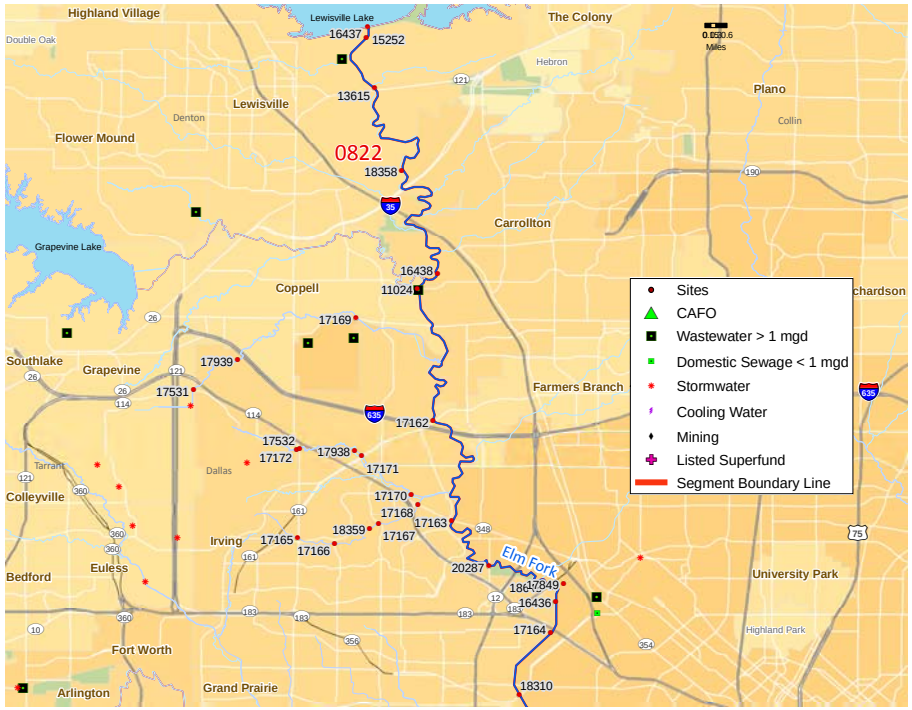


Figure H.9. Map of Segment 0822.

Public Water Supply: Fully Supporting

Fish Consumption Use: Fully Supporting

Assessment (Unclassified Segments):

Aquatic Life Use: The 5-year analysis for Hackberry Creek (0822C) showed a Concern for low dissolved oxygen and may indicate a future listing and changing water quality conditions (fig. H.10). Monitoring entities were notified of this concern.

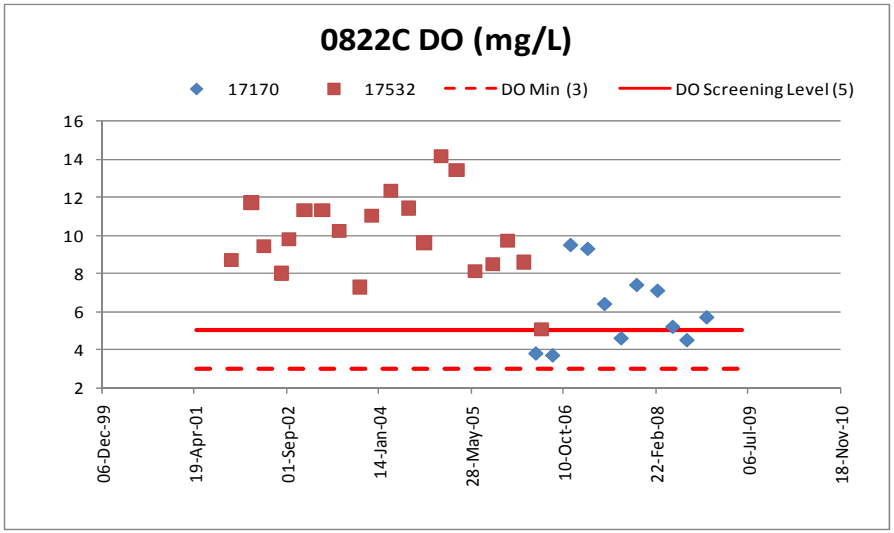


Figure H.10. Dissolved Oxygen in Segment 0822C .

General Use: Chlorophyll-a is a Concern for several of the segments. Cottonwood Branch shows a Concern on all three methods, Hackberry Creek shows a Concern for the 5-year analysis, and Ski Lake showed a Concern for the 2008 Assessment and was carried forward to the Draft 2010 Assessment.

Contact Recreation Use: Grapevine Creek is Non-Supporting for bacteria. Sources are likely NPS runoff in this highly urbanized watershed. Cottonwood Branch and Hackberry Creek were delisted for bacteria in the Draft 2010 Assessment. See the Bacteria Issues section for information related to those discussed above.

Public Water Supply: Not Assessed

Fish Consumption Use: Fully Supporting

Trend Analysis Overview

53 trends were identified for this segment. For additional trend methods and results, see the Data Review Methods appendix. Generally, a basin with a high number of trends indicates that water quality is changing and should be closely monitored in the future.

Trends (Classified Segments):

Site 17163 (AU 0822_01) showed an upward trend for Summer DO. Although the dataset met all of the requirements for trend analysis, it only represents two summer periods and is probably not useful for prediction of improving water quality. Hardness values are decreas-

Trends Key

A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Elm Fork		Amm			ChlA			Copper			DO			E.coli			Hard			pH			Sulfate			TDS Calc			TDS Meas			TP			W.Temp		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0822_01	17163											UP						DN	UP																		
0822_02	17162	DN	DN	DN						UP					DN																						
0822A_01	17168																	DN																			
0822A_01	18359																DN																				
0822A_02	17165													DN	DN		UP	UP	UP	UP																	
0822A_02	17166	DN	DN	DN											DN																						
0822B_01	17939	DN	DN	DN		DN			UP																							DN	DN	DN			UP
0822C_01	17170	DN	DN	DN				UP	UP	UP																											
0822C_01	17172					DN												UP																			
0822C_01	17532																								UP						UP						
0822C_01	17938	DN	DN	DN	DN		DN		UP								DN	DN		DN	DN								DN	DN							
0822D_01	17849																										UP										

Table H.5. Trends in Segment 0822.

ing in the summer and increasing in the winter, but no trend was identified for the period of record. Causes and sources are unknown.

Site 17162 (0822_2) shows significant downward trends for ammonia. Ammonia is often associated with wastewater effluent in urban areas. Although causes for the decrease are unknown, they are likely due to improving treatment at upstream WWTPs, repair of sewage pipelines, or repair of residential septic systems. A weak downward trend was identified for summer E. coli values at this location. In the urban areas of DFW, E. coli values tend to vary greatly across time. If the decrease in ammonia is based on repaired septic systems or sewer lines, this trend could represent a real decrease in E. coli. It is likely, however, that the trend, or possible trend, does not represent a real water quality improvement. For additional information, see the Bacteria Issues section.

A strong trend for winter dissolved copper was also found at site17162 (AU 0822_2). Further investigation revealed that the trend is unreliable and is likely due to censoring of the data.

Trends (Unclassified Segments):
Sites 17166, 17939, 17170, and 17938 are all in highly urbanized watersheds and all showed downward trends for ammonia for POR, Summer, and Winter (fig. H.11). All sites, except 17166 and 17939, showed a defined upward spike in measurements in 2003 followed by a reduction. Causes for the spikes are unknown but the spatial distribution of these sites suggest that the reductions are based reductions of NPS inputs.

All trends identified for Copper are due to censoring of data for non-detects and detected values are significantly below standards.

Hardness values for Cottonwood Branch (0822A) show downward trends at the two downstream sites and upward trends at the upstream site. Local CRP partners were contacted and more recent

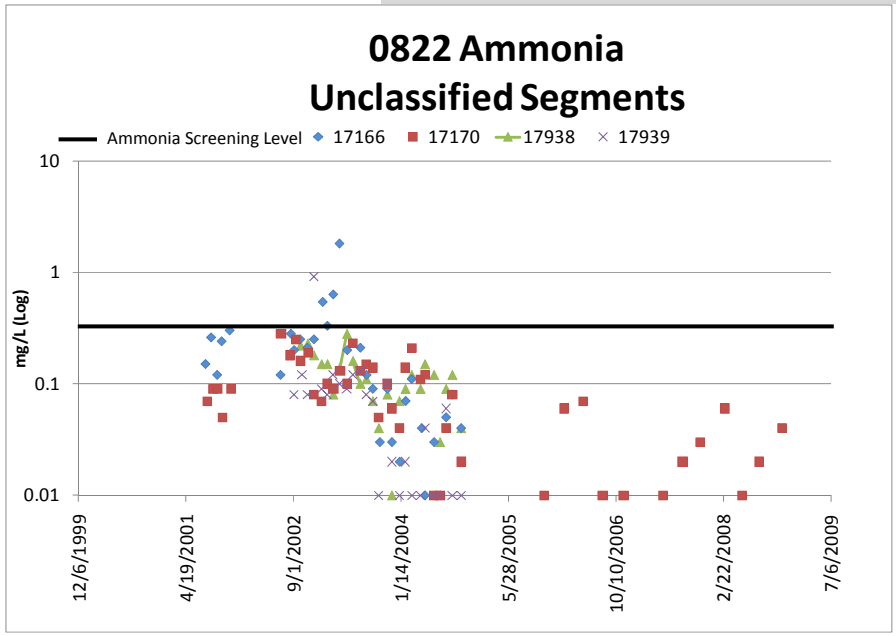


Figure H-11. Ammonia Trends in the Unclassified Segments of 0822.

data shows hardness values have decreased over the last three years. Causes are unknown.

Winter trends for both sulfate and TDS Measured were identified for site 17532 (fig. H.12). Trends were found to be significant and values for each constituent are very high. Additionally, since both parameters agree and pertain to dissolved solids, it is likely trends are real. This site is downstream of DFW Airport property. City of Irving field personnel advised that the site is a concrete lined channel that comes out of an underground pipe which is assumed to originate on airport property. DFW environmental personnel advised exact sources are unknown, but are likely naturally occurring based on the rock type and Blackland Prairie soils. There are no listed standards for sulfate on those segments.

Site 17939 shows increasing trend values for total phosphorous. Sources are unknown, but are likely NPS runoff.

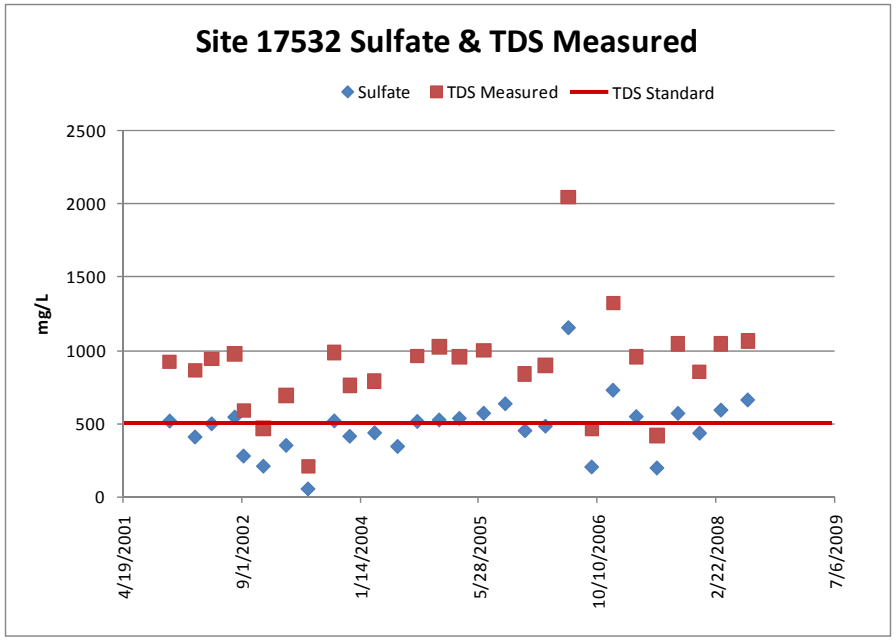
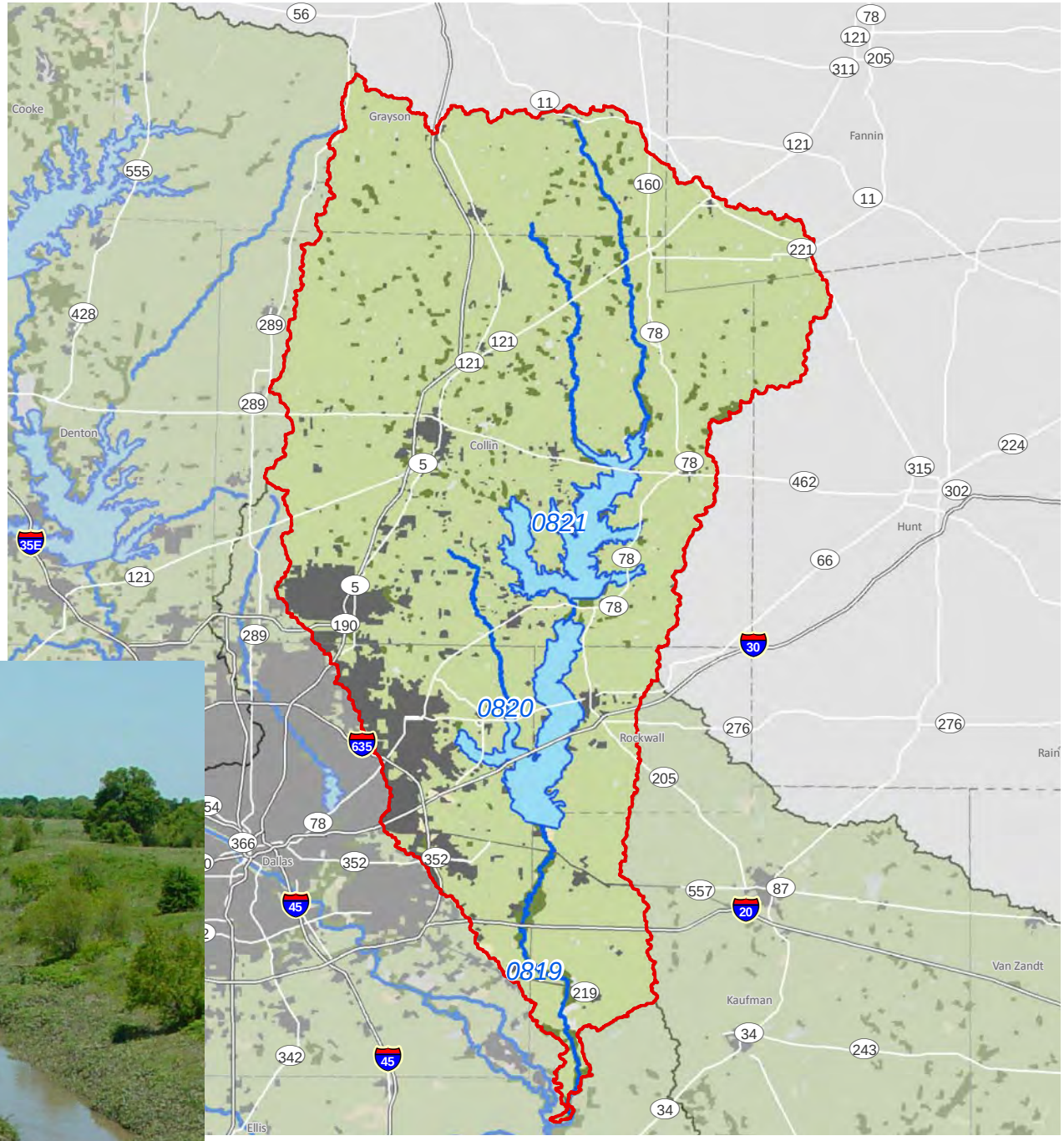


Figure H.12. Sulfate and TDS Values at Site 17532.

East Fork

Land Use Type

- Crop/Pasture/Other Agricultural
- Forest
- Rangeland
- Urban/Industrial/Residential



EAST FORK TRINITY RIVER

Classified Segments – 3
Unclassified Segments – 9

0821 – Lake Lavon
0821A – Pilot Grove Creek
0821B – Sister Grove Creek
0821C – Wilson Creek
0821D – East Fork Trinity River Above Lake Lavon
0820 – Lake Ray Hubbard
0820A – Cottonwood Creek
0820B – Rowlett Creek
0820C – Muddy Creek
0819 – East Fork Trinity River
0819A – Duck Creek
0819B – Buffalo Creek

Sites Used for Analysis:

2008 Assessment	15
Draft 2010 Assessment	27
5-Year Analysis	25
Valid Trends	20

East Fork - Count of Discharges by Type and County

County	Cooling Water	Domestic Sewage <1mgd	Mining	Stormwater	Wastewater >1 mgd	CAFO	Total Dischargers
COLLIN		23			4	1	28
DALLAS					4		4
FANNIN		2					2
GRAYSON		4					4
KAUFMAN		4			4		8
ROCKWALL		1		1	2		4
Total		34		1	14	1	50

Table I.1. Count of Dischargers for East Fork Subwatershed.

The East Fork Trinity River subwatershed extends approximately 107 river miles from Grayson County to the confluence with the Main Stem Trinity in Kaufman County. The subwatershed is primarily rural with row crop agriculture but is highly urbanized around Lake Ray Hubbard. Major population centers include the cities of McKinney and Rockwall as well as the communities of the Eastern DFW Metroplex. Water supply permits for Lake Lavon and Lake Ray Hubbard are held by NTMWD and the City of Dallas, respectively.

This subwatershed receives between 36 and 44 inches of precipitation annually and lies within the Blackland Prairie ecoregion which is typified by flat terrain.

The McKinney Smelting, Inc. site in McKinney is monitored by EPA's RCRA program. Special projects in this subwatershed include Envirocast, the Statewide Fish Tissue Monitoring Program, the North Texas Municipal Water District East Fork Monitoring Program, the 24 Hour DO and Use Attainment Initiative, and the Seven Lakes Atrazine Project. These projects are discussed in more detail in the Special Projects chapter.

Segment 0821 – Lake Lavon

Overview

This 21,400 acre segment impounds the East Fork Trinity River up to a normal pool elevation of 492 feet. 0821 is located entirely within the Blackland Prairie ecoregion and the land use is classified mostly as agriculture/pasture with large sections of urban development.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: The lowermost portion of this segment (0821_01) was found to have a Concern for nitrate on the 2008 Assessment. This Concern was carried forward into the Draft 2010 Assessment.

The screening level of 0.37 mg/L for nitrate is exceeded when lake elevations are up. Observed values of nitrate fall when the lake elevation falls (fig. I.1). This pattern is seen in other nutrient and conventional parameters in the lake and indicates that nitrate and other nutrients and conventionals are introduced into the lake during precipitation events. Exact causes and sources are unknown, but there are several wastewater dischargers around the reservoir as well as several small communities on the shores that may be contributing to the nitrate levels seen in the reservoir.

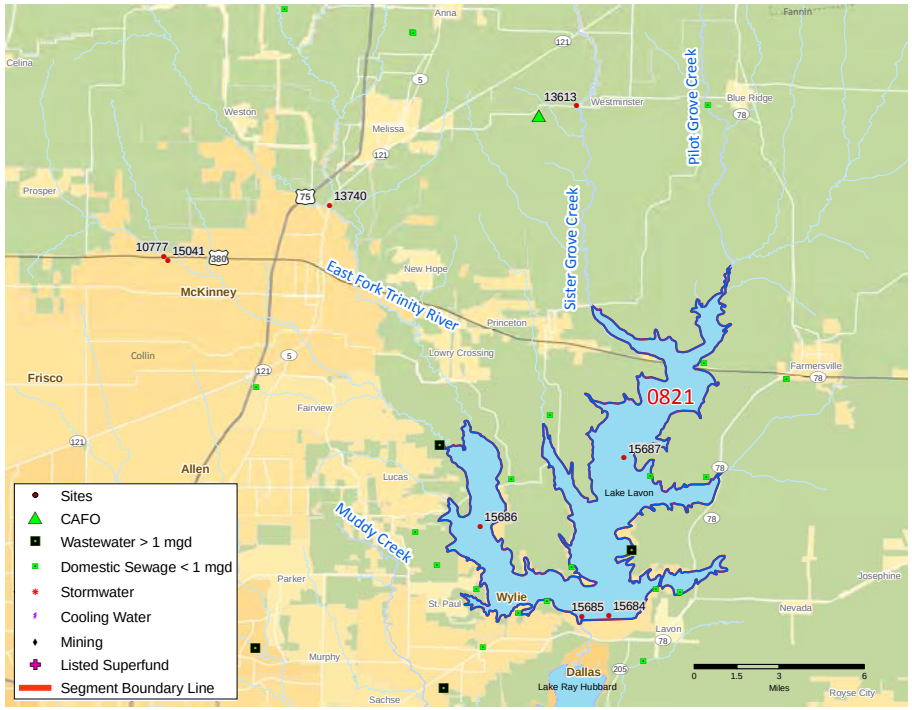


Figure I.2. Map of Segment 0821.

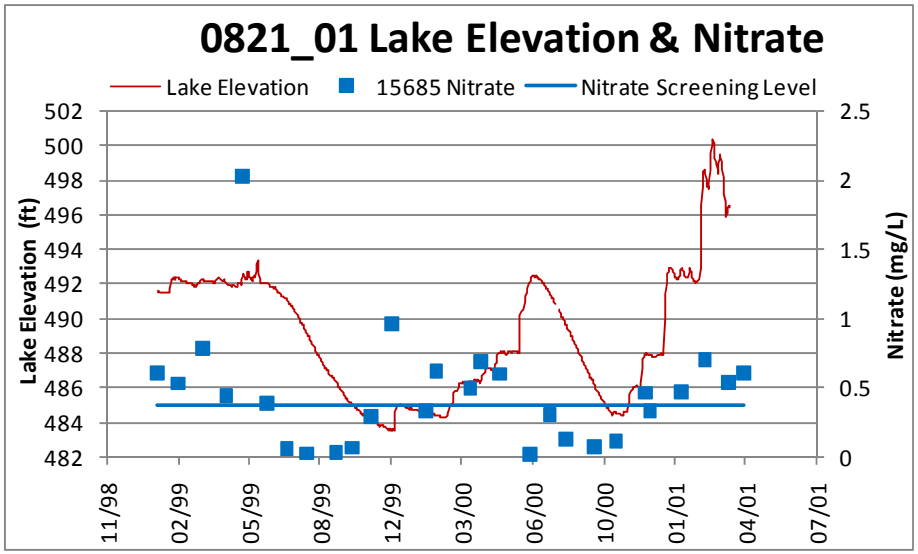


Figure I.1. Lake Elevation and Nitrate in Segment 0821_01

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Fully Supporting, No Concern, or Not Assessed

Fish Consumption Use: Not Assessed

Assessments (Unclassified Segments):
Aquatic Life Use: 0821C and 0821D were found to be Fully Supporting by the Draft 2010 Assessment. However, although the data sets are limited, the 5-year analysis found a Concern for depressed DO (figs. I.3 and I.4). DO in these unclassified segments falls below standards when streamflows are below 1 cfs.

General Use: Fully Supporting, No Concern, or Not Assessed

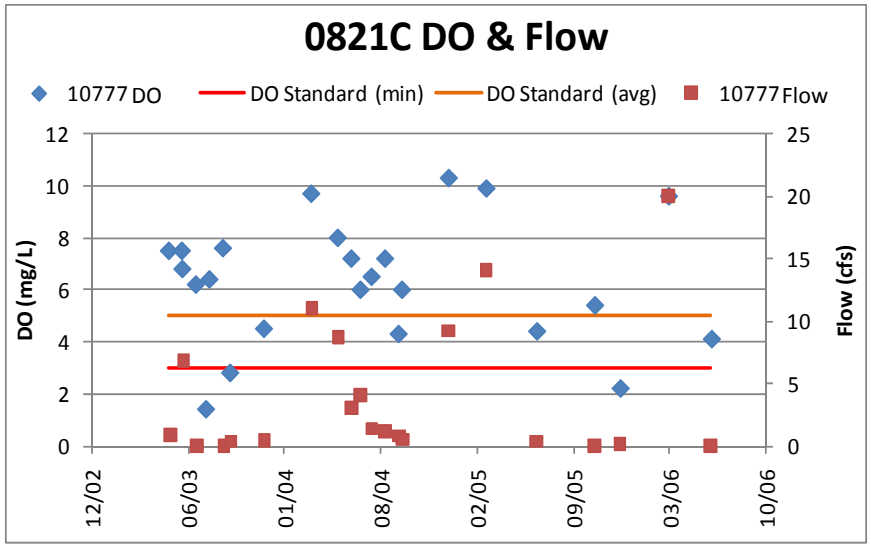


Figure I.3. DO and Flow in Segment 0821C.

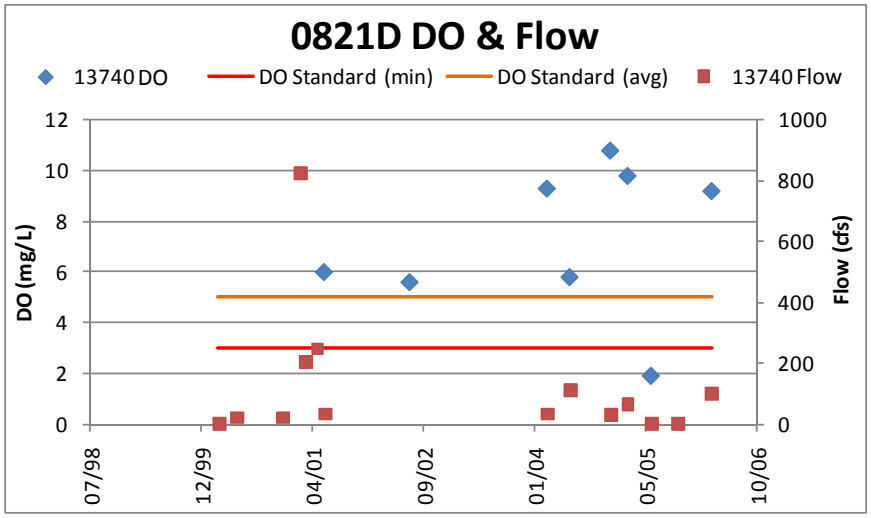


Figure I.4. DO and Flow in Segment 0821D.

Contact Recreation Use: 0821C and 0821D were found to be Non-Supporting due to elevated E. coli levels on the Draft 2010 Assessment. These findings are supported by the 5-year analysis.

Figures I.5 and I.6 show E. coli and flow for 0821C and 0821D. Both Wilson Creek (0821C) and the East Fork Trinity River above Lake Lavon (0821D) flow through large areas of row crop fields that are sparsely populated and have wooded riparian strips on either side of the stream bed. Elevated E. coli levels do not necessarily occur during high flow situations. Likely sources of E. coli in these unclassified segments include failing septic systems and wildlife.

Public Water Supply Use: Not Assessed

Fish Consumption Use: Not Assessed

Trend Analysis Overview

There were no trends identified in this segment.

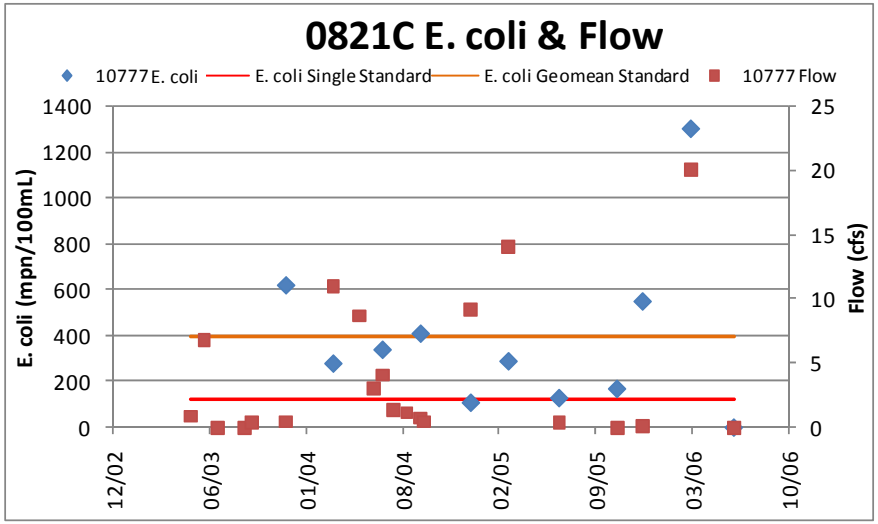


Figure I.5. E. coli and Flow in Segment 0821C.

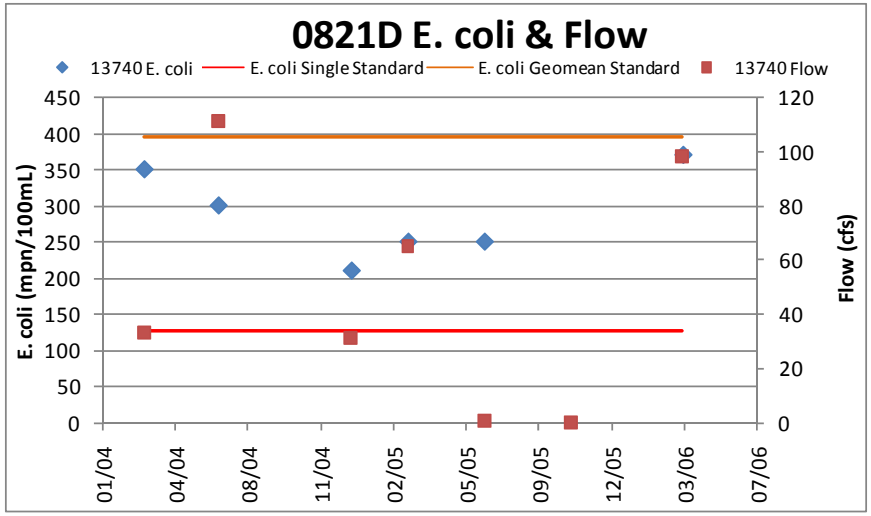


Figure I.6. E. coli and Flow in Segment 0821D.

Segment 0820 – Lake Ray Hubbard

Overview

This 22,745 acre segment impounds the East Fork Trinity River from Rockwall-Forney Dam to Lavon Dam in Collin County up to a normal pool elevation of 435.5 feet. Land use classifications are generally urban to the west and agriculture/pasture to the east. Watershed and shoreline development is increasing at a high rate. This segment is located entirely within the Blackland Prairie ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: The lower and middle portions of the East Fork arm of the reservoir were found to have Concerns for chlorophyll-a by the 2008 Assessment. These Concerns were carried forward into the Draft 2010 Assessment. The TCEQ report, Trophic Classification of Texas Reservoirs, classified Lake Ray Hubbard as hypereutrophic. This report notes that reservoirs "become more eutrophic as they age" due to the build-up of nutrients in the reservoir. Lake Ray Hubbard was completed in 1969 and reached full capacity in 1970, making the reservoir approximately 40 years old. Figure I.7 shows chlorophyll-a and nitrate data for the lower and middle portions of the reservoir (0820_01 and 0820_02). A majority of the chlorophyll-a data are above the screening level.

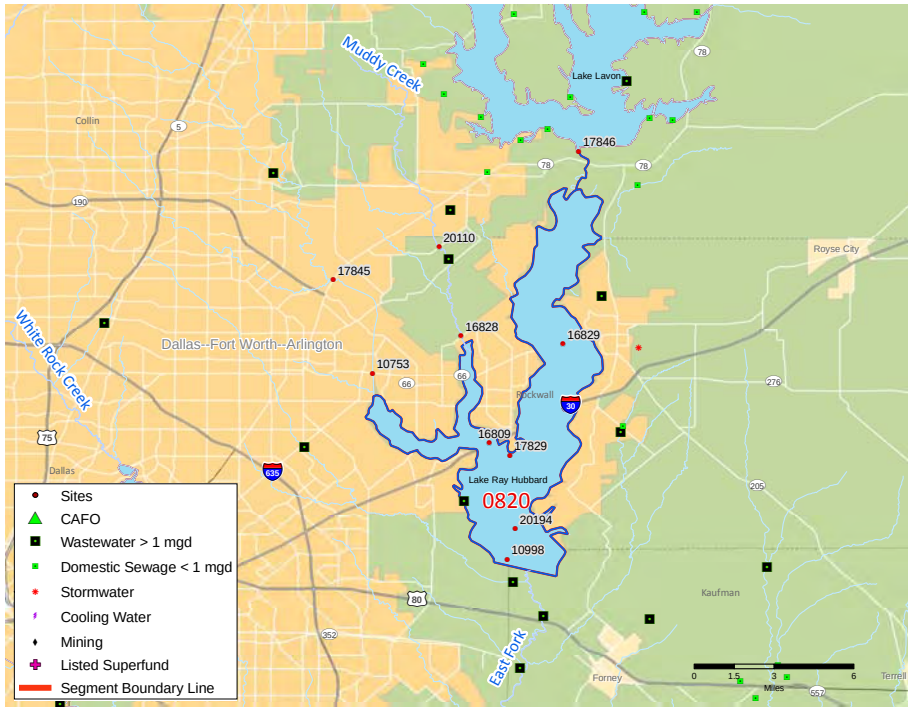


Figure I.8. Map of Segment 0820.

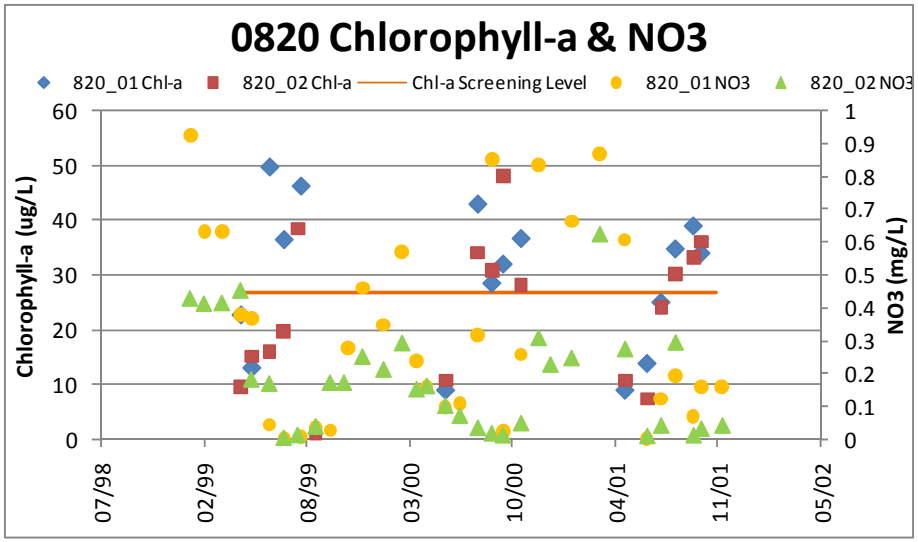


Figure I.7. Chlorophyll-a and Nitrate in Segment 0820.

The lower portion of the East Fork arm (0820_01) and the lower and middle portion of the main body of the reservoir (0820_04 and 0820_05) were found to have Concerns for nitrate in the 2008 Assessment. These Concerns were carried forward into the Draft 2010 Assessment. Nitrate correlates very well with lake elevation indicating that a potential source of nitrate is runoff (fig. I.9). Exceedances of the 0.37 mg/L screening level typically occur during rises in lake elevation. The shores and area surrounding Lake Ray Hubbard are heavily urbanized and residential fertilizers may be contributing to runoff and affecting nitrate levels in the reservoir. In addition, there

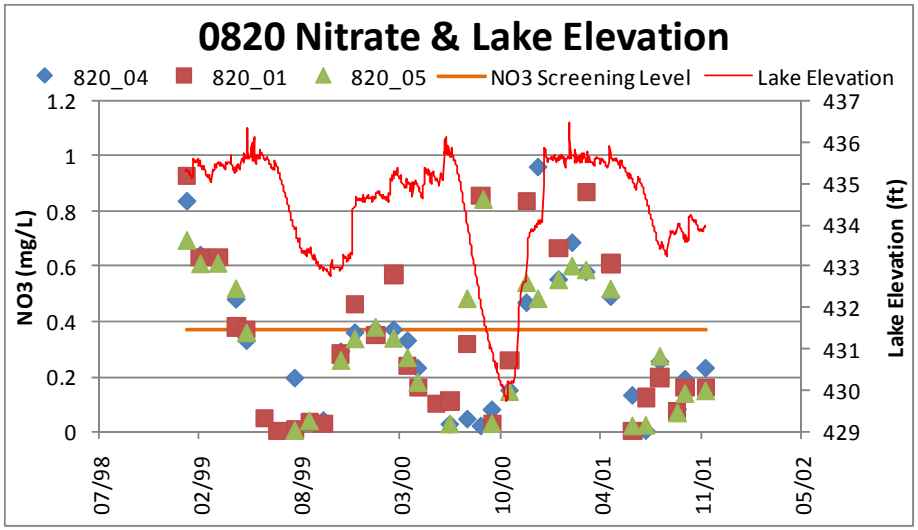


Figure I.9. Nitrate and Lake Elevation in Segment 0820.

are several wastewater treatment plants that discharge into tributaries of the reservoir.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Fully Supporting

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed

Assessments (Unclassified Segments):
Aquatic Life Use: 0820C was found to have Concerns for depressed DO by both the 2008 and Draft 2010 Assessments as well as the 5-year analysis.

DO data that were regularly below the standards occurred during a three year period from the summer of 2002 to the summer of 2004 (fig. I.10). After this time, the DO data begin to trend upward. 2002 and 2004 had higher than average yearly precipitation totals and cooler than average yearly average temperatures as measured at DFW International Airport. There are no chlorophyll-a data to determine if excessive algal growth is the cause of the low DO values observed during this time period. As expected, DO correlates well with water temperature. Further investigation showed that there was a weak correlation between turbidity and DO. However, this correlation is based on a two year period of data where turbidity, DO, and days since precipitation were concurrently available. Turbidity increased while DO decreased during precipitation events. Data for days since precipitation is available throughout the dataset and continued to show drops in DO during precipitation events. The increasing turbidity during precipitation events indicates sediments that are stirred-up or washed in may be the cause of low DO observations.

Alternative causes may include runoff of oxygen demanding substances or mixing of stratified layers if the stream is deep and slow moving. Further investigation and sampling is needed to determine

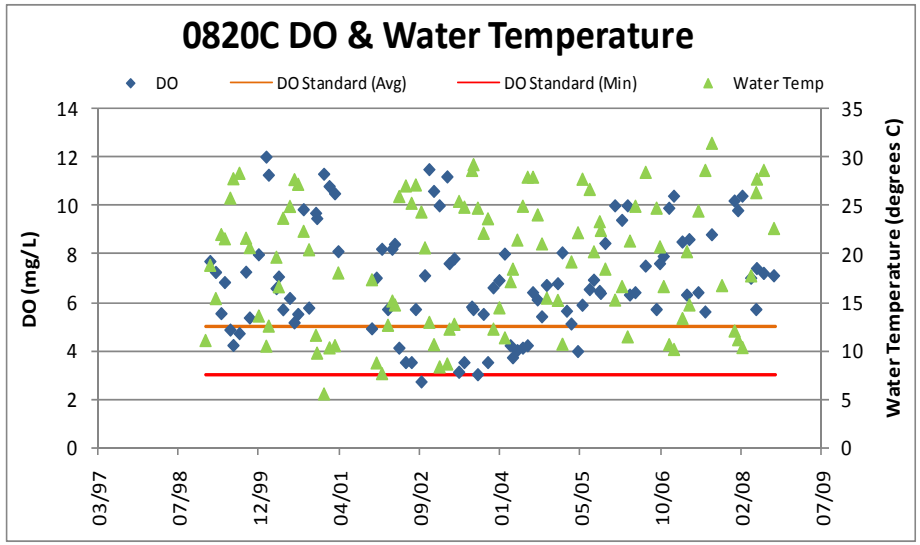


Figure I.10. DO and Water Temperature in Segment 0820C.

the morphology and hydrology of the stream and if any of these possibilities are occurring. Low DO observed during this time period may have been caused by activities in the watershed which are no longer occurring.

General Use: 0820C was found to have Concerns for nitrate by the 2008 Assessment. This Concern was carried forward into the Draft 2010 Assessment. 0820B was found to have a Concern for nitrate in the Draft 2010 Assessment.

Nitrate in Rowlett Creek and Muddy Creek are routinely above the screening level of 1.95 mg/L (fig. I.11). The sites used in the graph are located just upstream of the reservoir. As discussed above for Lake Ray Hubbard General Uses, the heavily urbanized area surrounding these streams may be contributing to the high nutrient levels observed via residential fertilizer runoff and wastewater effluent.

Contact Recreation Use: 820C was found to be Non-Supporting due to elevated levels of bacteria by both the 2008 and Draft 2010 Assessments. 820B was found to be Non-Supporting by both the Draft 2010 Assessment and the 5-year analysis. A possible source of bacteria into these streams is runoff from the surrounding residential areas.

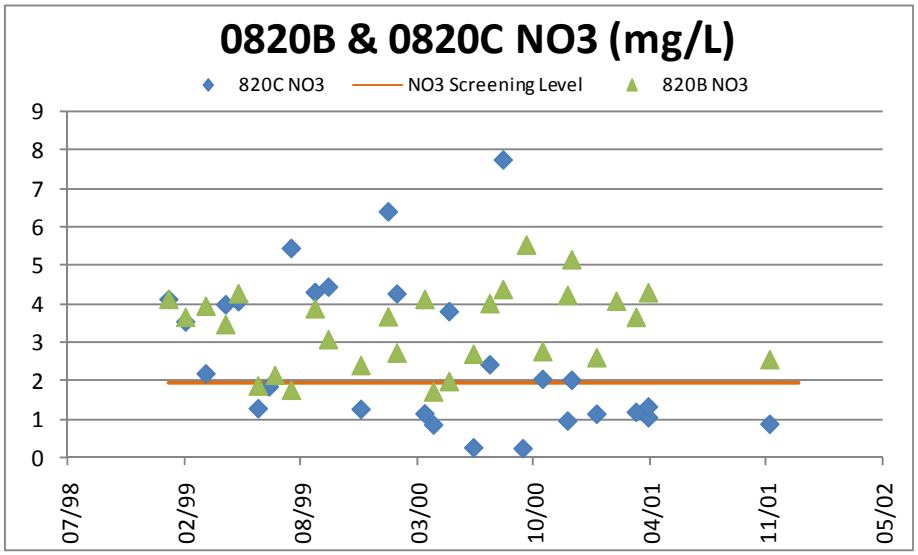


Figure I.11. Nitrate Values in Segments 0820B and 0820C.

Public Water Supply Use: Not Assessed

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed

Trend Analysis Overview

7 trends were identified in this segment. For additional detail on trend methods and results, see the Data Review Methods appendix.

East Fork		pH			S.Depth			TDS Calc		
Seg_AU	Site	A	S	W	A	S	W	A	S	W
0820_04	10998				UP	UP				
0820C_01	16828			DN						UP
0820B_01	17845							UP	UP	UP

Table I.2. Trends in Segment 0820.

Trends Key

A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)

UP Increasing Trends

DN Decreasing Trends

Trends (Classified Segments):

Secchi depth is increasing in the lower portion of the reservoir (0820_04). The clarity in this portion of the reservoir has increased from approximately 0.75 m in 2003 to 1 m in 2005.

Trends (Unclassified Segments):
Both Rowlett Creek (0820B_01) and Muddy Creek (0820C_01) have upward trends in TDS. There are no water imports into these creeks nor significant agricultural irrigation drainage that may account for the increasing trend (fig. I.12). However, there is a clear increase toward the end of 2006 followed by a decrease and leveling out of the data. These increases and subsequent decreases in observed values coincide with the severe drought in this area which was broken in 2007. Along with geology, the lack of rainfall and evaporation of surface water is the most likely cause of the increasing trends seen in these segments.

pH in Muddy Creek (0820C_01) has a downward trend for winter months. There are no chlorophyll-a data available at this site to determine if excessive algal growth is the cause of the declining trend. At the current rate of decline, this segment could be expected to fall below the 6.5 SU minimum standard within the next 20 years.

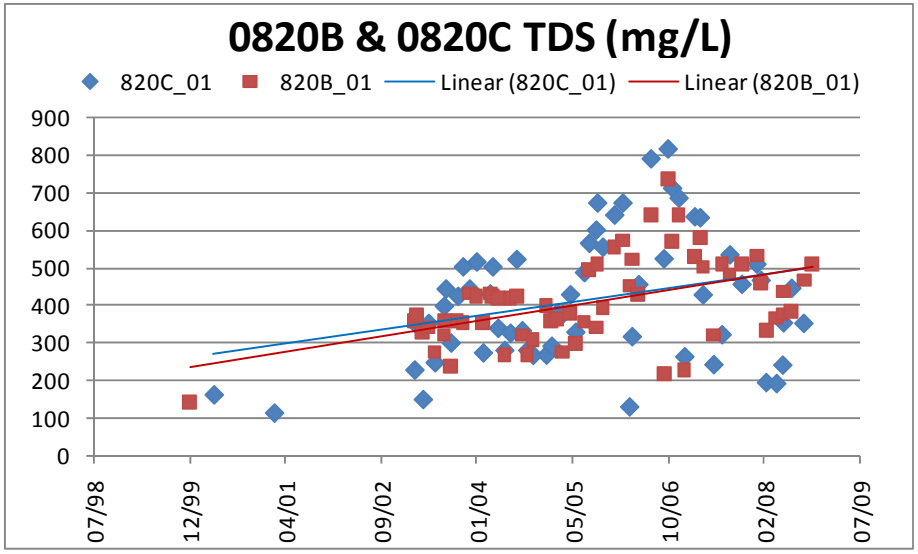


Figure I.12. TDS Trends in Segments 0820B and 0820C.

Segment 0819 – East Fork Trinity River

Overview

This 30 mile segment stretches from the confluence of the Main Stem Trinity River in Kaufman County up to the Rockwall-Forney Dam in Kaufman County. Land use is generally classified as agriculture/ pasture throughout the watershed with a significant portion of the riparian areas classified as forest. This segment is located entirely within the Blackland Prairie ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: This segment was found to be Non-Supporting due to elevated levels of chloride, TDS, and sulfate (fig. I.13) identified on both the 2008 and Draft 2010 Assessments and the 5-year analysis. Each of these parameters follows the same pattern which is also seen in the TDS graph for 0820B and 0820C (fig. I.12). Similarly, the peak in these parameters occurs during the drought of 2005 and 2006. However, there appears to be another increase or peak forming at the end of the data set. A possible cause for the elevated measurements is agricultural irrigation runoff in addition to geology, lack of rainfall, and surface water evaporation.

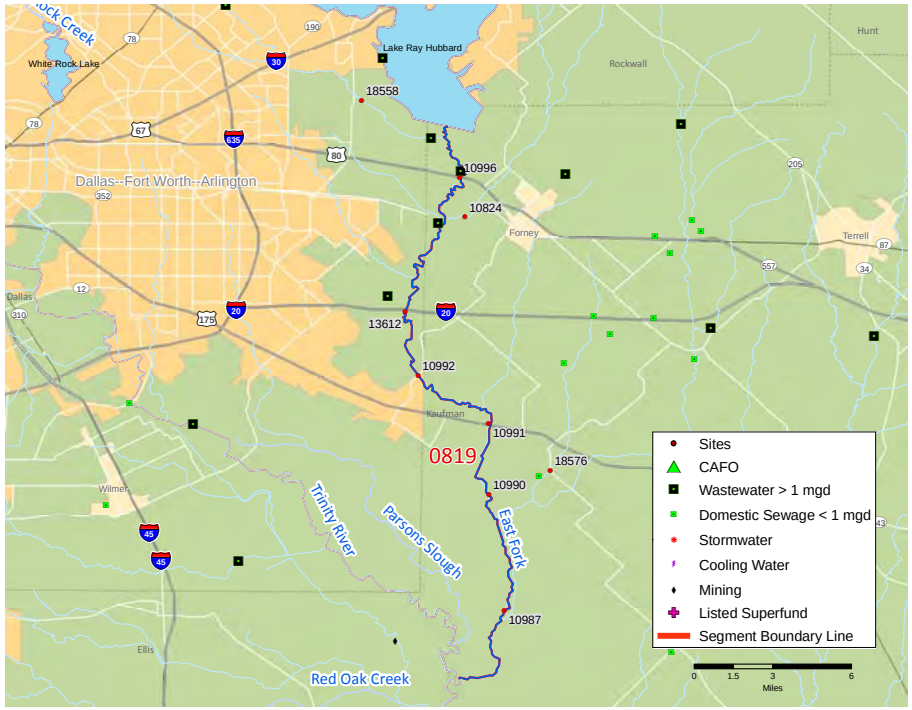


Figure I.14. Map of Segment 0819.

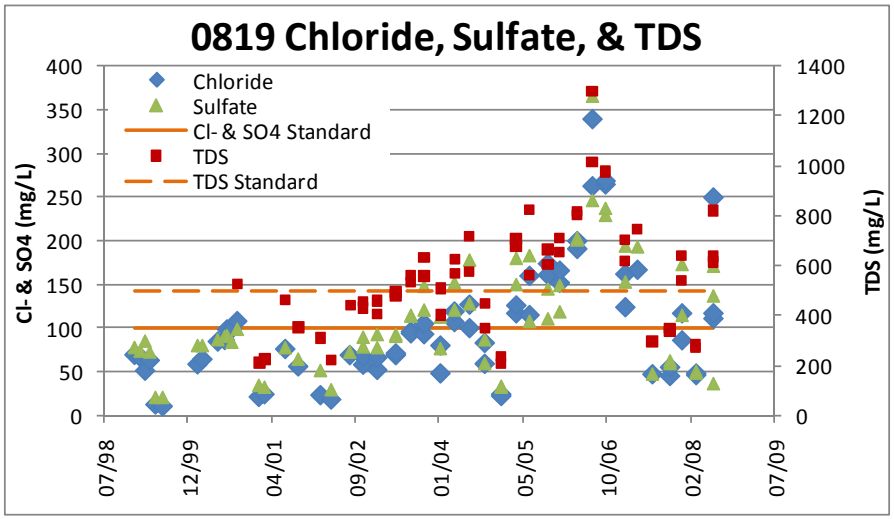


Figure I.13. Chloride, Sulfate, and TDS in Segment 0819.

Concerns for chlorophyll-a and nutrients were found using all three methodologies. Chlorophyll-a values were below the 14.1 ug/L screening level for most of the dataset. However, spikes in the observed values, which occurred in 2002 and from the summer of 2004 to the summer of 2005, result in the Concern. Nutrient values are consistently above screening levels. Several municipal wastewater treatment facilities discharge into this segment. Nutrients from these facilities and agricultural fertilizer runoff are likely sources of elevated nutrients. Corresponding increases in nutrients do not account for spikes in chlorophyll-a. Figure I.15 suggests that changes in Secchi depth correspond to the spikes in chlorophyll-a such that when the clarity of the water increases, chlorophyll-a levels increase.

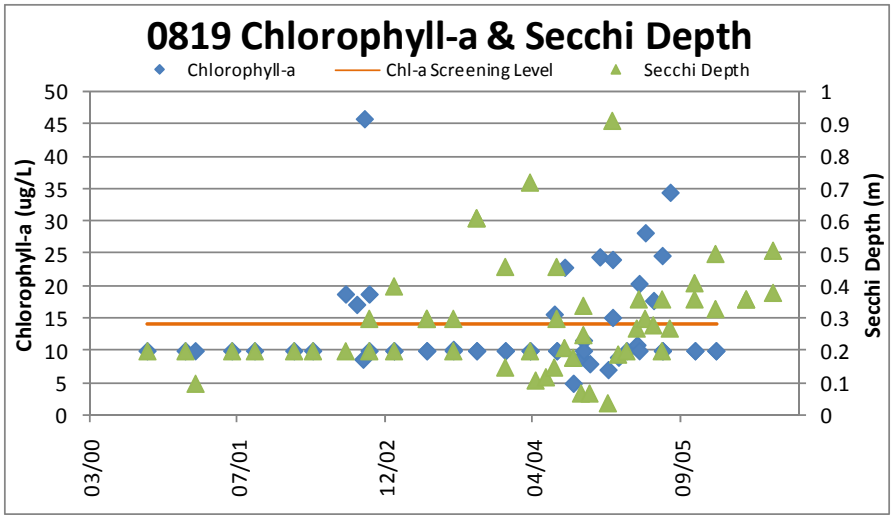


Figure I.15. Chlorophyll-a and Secchi Depth in Segment 0819.

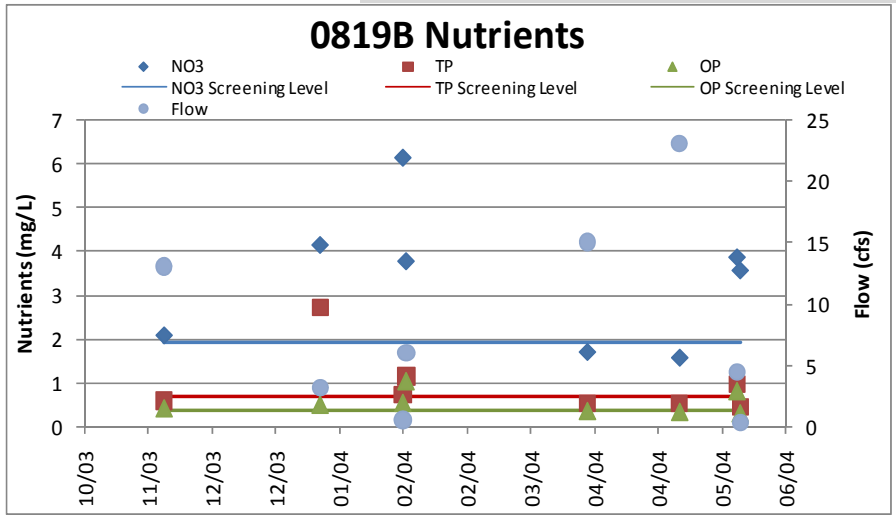


Figure I.16. Nutrients in Segment 0819B.

Chlorophyll-a values in this segment are likely light limited, not nutrient limited. Additionally, water clarity does not appear to be flow related.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed.

Public Water Supply Use: Not Assessed

Fish Consumption Use: Not Assessed

Assessments (Unclassified Segments):
Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: 0819B (Buffalo Creek) was found to have Concerns based on limited data for nitrate, OP, and TP by the Draft 2010 Assessment. There appears to be a slight negative correlation between flow and observed nutrient values (fig. I.16). Many values are very near to, or above, their respective screening levels for most of the data set indicating a fairly constant source of nutrients. Several dischargers release treated effluent into Buffalo Creek which adds nutrients. The negative correlation of flow and nutrients may be due to the dilution effect of the added flow during wet weather and the predominance of effluent in the stream during dry weather.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Not Applicable

Fish Consumption Use: Not Assessed

Trend Analysis Overview

There were 13 trends identified in this segment. For additional detail on trend methods and results, see the Data Review Methods appendix.

East Fork		Amm			Chloride			E.coli			S.Depth			Sulfate			TDS Meas			TP		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0819_01	10990								UP													
0819_01	10991	UP			UP						UP	UP	UP	UP	UP	UP	UP		UP			UP
0819_01	10996	DN																				

Table I.3. Trends in Segment 0819.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Trends (Classified Segments):

Trends for chloride, sulfate, and TDS are discussed under General Use of the Assessments section for this segment and displayed in Figure I.13. Data for the strong increasing trend (R^2 > 0.43) in Secchi depth are discussed in the same section and are shown in Figure I.15. Further investigation is needed to determine the cause of the increasing clarity of this segment due to the apparent light limited nature of the chlorophyll-a.

The increasing trend in E. coli occurs in the summer months at site 10990 (fig. I.17). The data here are influenced by the long period of dry weather followed by a wet period (as shown by the USGS East Fork Trinity River at Crandall gage) where E. coli levels increase. Due to the runoff influenced nature of the data, the most likely sources of E. coli in this segment are livestock and wildlife.

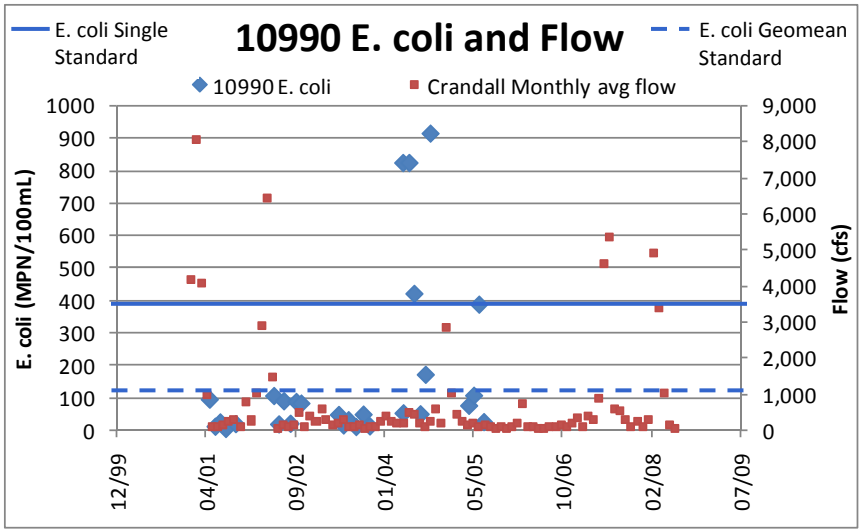


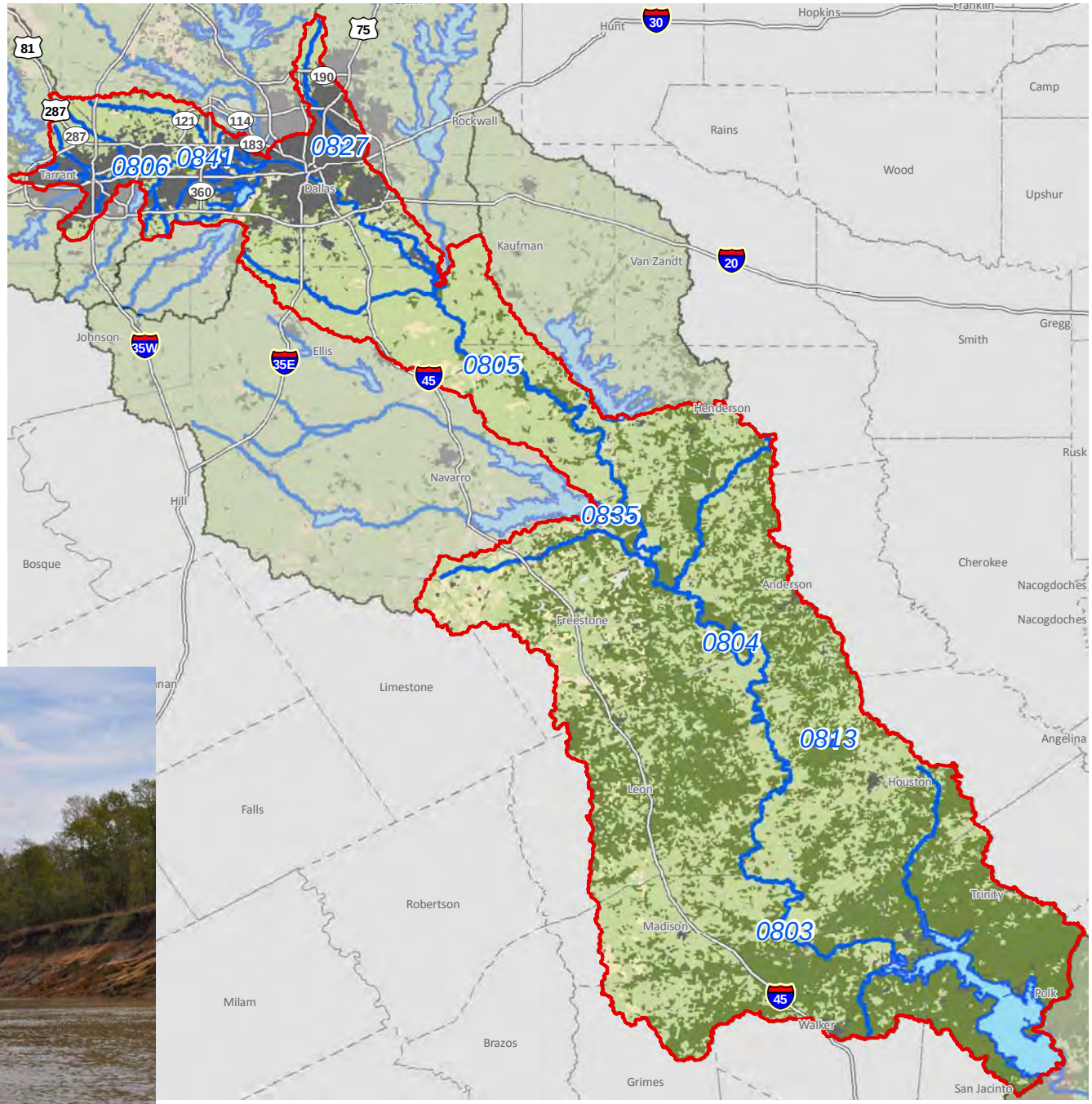
Figure I.17. E. coli and Flow at Site 10990.

Ammonia shows a weak decreasing trend (R^2 < 0.2) at 10996 and a weak increasing trend (R^2 < 0.2) at 10991. TP also shows a weak (r^2 < 0 .13) increasing trend at 10991. 10996 is the most upstream site in this segment and appears to be more influenced by the water quality leaving Lake Ray Hubbard than by the inputs from the watershed that can be seen at site 10991. As discussed in the General Use section, there are several discharges in this segment as well as agricultural fertilizer runoff that may be influencing nutrient levels. Some spikes in nutrients are correlated to increased flow events, however, the most likely source of increasing nutrients in the segment are increased flows from dischargers as a result of increasing populations.

Main Stem

Land Use Type

- Crop/Pasture/Other Agricultural
- Forest
- Rangeland
- Urban/Industrial/Residential



MAIN STEM TRINITY RIVER

Classified Segments – 8
Unclassified Segments – 50

0806 – West Fork Trinity River Below Lake Worth
0806A – Fosdic Lake
0806B – Echo Lake
0806C – Big Fossil Creek
0806D – Marine Creek
0806E – Sycamore Creek
0806F – Little Fossil Creek
0841 – Lower West Fork Trinity River
0841A – Mountain Creek Lake
0841B – Bear Creek
0841C – Arbor Creek
0841D – Big Bear Creek
0841E – Copart Branch Mountain Creek
0841F – Cottonwood Creek
0841G – Dalworth Creek
0841H – Delaware Creek
0841I – Dry Branch Creek
0841J – Estelle Creek
0841K – Fish Creek
0841L – Johnson Creek
0841M – Kee Branch
0841N – Kirby Creek
0841O – Mountain Creek
0841P – North Fork Cottonwood Creek
0841Q – North Fork Fish Creek
0841R – Rush Creek
0841S – Vilbig Lakes
0841T – Village Creek
0841U – West Irving Creek
0841V – Crockett Branch
0827 – White Rock Lake
0827A – White Rock Creek above White Rock Lake
0827B – White Rock Creek below White Rock Lake
0805 – Upper Trinity River
0805A – Red Oak Creek
0805B – Parsons Slough
0805C – White Rock Creek below White Rock Lake
0805D – Five Mile Creek
0835 – Richland Creek below Richland-Chambers Reservoir
0804 – Trinity River Above Lake Livingston
0804A – Box Creek
0804B – Keechi Creek
0804C – Mims Creek
0804D – Toms Creek
0804E – Northwest Branch
0804F – Tehuacana Creek
0804G – Catfish Creek
0804H – Upper Keechi Creek
0804I – Big Brown Creek
0804J – Fairfield Lake
0813 – Houston County Lake
0803 – Lake Livingston
0803A – Harmon Creek
0803B – White Rock Creek
0803C – Turkey Creek
0803D – Parker Creek
0803E – Nelson Creek
0803F – Bedias Creek

Sites Used for Analysis:

2008 Assessment	45
Draft 2010 Assessment	159
5-Year Analysis	160
Valid Trends	58

Main Stem - Count of Discharges by Type and County							
County	Cooling Water	Domestic Sewage <1mgd	Mining	Stormwater	Wastewater >1 mgd	CAFO	Total Dischargers
ANDERSON		5				4	9
DALLAS		13		3	6	1	23
ELLIS		1	1		1		3
FREESTONE	1	8	1		4		14
GRIMES		2					2
HENDERSON		5			2		7
HOUSTON		5		1	2	1	9
KAUFMAN		1					1
LEON		5					5
MADISON		3		3	1	1	8
NAVARRO		2				1	3
POLK		7					7
SAN JACINTO		7					7
TARRANT		4		6	4		14
TRINITY		13					13
WALKER		3			2	1	6
Total	1	84	2	13	22	9	131

Table J.1. Count of Dischargers for Main Stem Subwatershed.

The Main Stem Trinity River runs 421 miles from the Lake Worth Dam past the confluence with the Clear Fork just north of downtown Fort Worth. It flows east through the mid-cities of the Dallas-Fort Worth Metroplex before being joined by the Elm Fork. South of Dallas, the East Fork connects to the Main Stem and it continues 200 miles south to headwaters of Lake Livingston near the city of Crockett. The Main Stem terminates at the Lake Livingston Dam which crosses Polk and San Jacinto counties. In general, the Main Stem is highly urbanized and developed in the upper reaches around the DFW Metroplex. It becomes more rural with row crop agriculture as the river travels south to Trinidad, Palestine, and Crockett.

Through much of the DFW Metroplex, the Main Stem Trinity River has been channelized and leveed. Development along the urbanized portions of the river is taking place. The City of Fort Worth has created the Trinity River Vision which plans for an urban lake and development along the shoreline near downtown Fort Worth. The City of Dallas has begun construction on the Trinity River Corridor Project which will recreate natural meanders between the levees in the downtown area. Additionally, plans call for the creation of a series of urban and natural lakes to promote economic development and increase recreational opportunities along the river.

The Main Stem subwatershed averages 32 inches of rain per year in the upper portion of the watershed and 50 inches in the south. The subwatershed begins in the Grand Prairies before flowing through the Eastern Cross Timbers, Blackland Prairies, Post Oak Savannah, and finally into the Piney Woods ecoregion surrounding Lake Livingston.

There are many sites in this subwatershed, especially throughout the DFW Metroplex, that have been assessed by the EPA's Brownfield Program or are monitored by their RCRA and ECHO programs. In addition, there are three Superfund sites. These are the Pesses Chemical Company site in Fort Worth, the Bio-Ecology Systems, Inc. site in Grand Prairie, and the RSR Corporation site in Dallas. Both the Pesses and Bio-Ecology sites were removed from the National Priority List (NPL) in the mid 1990s. Portions of the RSR site were deleted from the NPL in 2007, however, some portions of the site remain on the list and are subject to cyclical review to determine if control measures are still protecting human and environmental health. Special projects in this subwatershed include Envirocast Phase II, the Statewide Fish Tissue Monitoring Program, Fort Worth-Legacy-Fish Tissue Sampling, Fort Worth-Legacy Pollutants, Fort Worth-Legacy Pollutants-Implementation Plan, Trinity River-PCBs in Tissue, Diurnal DO Dynamics, Trinity River-Bacteria, Dallas and Tarrant Counties-Fish Tissue, Dallas and Tarrant Counties-Legacy Pollutants, Dallas and Tarrant Counties-Legacy Pollutants-Implementation Plan, and Tier 2 mercury in East Texas Water Bodies. These programs are discussed in more detail in the Special Projects chapter.

Segment 0806 – West Fork Trinity River Below Lake Worth

Overview

This 32 mile segment of the West Fork Trinity River travels 33 miles southeast from the Lake Worth dam to the confluence of Village Creek in Tarrant County. This highly urbanized segment begins in the Grand Prairies and ends in the Eastern Cross Timbers ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: This segment is listed as a Concern on both the 2008 and Draft 2010 Assessments and the 5-year analysis for chlorophyll-a. Exact causes for the high chlorophyll-a values are unknown. Chlorophyll-a data show a direct relationship with water temperature (fig. J.1). DO values and pH values consistently meet the standard and indicate that there are no apparent significant negative effects from these levels of chlorophyll-a.

Figure J.2. Map of Segment 0806.

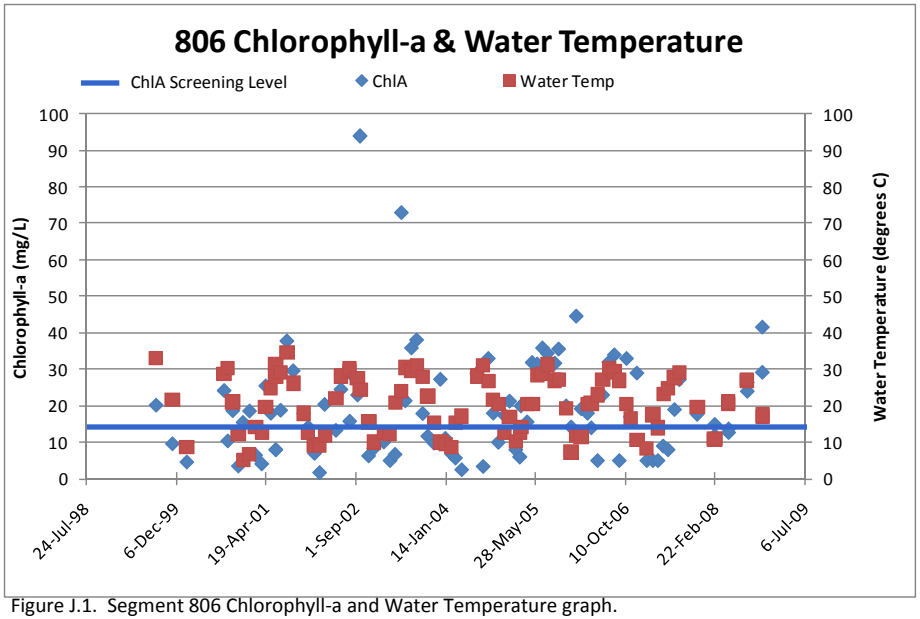


Figure J.1. Segment 806 Chlorophyll-a and Water Temperature graph.

Contact Recreation Use: Fully Supporting or No Concern

Public Water Supply Use: Fully Supporting or Not Assessed

Fish Consumption Use: This segment is listed on both the 2008 and Draft 2010 Assessments for chlordane and PCBs in fish tissue. These listings are based on Texas Department of State Health Services (DSHS) fish tissue samples. Exact sources for these chemicals are unknown, but are likely contaminated sediment or buried chemical stockpiles. These chemicals have been illegal for decades. Several Total Maximum Daily Load (TMDL) studies have been conducted or are currently underway to determine the sources and fates of these chemicals. See the Special Projects chapter for a link to further descriptions of these projects.

Assessments (Unclassified Segments):
Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Not Assessed
Contact Recreation Use: Marine Creek and Sycamore Creek are listed as a Concern for E. coli on both the 2008 and Draft 2010 Assessments. Additionally, Little Fossil Creek is listed as a Concern on the 2010 Draft Assessment. See the Bacteria Issues section for additional information.

Public Water Supply Use: Not Applicable

Fish Consumption Use: Fosdic Lake and Echo Lake are listed as Non-Supporting for PCBs in fish tissue and as a Concern for arsenic in fish tissue. In 2006, DSHS completed a survey of fish tissue in these segments and the listing is based on DSHS reports. Exact sources for these chemicals are unknown, but are likely contaminated sediment or buried chemical stockpiles. Fishing and consumption bans are in effect for both Fosdic and Echo Lakes.

Trend Analysis Overview
Seven trends were identified in segment 0806. For additional detail on trend methods and results, see the Data Review Methods appendix.

Main Stem		E.coli			TDS Calc		
Seg_AU	Site	A	S	W	A	S	W
0806_01	10938				DN	DN	DN
0806_01	16120	DN			DN	DN	DN

Table J.2. Segment 806 Trends.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Trends (Classified Segments):
Seven trends, or possible trends, were identified in 0806 which suggest that this segment is fairly stable.

The downward trend for E. coli is weak and the data seems to be skewed by a series of low data points between mid-2005 and mid-2006. This time period coincides with a significant drought and it is likely that the trend is a result of lower than normal loadings of bacteria from the watershed (fig. J.3).

TDS trends for both stations are weak and likely due to variation in flow instead of time. Low TDS values tend to track with periods of low flow (fig. J.4).

Trends (Unclassified Segments):
No trends identified for unclassified segments.

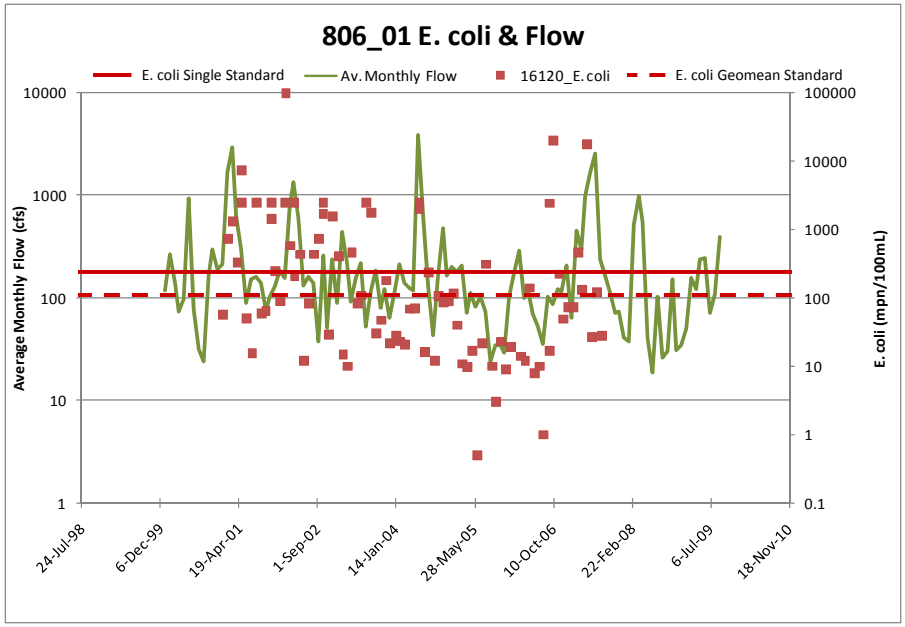


Figure J.3. Graph of E. coli and Flow in 0806_01.

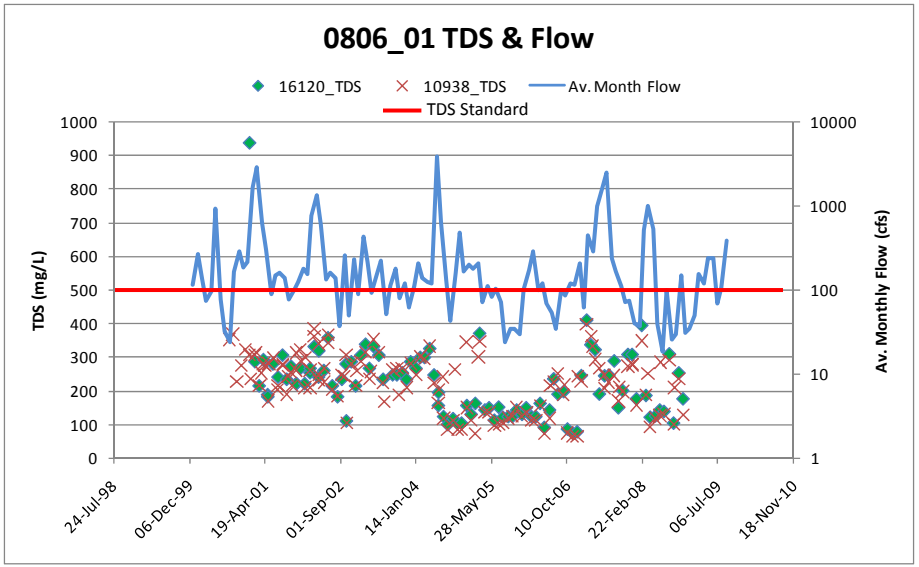


Figure J.4. Graph of TDS and Flow in 0806_01.

Segment 0841 – Lower West Fork Trinity River

Overview

This 26 mile segment starts from a point immediately upstream of the confluence of the Elm Fork Trinity River in Dallas County to a point immediately upstream of the confluence of Village Creek in Tarrant County. The upper half of this highly urbanized watershed is in the Eastern Cross Timbers and the lower half is in the Blackland Prairie ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, Not Assessed

General Use: OP and TP results are significantly above the screening level in Assessment Units 1 and 2 of segment 0841 (fig. J.5). However, there are no indications from available data that nutrients are causing adverse effects as there are no observed changes in DO or pH data.

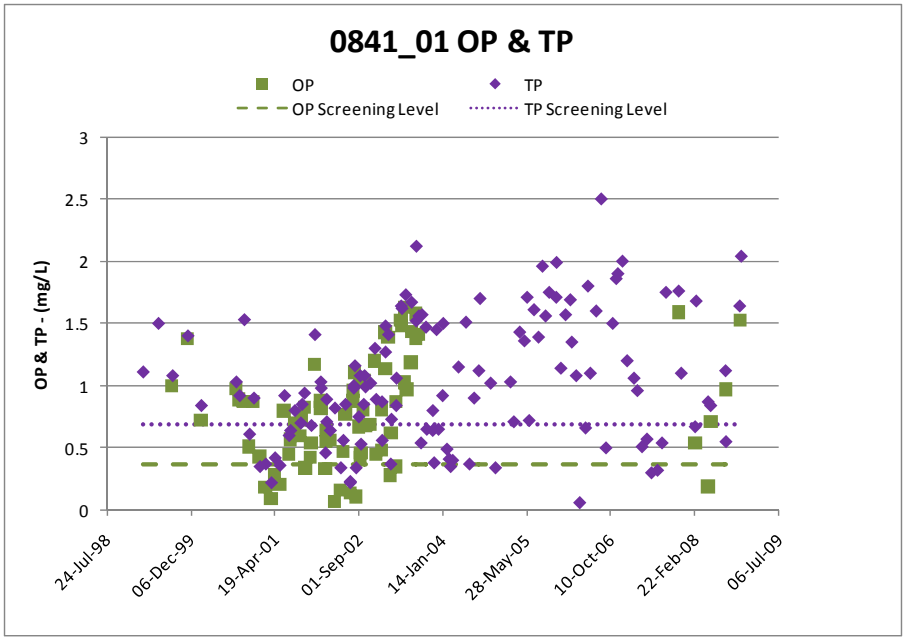


Figure J.5. Graph of OP and TP for segment 0841_01.

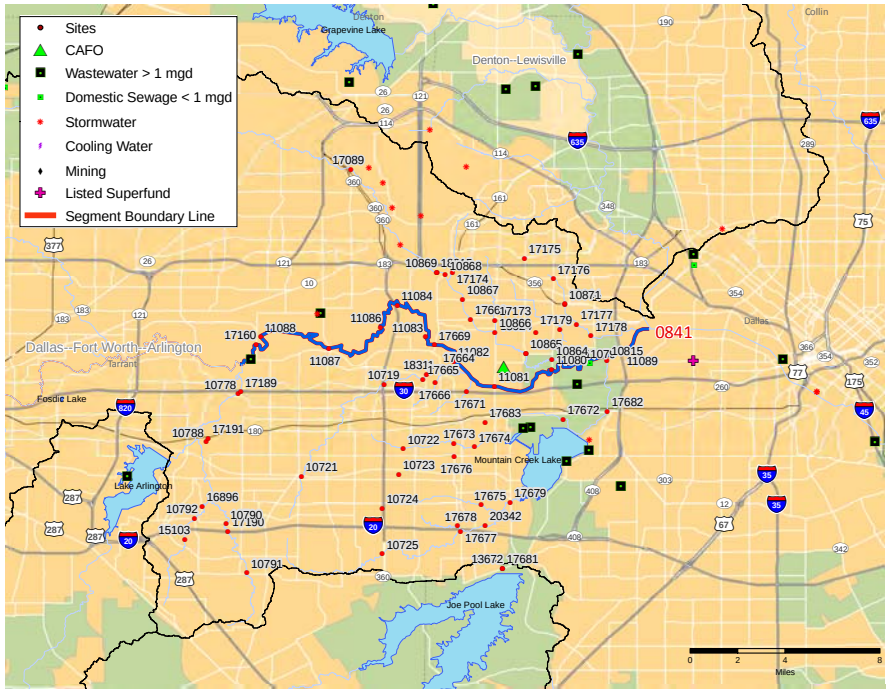


Figure J.6. Map of Segment 0841.

Both 0841_1 and 0841_2 show a Concern for chlorophyll-a, nitrate, OP, and TP on both the 2008 and Draft 2010 Assessments. Additionally, 0841_1 shows Concerns for the above parameters on the 5-year analysis.

Contact Recreation Use: Segment 0841_1 is listed as Non-Supporting for bacteria on all three methodologies. See the Bacteria Issues section for additional information.

Public Water Supply Use: Not Applicable

Fish Consumption Use: Both 0841_1 and 0841_2 are listed as Non-Supporting for fish consumption based on elevated levels of chlordane and PCB's in fish tissue. The listing is based on DSHS sampling

of fish tissue. Exact sources for these chemicals are unknown, but are likely contaminated sediment or buried chemical stockpiles. These chemicals have been banned for decades.

Assessments (Unclassified Segments):
Because many of these unclassified segments share many similar characteristics, not all aspects of the assessments or trends are addressed. For additional information on a particular segment, see either the 2008 or Draft 2010 Assessment available from the TCEQ website (http://www.tceq.state.tx.us/).

Aquatic Life Use: Many of the segments are listed as Non-Supporting or Concern for depressed dissolved oxygen. These streams are small, shallow tributaries with intermittent or perennial pools or are dry during much of the summer months. Additionally, there were no DO trends identified in any of these tributaries indicating that DO remains stable and is likely a factor of the seasonally consistent low flows and hot summer temperatures. During periods of limited rainfall, the only input is landscape irrigation runoff. To better classify these streams, a series of habitat characterization site visits have been completed and additional visits are in progress (fig. J.7).

General Use: No Concern or Not Assessed

Contact Recreation Use: Most of these segments are listed as Non-Supporting for bacteria. See the Bacteria Issues section for additional explanation regarding bacteria listings in urban streams.

Public Water Supply Use: Not Applicable

Fish Consumption Use: Mountain Creek Lake (0841A) is listed as Non-Supporting in the 2008 and Draft 2010 Assessments. In 2006, DSHS completed a survey of fish tissue in these segments and their data was used for assessment. Exact sources for these chemicals are unknown, but are likely contaminated sediment or buried chemical stockpiles. Elevated levels of chlordane, DDD, DDE, DDT, dieldrin, heptachlor epoxide, and PCBs were found in fish tissue samples in 0841A at levels deemed harmful to human health. The remainder of the segments are either Fully Supporting, No Concern, or Not Assessed.

Figure J.7. Photograph Depicting Typical Summer Flow Conditions at Some 0841 Sites.

Trend Analysis Overview

170 trends were identified in segment 0841. For additional detail on trend methods and results, see the Data Review Methods appendix. All trends are listed in the SAS Results appendix. Only robust or particularly interesting trends are discussed in this section.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Main Stem		Amm			ChlA			Chloride			Copper			E.coli			FecalColi			Hard			OP			pH			Sulfate			TDS Calc			TDS Meas			TP			W.Temp		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0841_01	11081	DN	DN																						UP															UP			
0841_01	17669	DN		DN																										DN								UP		UP			
0841B_01	10866																									DN		DN															
0841B_01	10867	DN	DN																							DN	DN	DN															
0841B_01	10868												UP	DN	DN																												
0841B_01	17663	DN	DN																							DN	DN				UP												
0841B_01	18313	DN	DN	DN								UP					UP		UP							DN																	
0841B_01	18315	DN	DN	DN								UP														DN		DN														UP		
0841D_01	17089													DN																													
0841E_01	17672				DN	DN	DN			DN				DN		DN	DN		DN		DN	DN													DN	DN	DN	DN	DN	DN			
0841F_01	10723										DN	DN		UP	UP																												
0841F_01	17674	DN		DN				UP													DN					DN																	
0841F_01	17676	DN	DN	DN																							DN		UP														
0841H_01	17176																									DN	DN																
0841H_01	17177						UP								DN					DN	DN					UP																	
0841H_01	17178	DN	DN	DN							UP	UP	UP									DN																		DN			
0841H_01	18314	DN	DN	DN							UP	UP						DN					UP		UP	DN	DN	DN															
0841I_01	17173					UP								UP		UP										DN		DN															
0841J_01	17174																			DN		DN																					
0841K_01	10724													UP	UP																	UP	UP										
0841K_01	10725				UP	UP																		UP																			
0841K_01	17677	DN	DN		DN					DN										DN		DN					DN								DN		DN						
0841K_01	17679		DN			UP				DN										DN															DN			UP		UP			
0841L_01	10719																																							DN			
0841L_01	17664						DN																																				
0841M_01	10792																											DN															
0841N_01	17675	DN	DN																								DN																
0841O_01	10815	DN	DN																UP											UP													
0841O_01	17681		DN														UP		UP																								
0841O_01	17682	DN	DN															UP				DN																					
0841P_01	10722																					DN						DN										DN	DN				
0841P_01	17673	DN		DN																								DN															
0841Q_01	17678	DN	DN		DN		DN												UP							DN	DN																
0841R_01	10791																															UP		UP									DN
0841R_01	17190																										DN					UP											
0841R_01	17191				UP	UP																																					
0841T_01	17189													UP	UP																	UP											
0841U_01	17179																					DN						DN															
0841V_01	17683								UP																														UP				

Table J.3. Trend Results for Segment 0841.

Trends (Classified Segments):
Summer sulfate values at station 17669 showed a significant (R^2>0.34) downward trend. Increasing trends were identified for nutrients at stations 11081 and 17669. See the Nutrients section for additional information.

Trends (Unclassified Segments):
The volume of trends suggests that the water quality in these small, highly developed urban subwatersheds is unstable and should continue to be monitored closely by local entities. Of the trends identified, other than pH, downward trends are generally considered to be improving water quality. Because the standard for pH is a bracket, increasing or decreasing trends could be considered improving or degrading. In all, there are 117 downward trends and 50 upward trends identified.

The two upstream sites on Delaware Creek show downward trends for pH (fig. J.8). Further downstream, site 17177 showed a significant upward trend (r^2 > 0.3). It is unknown what caused this trend in pH and the data stops in October of 2004. A new site just downstream shows that pH values between 2005 and 2009 display no trend and are currently within the standard. Causes of the high pH values at station 17177 during the 2003-04 time period are unknown.

Copart Branch Mountain Creek drains a very small portion of Grand Prairie that's land use is 100% industrial. Specifically, the watershed is comprised of several junk yards, auto repair shops, and portions of the closed Naval Air Station, Dallas. Copart Branch has shown significant improvement over the last 10 years (fig. J.9). Strong downward trends in chlorophyll-a, chloride, E.coli, fecals, hardness, TDS measured, and total phosphorous were identified. Unfortunately, there are no flow data available for this site. According to City of Grand Prairie environmental personnel, decreasing trends are likely a combination of the Automotive Related Business Task Force that began inspecting facilities in 2005 and the phasing out of operations of Naval Air Station activities over the last decade.

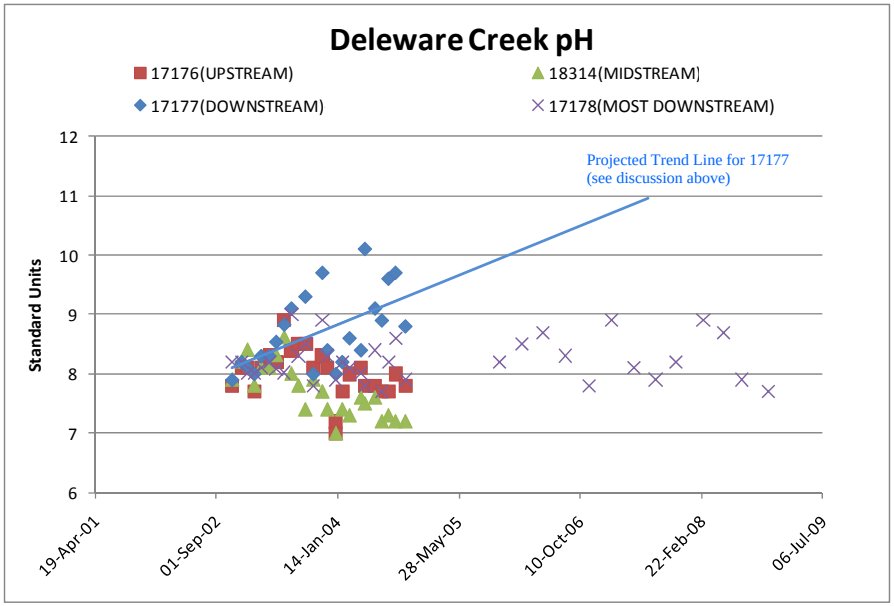


Figure J.8. Delaware Creek pH Graph.

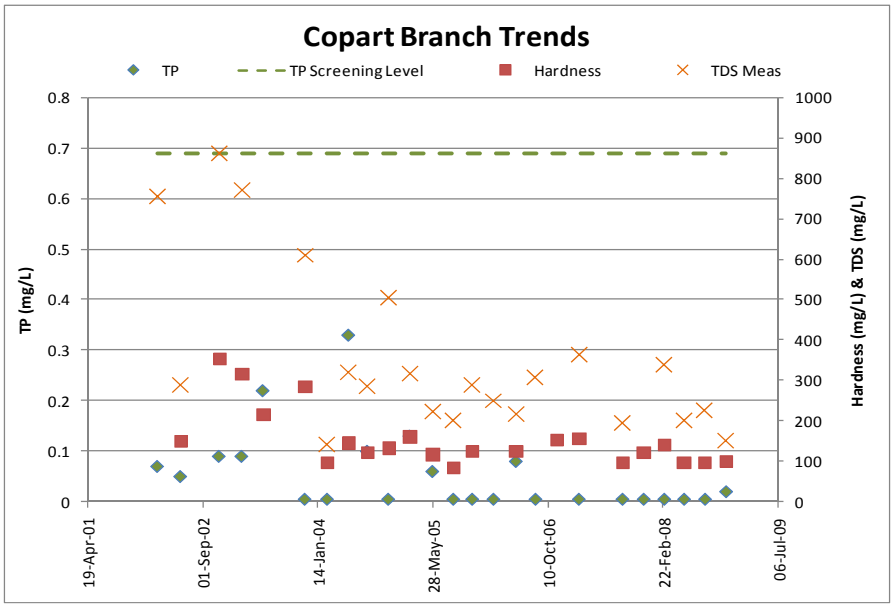


Figure J.9. Copart Branch Trends Graph.

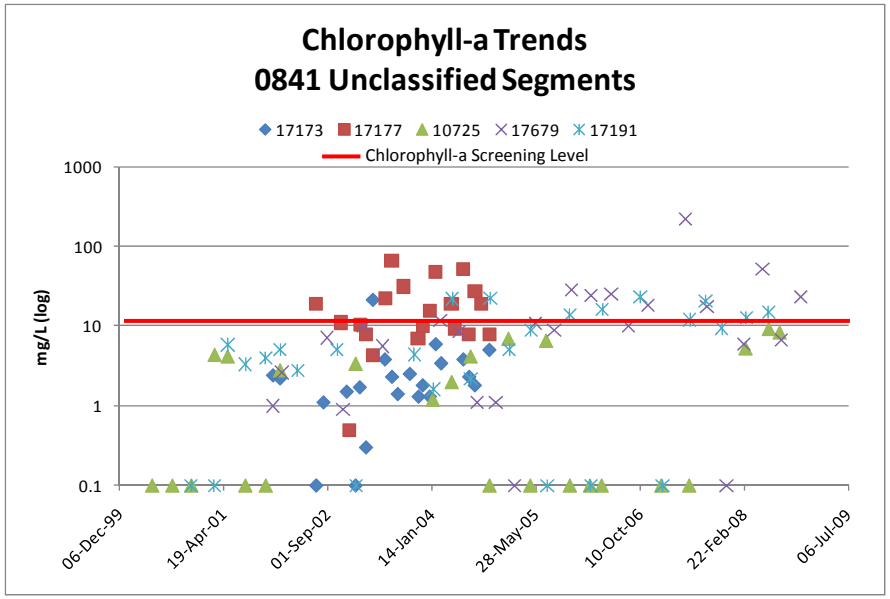


Figure J.10. Chlorophyll-a Trends in Segment 0841 Unclassified Segments.

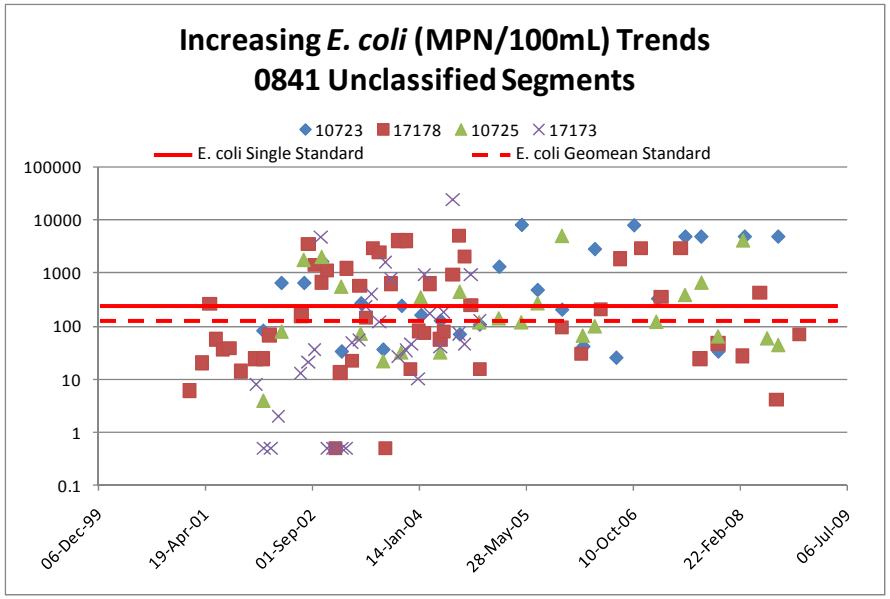


Figure J.11. 0841 Increasing E. coli Trends in Unclassified Segments.

Dry Branch Creek (17173), Delaware Creek (17177), Fish Creek (17025 & 17679), and Rush Creek (17191) all show increasing trends for chlorophyll-a (fig. J.10). These sites are spread throughout the upper Main Stem subwatershed and land cover compositions of the drainage basis are varied. Some of the stations drain open land and others are highly urbanized. High chlorophyll-a is an indication of excessive phytoplankton growth.

Four sites showed upward trends in the unclassified segments of 0841. The upward trends, or possible trends, were identified at Cottonwood Creek (10723), Delaware Creek (17178), Fish Creek (10725), and Dry Branch Creek (17173) (fig. J.11). By nature, E. coli values vary greatly. See the Bacteria Issue section for additional discussion about bacteria in urban streams.

Upward E. coli trends for these segments do not show an identifiable spike which may indicate a possible illicit discharge or point source. Likely, if trends are real, sources are non point source loadings that are difficult to identify or control.

Segment 0805 – Upper Trinity River

Overview

This 97 mile segment starts immediately upstream of the confluence of the Cedar Creek Reservoir discharge canal in Henderson/Navarro County and runs upstream of the confluence of the Elm Fork Trinity River in Dallas County. The upper 15 miles of the watershed are highly urbanized and the lower 82 miles are mostly rural cropland and pasture. The flow in this section can be almost 100% wastewater effluent from the Dallas/Fort Worth Metroplex during the hot, dry summer months and periods of drought. Water here is generally very turbid as it flows through the Blackland Prairie and into Post Oak Savanna.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, Not Assessed, or No Concern

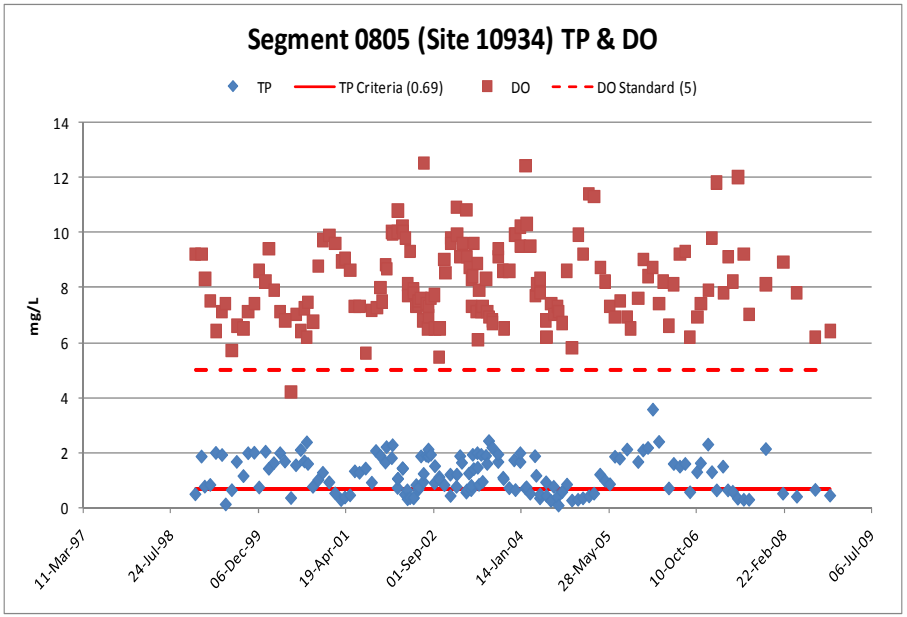


Figure J.12. Segment 0805 (Site 10934) TP vs. DO Graph.

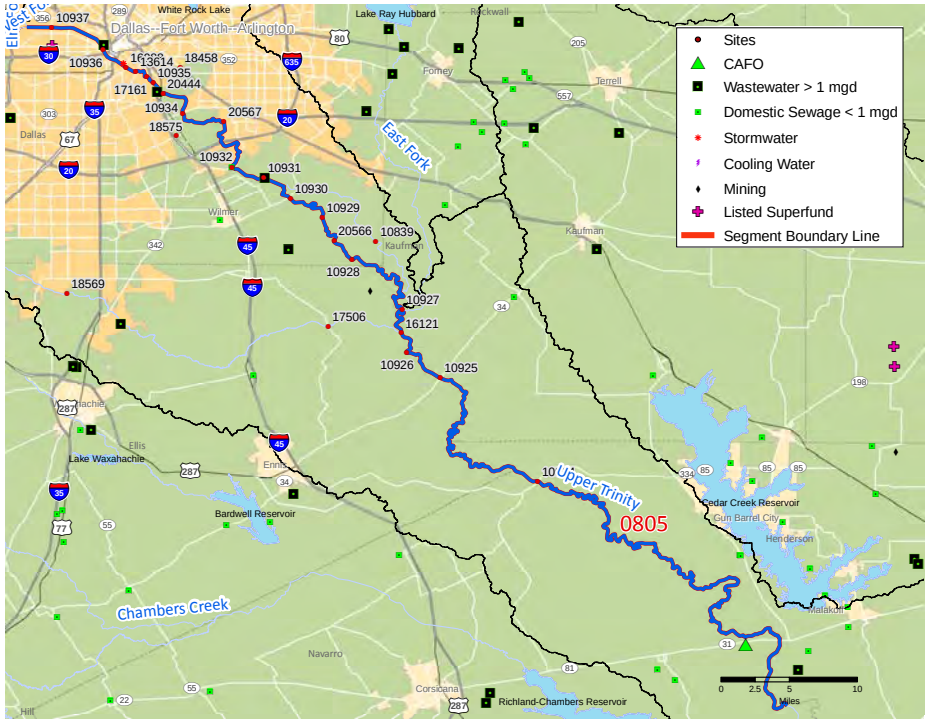


Figure J.13. Map of Segment 0804.

General Use: All of the assessment units in this segment show Concerns for nitrate, orthophosphorus, total phosphorus, and chlorophyll -a using all three methodologies. As discussed earlier, measurable water quality deterioration due to nutrient concentrations above the criteria generally are not found in the Trinity River. Figure J.12 shows TP concentrations well above the criteria with no noticeable effects on dissolved oxygen. Studies have shown that light penetration, due to the natural turbidity of the Trinity River, is the limiting factor for algal growth in the Trinity River basin.

Contact Recreation Use: Only 0805_06 is Fully Supporting. The other assessment units have either a Non-Supporting or Concern designation, or do not have not enough data to assess. See the Bacteria Issues section for additional information on sources and causes.

Public Water Supply Use: Not Applicable

Fish Consumption Use: In 1990, The Department of State Health Services placed a consumption ban on all portions of this segment for chlorodane, DDE, and PCBs in fish tissue samples. These chemicals have been banned for decades and the exact sources are unknown. It is likely contaminated sediment or buried stockpiles of these substances are the sources or sources.

Assessments (Unclassified Segments):
Aquatic Life Use: No Concern or Not Assessed

General Use: No Concern or Not Assessed

Contact Recreation Use: Fully Supporting or Not Assessed

Public Water Supply Use: Not Applicable

Fish Consumption Use: Not Applicable

Trend Analysis Overview
18 trends were identified in segment 0805. For additional detail on trend methods and results, see the Data Review Methods appendix.

Trends (Classified Segments):
Generally, there are few trends for this segment which would indicate the water quality is stable. Of the parameters that show trends in segment 0805, only summertime flow has an R^2 > 0.2 (Station 10934 Summer Flow R^2 = 0.25). If there are actual increased flows, they are slight and likely due to the increase in population in the DFW area and the resultant higher wastewater flows from treatment plants.

Trends (Unclassified Segments):
Site 17506 showed a possible sight decreasing trend for E. coli. Reasons for this decrease, or possible decrease, are unknown.

Main Stem		Amm			E.coli			Flow			OP			S.Depth			TDS Calc			W.Temp		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0805_02	10925		DN				DN		UP			DN			DN							
0805_03	10934	DN	DN					UP	UP			DN						DN				
0805_04	10937		DN										UP					DN				UP
0805A_01	17506				DN	DN																
0805B_01	10839					DN																

Table J.4. Trend Results for Segment 0805.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Segment 0804 –Trinity River Above Lake Livingston

Overview

This rural 158 mile segment of the Trinity River travels southeast from approximately 20 miles above the confluence of Richland Creek to Lake Livingston. This segment is generally considered the "Middle Trinity" and runs entirely through the Post Oak Savannah. Land use in 0804 is generally split between forest and agriculture/pasture.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Nutrients and chlorophyll-a are generally listed as Concerns throughout the entire segment. In some instances, values are significantly above the criteria. Because phytoplankton growth in the Trinity River is generally light limited, nutrients and chlorophyll-a are not known to cause harmful algal blooms in this segment or further downstream in Lake Livingston. For a more in-depth analysis of nutrients, see the 2008 and Draft 2010 Assessments.

Contact Recreation Use: Fecal Coliform was identified as a Concern in the lower 25 miles of the segment by both the 2008 and Draft 2010 Assessments.

Public Water Supply Use: Not Applicable

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed.

Assessments (Unclassified Segments):

Aquatic Life Use: Catfish Creek was designated as Non-Supporting due to low dissolved oxygen using all three methodologies. 24-hour DO measurements during the critical periods show average DO values below the standard of 5 mg/L. The watershed for this segment is mostly undeveloped with no point discharges and consists of cropland and pasture with mixed forest along the riparian areas. Causes and reasons for the low DO are unknown.

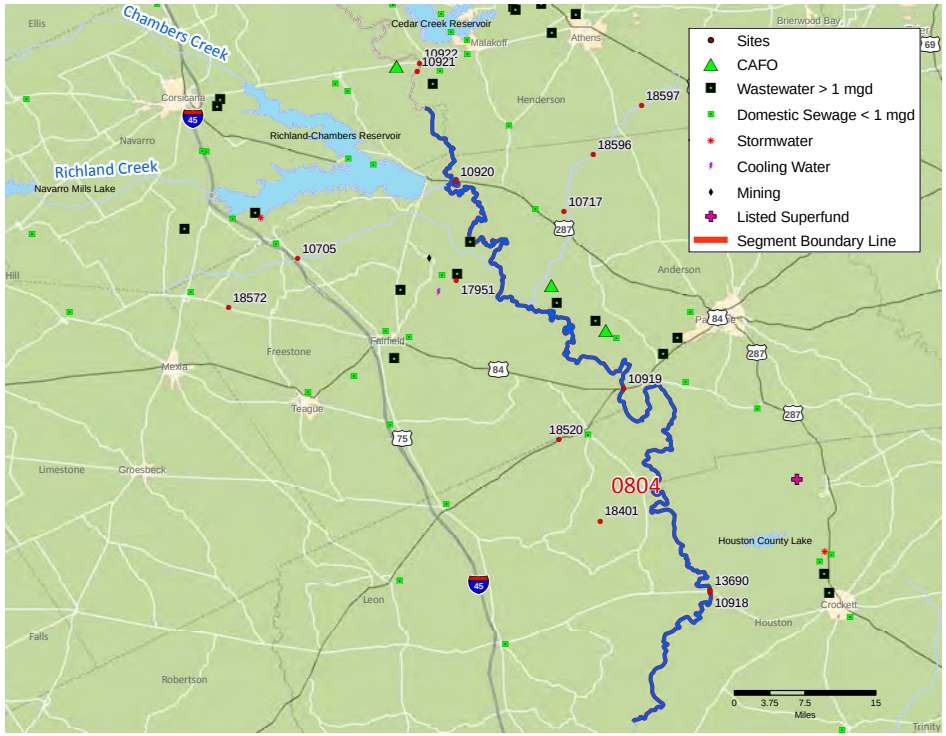


Figure J.14. Map of Segment 0804.

Upper Keechi Creek also shows Non-Supporting for dissolved oxygen on both the Draft 2010 Assessment and the 5-year analysis. Some evidence suggests that the low average DO values from the 24-hour measurements may be the result of very low flows.

General Use: Fairfield Lake shows a Concern for chlorophyll-a and OP. Exact sources are unknown, but it is likely NPS runoff from the surrounding cropland and a small section of urban development around Fairfield Lake.

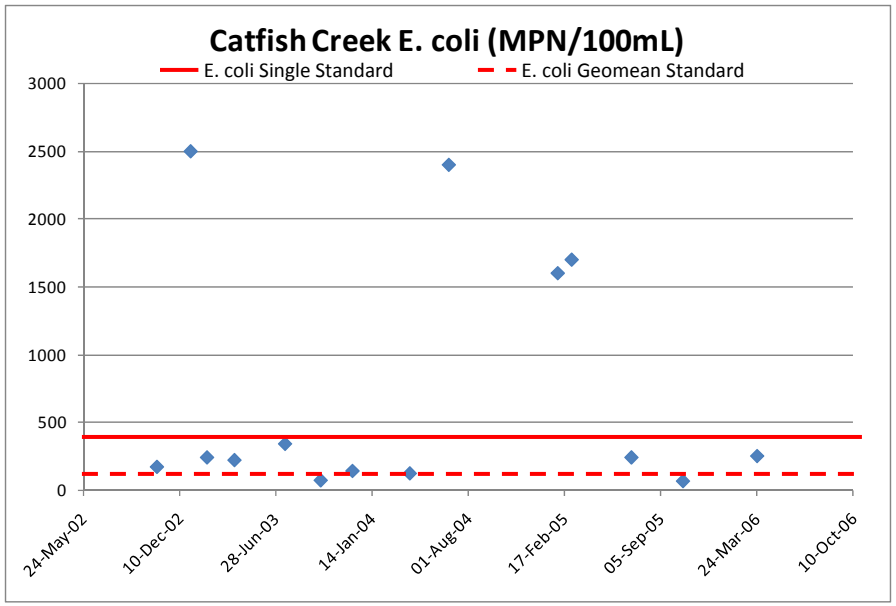


Figure J.15. E. coli results in Catfish Creek Segment 0805_G

Contact Recreation: Catfish Creek was listed as a Concern for E. coli on the 2008 Assessment and downgraded to Non-Supporting on the Draft 2010 Assessment. The values are generally below the single sample standard of 394 MPN (4 exceedances in the 23 sample data set) but the samples trend on the high side of the geometric mean standard of 126 MPN. Four extremely high samples cause the Non-Supporting designation (fig. J.15) and sources are unknown.

Fish Consumption Use: Fully Supporting or Not Assessed.

Trend Analysis Overview

9 weak downward trends were identified in segment 0804. For additional detail on trend methods and results, see the Data Review Methods appendix.

Trends (Classified Segments):

9 weak downwards were identified in this segment indicating possible improving water quality.

Trends (Unclassified Segments):

Weak downward trends were identified for winter ammonia and summer chloride. Fluoride trends are strong, but values are an order of magnitude lower than the standards and are of no concern.

Main Stem		Amm			Cadmium			Chloride			Fluoride			S.Depth		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0804_01	13690					DN										
0804_04	10919															DN
0804_07	10922	DN	DN													
0804G_01	10717			DN					DN		DN	DN	DN			

Table J.5. Trend Results for Segment 0804.

Trends Key

A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Segment 0803 – Lake Livingston

Overview

This 82,600 acre segment impounds 1,750,000 acre-feet of water from Trinity River. It stretches from the Livingston Dam in Polk/San Jacinto County to a point 1.1 miles upstream of Boggy Creek in Houston/Leon County, up to a normal pool elevation of 131 feet. This segment begins in the Post Oak Savannah where the land use is generally agriculture and transitions in to the Piney Woods ecoregion with nearly all of the land use classified as forest.

Assessments (Classified Segments):

Aquatic Life Use: Although there is limited data, three assessment units in the upper portion of Lake Livingston show a Concern for low dissolved oxygen in the 2008 and Draft 2010 Assessments. Available data show no values below the standard and TCEQ was apprised of a possible error. Further investigation is in progress.

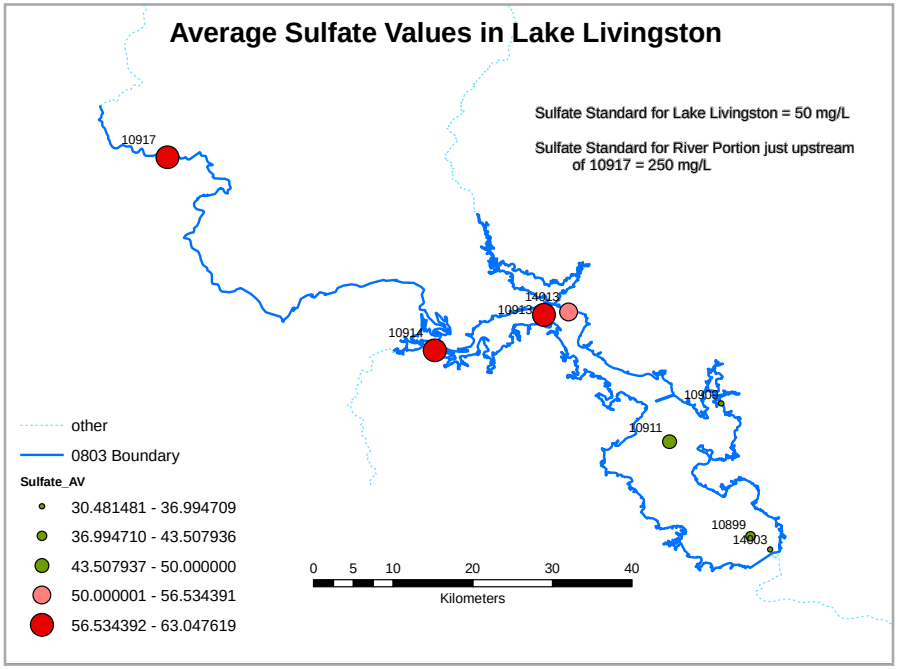


Figure J.16. Map of Average Sulfate Values in Lake Livingston.

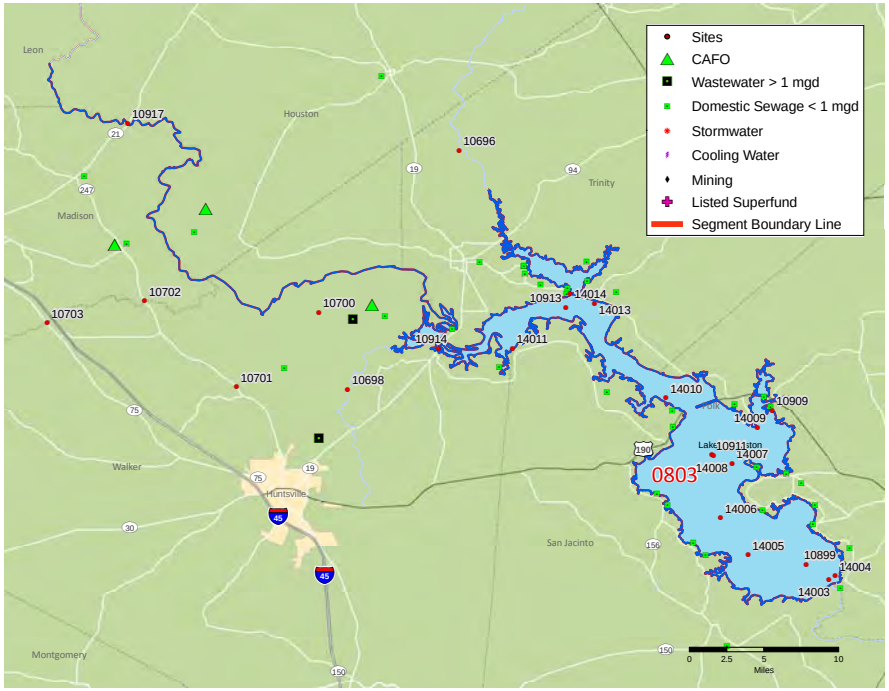


Figure J.17. Map of Segment 0803.

General Use: Sulfate has caused the entire Lake Livingston Reservoir to be Non-Supporting on all three methodologies. The standard for sulfate applies to the entire reservoir. With Lake Livingston, however, this reservoir-wide application of the standard is invalid. The upper 44 miles of the reservoir appear and act as a riverine system, yet the reservoir standard for sulfate is applied to those sites. The river standard of 150 mg/L is probably more appropriate (fig. J.16).

Two segments of Lake Livingston are listed as Non-Supporting for high pH near the dam and middle portions of the reservoir on the 2008 and Draft 2010 Assessments. Data were plotted against chlorophyll-a, ammonia, and inflow at an upstream gage, but no relationship was discovered. The causes and reasons for high pH readings are unknown.

Lake Livingston also shows Concerns for chlorophyll-a and nutrients throughout most of the reservoir. Previous studies have shown that the influences from the DFW area have dissipated by this point. See the Nutrients section for additional discussion of nutrients and chlorophyll-a in Lake Livingston. Lake Livingston is classified as hypereutrophic by the TCEQ report titled Trophic Classification of Texas Reservoirs.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed.

Public Water Supply Use: Fully Supporting, No Concern, or Not Assessed.

Fish Consumption Use: Fully Supporting or No Concern

Assessments (Unclassified Segments):
Aquatic Life Use: The Draft 2010 Assessment shows a Concern in Nelson Creek for dissolved copper and lead. These Concerns are based on a very small dataset of 6 samples with one high value. On Bedias Creek, the Draft 2010 Assessment found one extremely high value (out of only 4 samples) from 2005 for dissolved zinc which triggered a Concern.

General Use: Harmon Creek shows a Concern for NO3, OP, and TP. The data set is limited, but the values are high. Although land use classifications are similar throughout the segment, Harmon Creek is the only unclassified segment in 0803 with nutrient concerns. Because wastewater effluent is generally high in nutrients, it is likely that the upstream City of Huntsville WWTP is the source.

Contact Recreation Use: Bedias Creek is listed as a Concern for bacteria. The data set is limited; there are only 5 samples.

Public Water Supply Use: Not Applicable

Fish Consumption Use: No Concern or Not Assessed

Trend Analysis Overview
28 trends were identified in segment 0803. For additional detail on trend methods and results, see the Data Review Methods appendix. All trends are listed in the SAS Results appendix. Only robust or particularly interesting trends are discussed in this section.

Possible trends for arsenic were very weak (all three r^2 < 0.19) and the highest measured values are only 10% of the standard. Trends for dissolved nickel were identified, but even the maximum values are over an order of magnitude less than the standard and do not present a concern.

Upward trends for chloride were found at two sites located in the middle portion of Lake Livingston. Values are well below the standard, but an r^2 for summer trends of 0.44 suggest the trends are real. Sources and causes are unknown.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Main Stem		Arsenic			ChlA			Chloride			Hard			Nickel			Nitrate			OP			pH			S.Depth			Sulfate		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0803_01	10899		UP			UP					UP	UP	UP																		
0803_05	10909							UP			UP	UP	UP	UP	UP												DN		UP		
0803_06	10911							UP	UP					UP	UP						DN						DN				
0803_07	10913														UP										DN		DN				
0803_10	10914		UP															DN								DN	DN	DN			
0803_11	10917		UP																												

Table J.6. Trend Results for Segment 0803.

Additionally, upward trends for hardness and downward trends for Secchi depth were identified in the middle portion of Lake Livingston and tend to confirm that there is a general upward trend in conventional parameters (note: 2008 and Draft 2010 Assessment show Concerns for chlorophyll-a and nutrients). Sources are unknown and additional sampling continues.

Significant decreases in Secchi depth, which indicate increasing turbidity, were found at station 10914 in the Upper Portion of the reservoir (fig. J.18). As in other parts of the basin, chlorophyll-a values showed a positive correlation with Secchi depth (fig. J.18).

Trends (Unclassified Segments):
No trends identified in this segment.

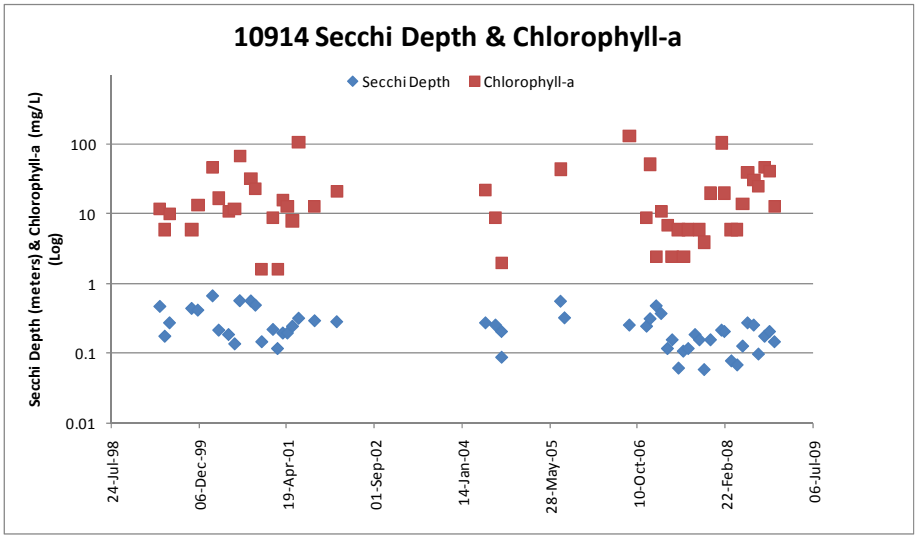


Figure J.18. Secchi Depth Graph for Site 10914 in segment 0803.

Segment 0827 –White Rock Lake

Overview

This 1,100 acre urban lake in Dallas County impounds White Rock Creek up to a normal pool elevation of 458 feet. Segment 0827 is located entirely within the Blackland Prairie ecoregion and watershed is nearly all developed.

Assessments (Classified Segments):

Aquatic Life Use: No Concern or Not Assessed

General Use: No Concern or Not Assessed

Contact Recreation Use: Fully Supporting or Not Assessed

Public Water Supply Use: Not Applicable

Fish Consumption Use: Not Assessed

Assessments (Unclassified Segments):

Aquatic Life Use: Fully Supporting, Not Assessed, or No Concern

General Use: The 2008 Assessment showed a Concern for TP, OP, and nitrate. The Draft 2010 Assessment listed only nitrate as a Concern with 27 of 71 samples exceeding the criteria of 1.9 mg/L.

Contact Recreation Use: White Rock Creek is listed as Non-Supporting for elevated bacteria levels. See the Bacteria Issues section for additional information.

Fish Consumption Use: Fully Supporting, Not Assessed, or No Concern

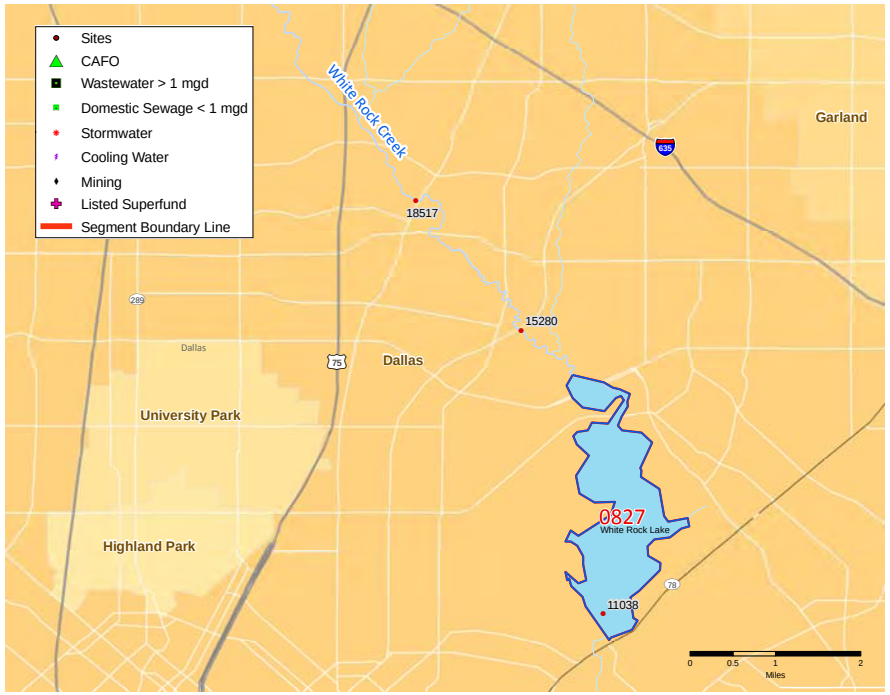


Figure J.19. Map of Segment 0827.

Trend Analysis Overview

6 trends were identified in segment 0827. All trends are listed in the SAS Results section and only robust or particularly interesting trends are discussed in this section.

Trends (Classified Segments):

None identified.

Trends (Unclassified Segments):

Winter chloride showed an upward trend (r^2 = 0.33). The maximum value in the dataset was less than half of the standard and the possible trend is of no concern.

Main Stem		Chloride			DO			Flow			OP			TP		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0827A_01	18517	UP		UP		DN				UP			UP			UP

Table J.7. Trend Results for Segment 0827.

Trends Key

A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)

UP Increasing Trends
DN Decreasing Trends

Segment 0835 –Richland Creek Below Dam

Overview

This 5 mile segment runs from the confluence of the Trinity River to the Richland-Chambers dam in Freestone County. North of the segment is agriculture/pasture and south of the segment is forest. The entire segment is within the Post Oak Savannah ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: No Concern or Not Assessed

General Use: No Concern or Not Assessed

Contact Recreation Use: Fully Supporting or Not Assessed

Public Water Supply Use: Not Applicable

Fish Consumption Use: Not Assessed

Trend Analysis Overview

No trends identified

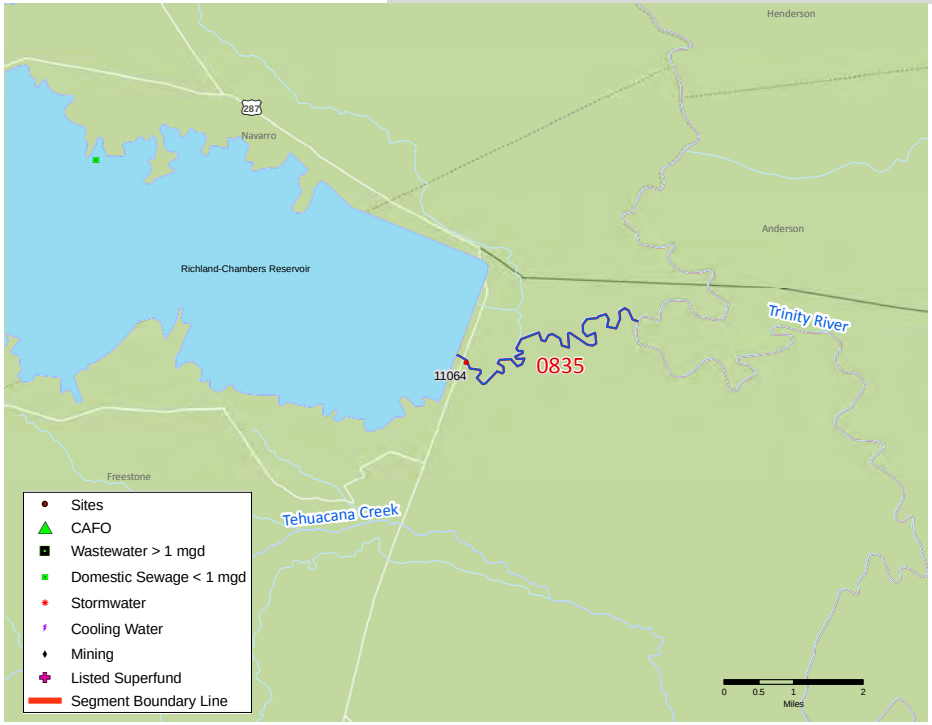


Figure J.20. Map of Segment 0835.

Segment 0813 –Houston County Lake

Overview

This 1,300 acre segment impounds Little Elkhart Creek in Houston County up to a normal pool elevation of 260 feet. Portions of the area on the southwest side of the segment are developed, but the vast majority of the watershed is rural and the land use classification is split between forest and agriculture/pasture. Houston County Lake is completely within the Post Oak Savannah ecoregion. This reservoir has been characterized as eutrophic by the TCEQ report Trophic Classification of Texas Reservoirs.

Assessments (Classified Segments):

Aquatic Life Use: No Concern or Not Assessed

General Use: No Concern or Not Assessed

Contact Recreation Use: Fully Supporting or Not Assessed

Public Water Supply Use: Not Applicable

Fish Consumption Use: Not Assessed

Trend Analysis Overview

One trend was identified in segment 0827. For additional detail on trend methods and results, see the Data Review Methods appendix. All trends are listed in the SAS Results appendix and only robust or particularly interesting trends are discussed in this section.

Trends (Classified Segments):

One possible, weak downward trend (r^2 = 0.17) for fluoride was identified in this segment. The values are over an order of magnitude less than the standard and there is no concern.

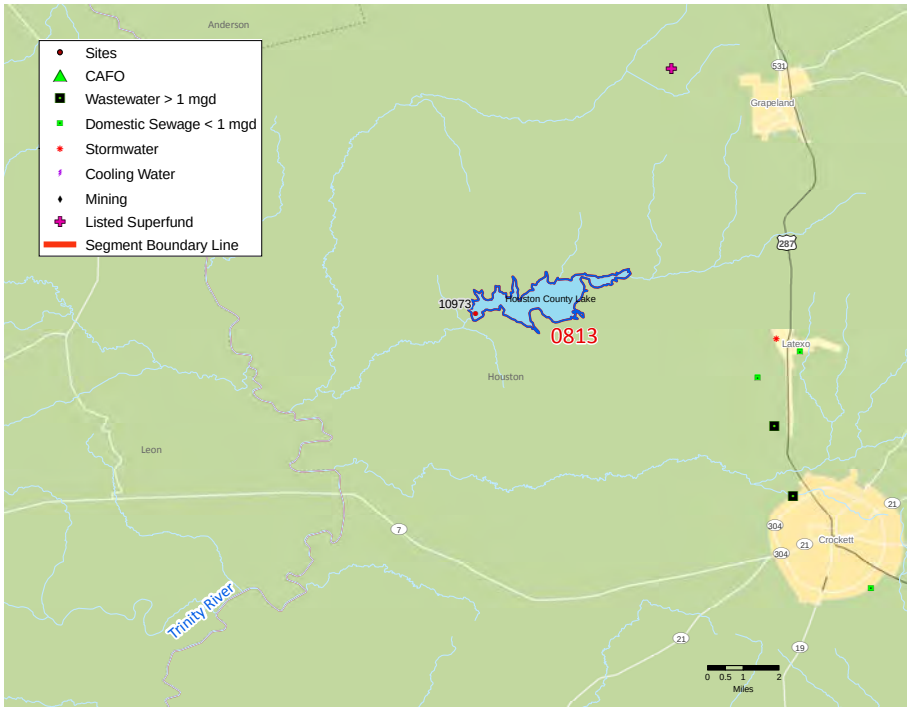
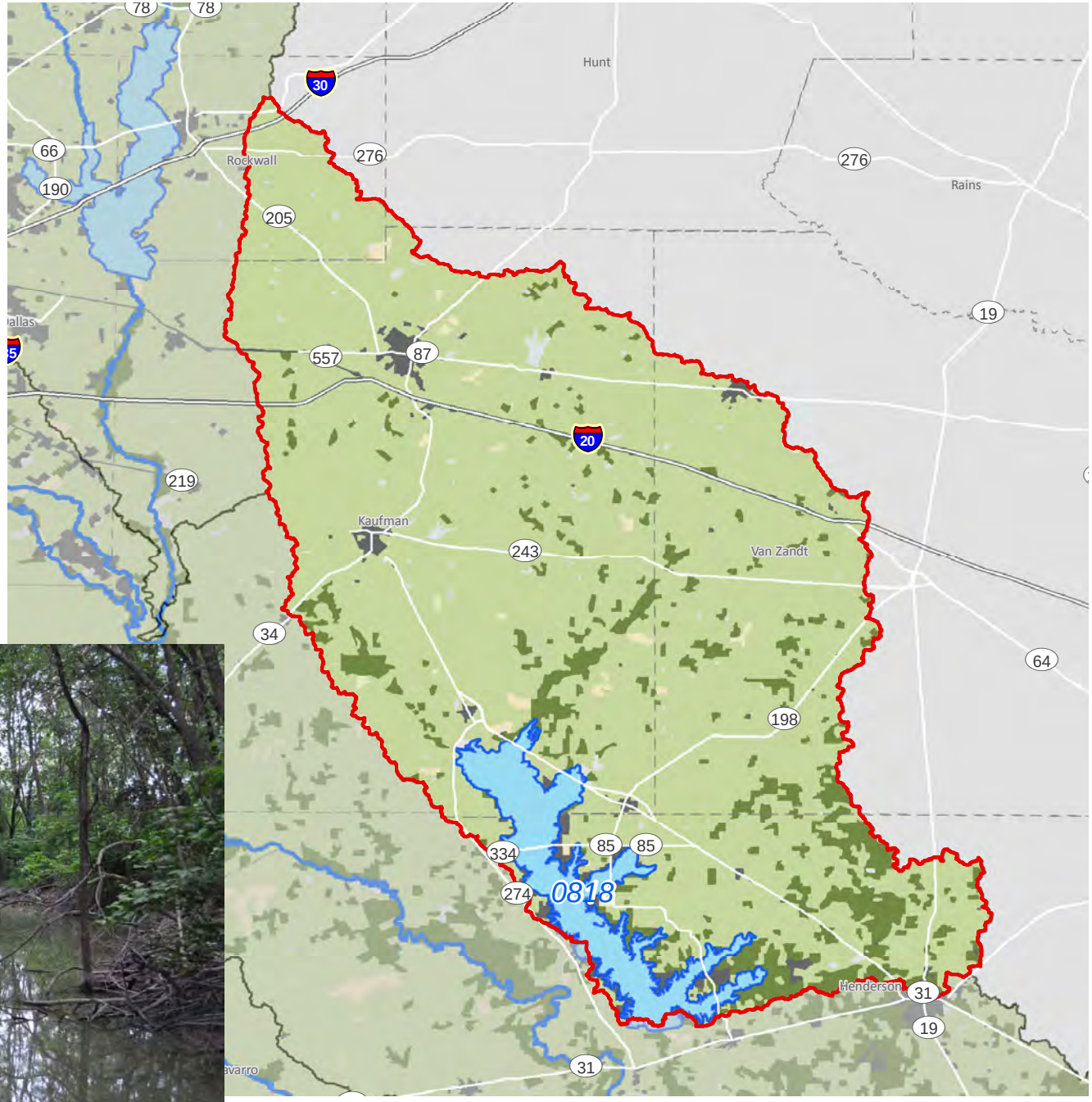


Figure J.21. Map of Segment 0813.

Cedar Creek

Land Use Type

- Crop/Pasture/Other Agricultural
- Forest
- Rangeland
- Urban/Industrial/Residential



CEDAR CREEK

Classified Segments – 1
Unclassified Segments – 0

0818 – Cedar Creek Reservoir

Sites Used for Analysis:

2008 Assessment	22
Draft 2010 Assessment	27
5-Year Analysis	7
Valid Trends	6

Cedar Creek - Count of Discharges by Type and County							
County	Cooling Water	Domestic Sewage <1mgd	Mining	Stormwater	Wastewater >1 mgd	CAFO	Total Dischargers
HENDERSON		8	1		5		14
KAUFMAN		8			4		12
VAN ZANDT		1					1
Total		17	1		9		27

Table K.1. Cedar Creek Dischargers by Type.

The Cedar Creek subwatershed extends approximately 55 river miles from Kaufman County to the Cedar Creek Reservoir dam in Henderson County. The watershed is largely rural with row crop agriculture and grazing. However, a large portion of the land directly adjacent to the reservoir has been developed. Major population centers include the cities of Terrell, Kaufman, and Athens. Water rights permits for Cedar Creek Reservoir are held by TRWD.

This subwatershed receives between 38 and 44 inches of precipitation annually. The upper reaches of the subwatershed lie within the Blackland Prairie ecoregion while the reservoir and lower portions of the subwatershed lie within the Post Oak Savannah. A large portion of the terrain in this subwatershed consists of gently rolling hills.

The North Texas Ready Mix, Inc. site near Wills Point has been assessed under the EPA Brownfields program, however it is unknown if cleanup is necessary. The Van Der Horst USA Corporation site in Terrell has been identified as a Superfund site. Cleanup at this site has begun and EPA is currently working to determine if there is a risk of human exposure and if contamination of groundwater is under control. Special projects in this subwatershed include Agricultural NPS Remediation, Cedar Creek Reservoir Watershed Protection Plan, Reservoir Research, Envirocast, and the Statewide Fish Tissue Monitoring Program. These programs are discussed in more detail in the Special Projects chapter.

Segment 0818 – Cedar Creek Reservoir

Overview

This 33,750 acre reservoir impounds Cedar Creek from the Joe B. Hoggsett Dam in Henderson County up to a normal pool elevation of 322 feet. Although a majority of the land use around the reservoir is classified as agriculture/pasture, development has caused much of the shoreline to be classified as urban. This reservoir is entirely within the Post Oak Savannah ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: All portions of the lake, with the exception of Cedar Creek Cove, were found to be either Fully Supporting or No Concern on both the 2008 and Draft 2010 Assessments. Cedar Creek cove was found to have a Concern for depressed DO in the 2008 Assessment that carried forward into the Draft 2010 Assessment. Figure K.1 shows that the DO is well correlated to the water temperature, as would generally be expected. As water temperature increases less oxygen can be dissolved into the water. Further examination did not show a correlation with either chlorophyll-a or lake elevation which indicates that the depressed DO in the cove is neither the result of algal blooms nor low reservoir elevations. Unfortunately, there are no data available from the USGS gage upstream of the reservoir on Cedar Creek to determine if low flows in the watershed contributed to the low DO in the cove.

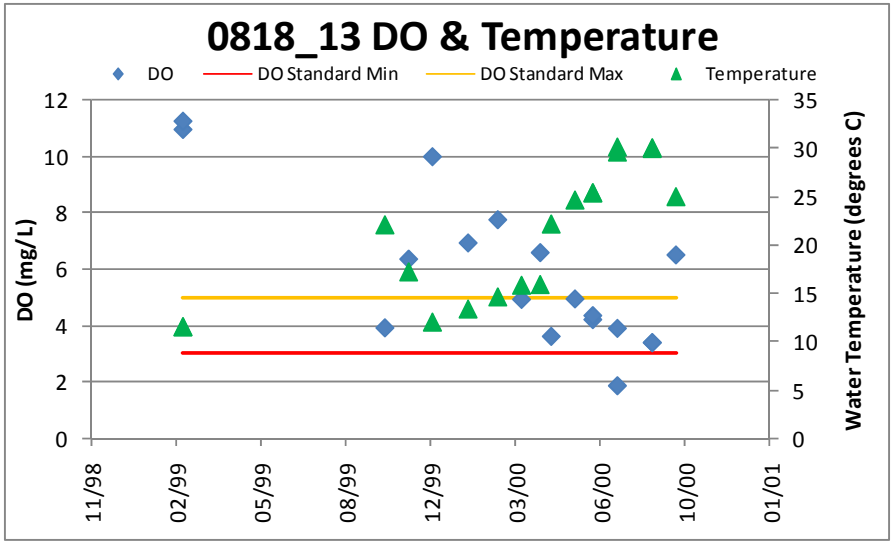


Figure K.1. DO and Temperature in Segment 0818

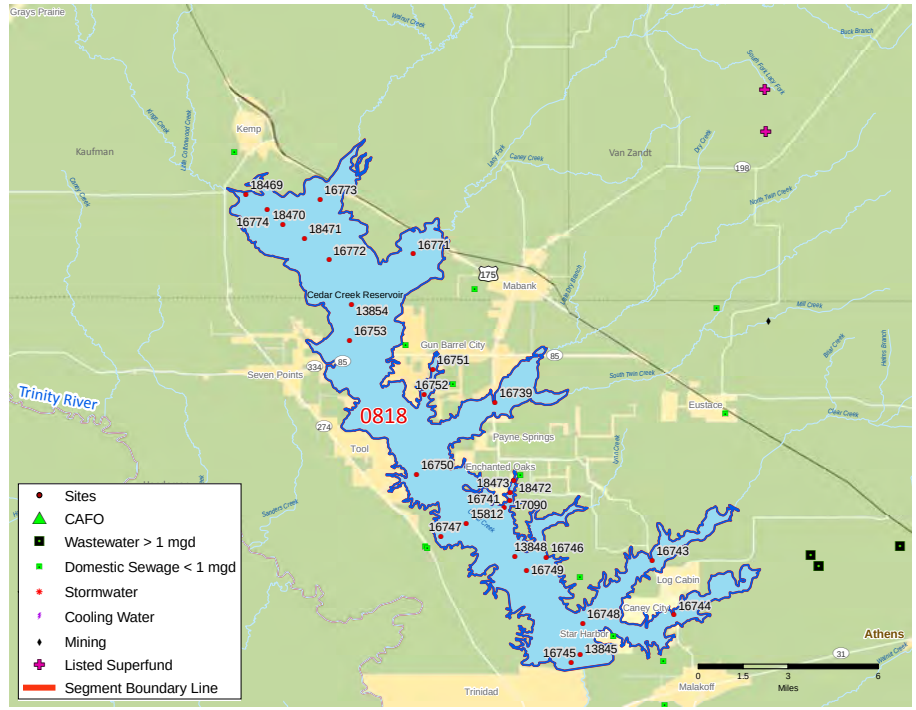


Figure K.2. .Segment 0818 Map.

General Use: A majority of the reservoir was found to be Non-Supporting in the 2008 Assessment due to elevated pH levels. These findings were either carried forward into the Draft 2010 Assessment or reassessed and found to still be Non-Supporting. Additionally, Concerns for chlorophyll-a were found throughout the reservoir by both the 2008 and Draft 2010 Assessments. Concerns for ammonia were found in several coves, as well as TP and OP in Cedar Creek Cove, by both the 2008 and Draft 2010 Assessments. The results of the 5-year analysis support many of these findings. Figures K.3, K.4 and K.5 show the pH, chlorophyll-a, and ammonia levels at several sites within the reservoir. As shown, many values exceed the standards and screening levels. It is important to note that the standards for pH in Cedar Creek Reservoir are lower than other reservoirs in the basin, 6 SU minimum and 8.5 SU maximum compared to 6.5 SU and 9 SU.

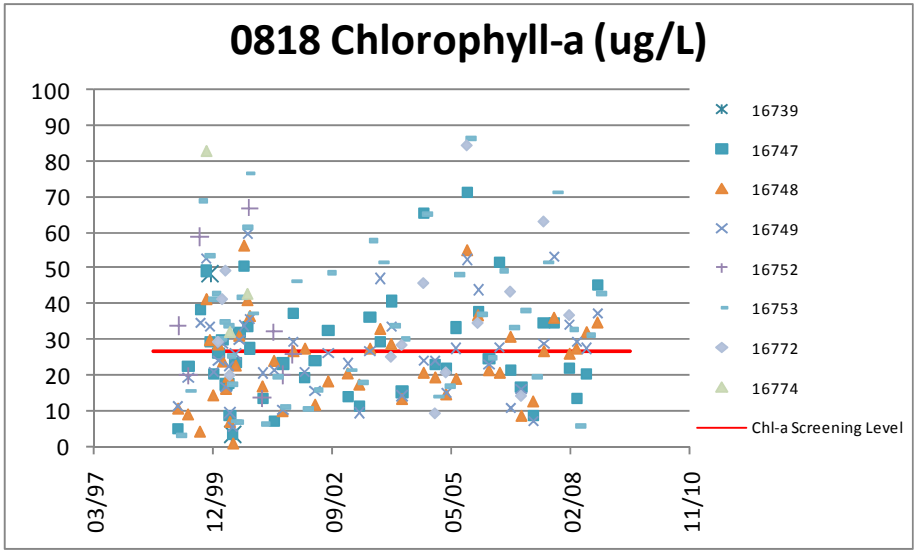


Figure K.4. Chlorophyll-a in Segment 0818.

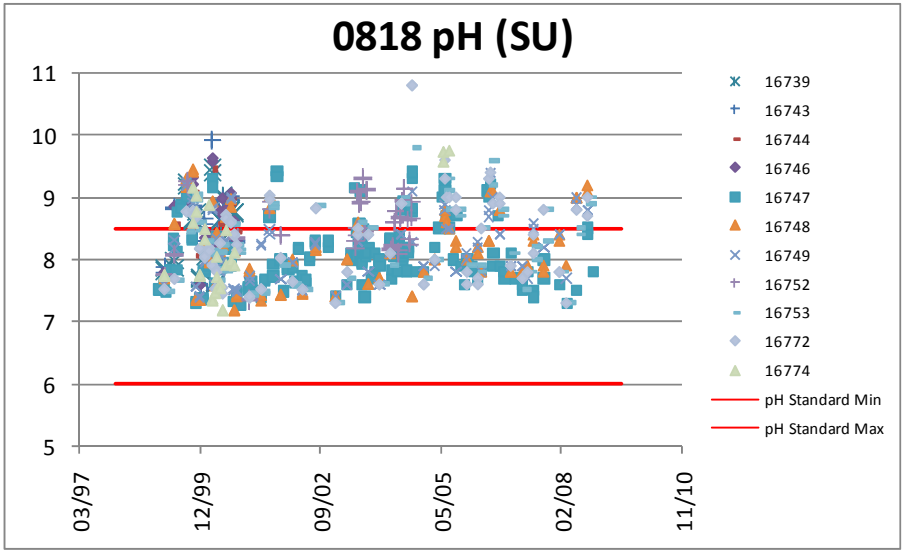


Figure K.3. pH in Segment 0818.

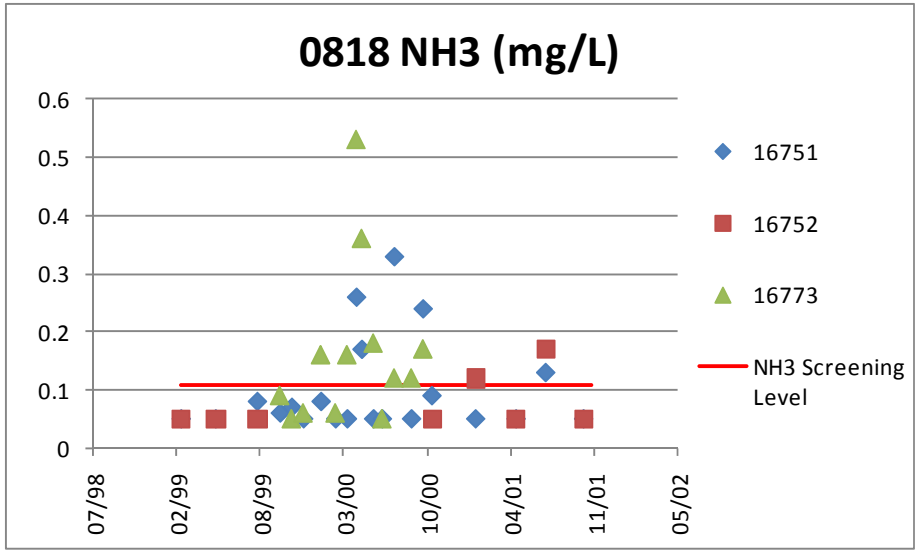


Figure K.5. Ammonia in Segment 0818.

Location	Parameter	Sites	N	Years	TSI	Classification
Near dam	Secchi Depth	1	60	10 years sampled from 1999-2008	63.3	Eutrophic
Southern end	Secchi Depth	2	7	4 years sampled from 1999-2005	59.8	Eutrophic
Near dam	Chlorophyll-a	1	47	10 years sampled from 1999-2008	63.1	Hypereuthrophic
Southern end	Chlorophyll-a	1	6	4 years sampled from 1998-2003	53.4	Eutrophic
Near dam	TP	1	48	10 years sampled from 1999-2008	70.7	Eutrophic
Southern end	TP	2	4	3 years sampled from 1998-2006	65.8	Eutrophic

Table K.2. Trophic State Index (TSI) for Selected Locations in Cedar Creek..

The TCEQ document, Trophic Classification of Texas Reservoirs, does not include Cedar Creek Reservoir due to inadequate data at the time the calculations were conducted. Carlson's Trophic State Index (TSI) calculations require 10 years of data. TSI values were calculated in-house for chlorophyll-a, TP, and Secchi depth using the 10-year period of record for this report. Based on the results of the TSI calculations, Cedar Creek Reservoir would fall into the eutrophic or hypereutrophic category. Table K.2 lists the TSI values and classifications. The TCEQ report specifies that data be taken from the site nearest to the dam. Cedar Creek Reservoir is somewhat unique in that the dam is located near the middle of this reservoir rather than at the downstream end. For these calculations, a site nearest to the dam (16747) and sites near the southern end of the reservoir (13845 and 16745) were used to determine if there was a difference between the two locations. The TCEQ report bases the overall trophic status on the chlorophyll-a TSI values. In this case, Cedar Creek Reservoir would best be classified as hypereutrophic as defined by the TSI calculated for the near dam site. As stated in the TCEQ report, reservoirs typically become more eutrophic as they age. Cedar Creek Reservoir was completed in 1965. The age of the reservoir, in addition to runoff from developments and communities as well as several municipal dischargers around the reservoir, are the most likely contributors to the high levels of pH, chlorophyll-a, and nutrients.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Fully Supporting, No Concern, or Not Assessed

Fish Consumption Use: Fully Supporting or Not Assessed

Trend Analysis Overview

There were 34 trends identified in this subwatershed. For additional detail on trend methods and results, see the Data Review Methods appendix.

Trends (Classified Segments):

There are upward trends in TDS values throughout the reservoir and TDS levels correspond very well with low lake elevations (fig. K.6). The largest peak in TDS coincides with an extended drought from 2005 to 2006 and may be the reason the TDS trends were found to be significant. Chloride trends followed the same pattern as the TDS.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Cedar Creek		Chloride			OP			pH			S.Depth			Sulfate			TDS Calc			TDS Meas			TP		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0818_01	16748			UP																UP	UP	UP			UP
0818_04	16749																			UP	UP	UP		UP	
0818_06	16747	UP		UP	UP	UP									DN			UP	UP	UP	UP	UP			
0818_06	16750				UP	UP					DN	DN	DN							UP	UP	UP		UP	
0818_09	16753				UP				UP		DN		DN							UP	UP	UP		UP	
0818_11	16772								UP								UP	UP							

Table K.3. Trends in Segment 0818.

It is likely that chloride trends are also explained by the recent drought.

Increasing trends for OP and TP appear to be related to high flows and increasing lake levels after the recent drought. Throughout the dataset, spikes in OP and TP values generally correspond to the flow values from the USGS gage on Cedar Creek (fig. K.7) and the highest values are found after the recent drought. Data suggests that nutrients are washed into the reservoir during runoff events. Regardless of the increasing trends, the observed values are well below the screening levels of 0.69 mg/L for TP and 0.37 mg/L for OP.

As discussed in the assessment section above, Cedar Creek Reservoir has high pH levels and Concerns for chlorophyll-a due to the hypereutrophic status of the reservoir. The increasing trends for pH and the decreasing trends for Secchi depth are likely due to the ongoing eutrophication of the reservoir.

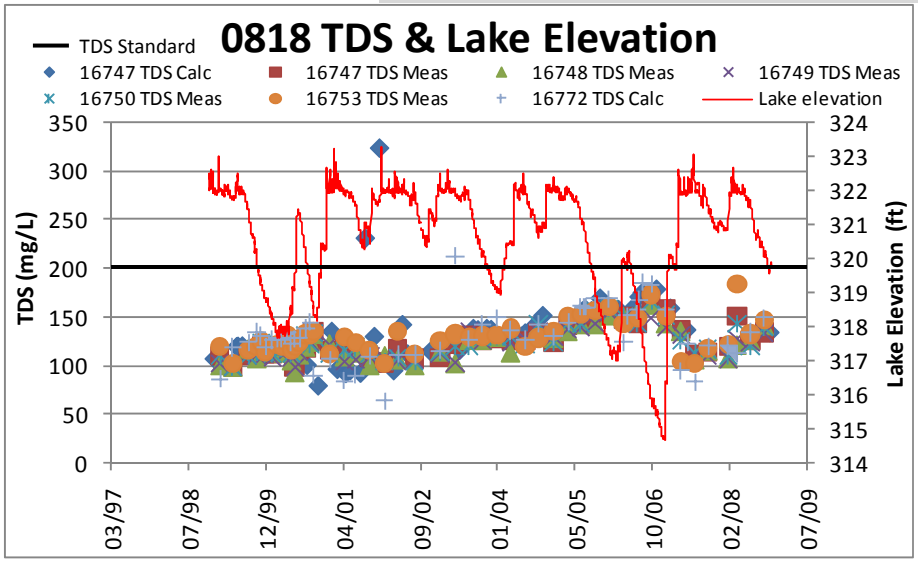


Figure K.6. TDS and Lake Elevation in Segment 0818.

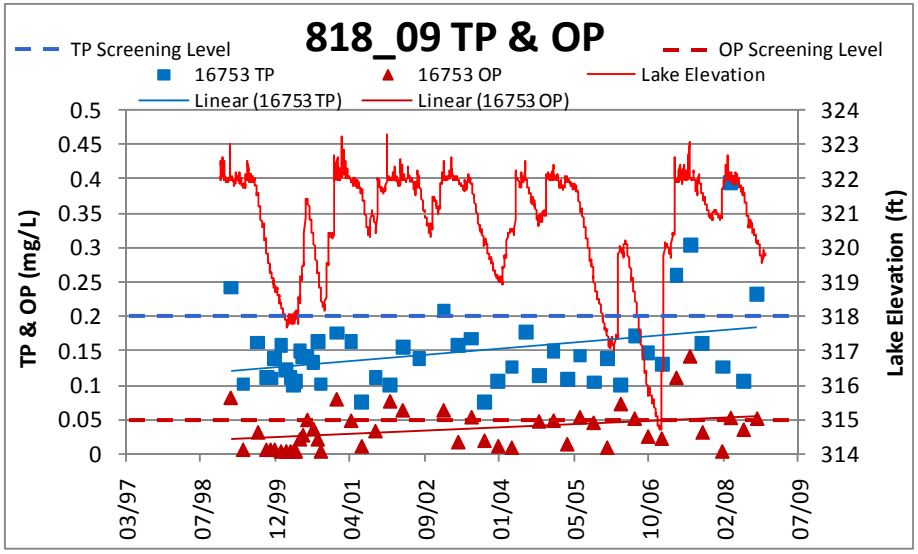


Figure K.7. TP and OP in Segment 0818_09.

Richland-Chambers

Land Use Type

- Crop/Pasture/Other Agricultural
- Forest
- Rangeland
- Urban/Industrial/Residential

RICHLAND-CHAMBERS

Classified Segments – 6
Unclassified Segments – 9

0816 – Lake Waxahachie
0816A – South Prong Creek
0815 – Bardwell Reservoir
0815A – Waxahachie Creek
0814 – Chambers Creek Above Richland-Chambers Reservoir
0814A – Mill Creek
0814B – South Fork Chambers Creek
0817 – Navarro Mills Lake
0817A – Richland Creek
0837 – Richland Creek Above Richland-Chambers Reservoir
0836 – Richland-Chambers Reservoir
0836A – Pin Oak Creek
0836B – Cedar Creek
0836C – Grape Creek
0836D – Post Oak Creek

Sites Used for Analysis:

2008 Assessment	21
Draft 2010 Assessment	39
5-Year Analysis	27
Valid Trends	9

Richland-Chambers - Count of Discharges by Type and County

County	Cooling Water	Domestic Sewage <1mgd	Mining	Stormwater	Wastewater >1 mgd	CAFO	Total Dischargers
JOHNSON		5					5
LIMESTONE		1					1
NAVARRO		9		1	4		14
Total		35		2	8		45

Figure L.1. Richland –Chambers Dischargers by Type.

The Richland-Chambers subwatershed extends approximately 100 river miles on the Chambers Creek branch and 79 miles on the Richland Creek branch. Chambers Creek begins in Johnson County and Richland Creek begins in Hill County. These two creeks come together to form Richland-Chambers Reservoir and the subwatershed ends at the dam in Freestone County. The subwatershed is predominately rural with row crop agriculture. The major population centers include Waxahachie and Corsicana.

This subwatershed receives between 32 and 40 inches of precipitation annually. The upper reaches of the main tributaries lie within the Blackland Prairies, while the reservoir itself lies within the Post Oak Savannah.

Both the Agricultural Warehouse Ennis and the Chemical Reclamation Services Avalon Facility are located near Bardwell Reservoir and are monitored by EPA's RCRA program. Special projects in this subwatershed include Envirocast, the Statewide Fish Tissue Monitoring Program, the Seven Lakes Atrazine Project, The Ellis-Prairie SWCD Water Quality Project, BMP verification, Implementation Support within the Navarro SWCD, Triazine Herbicide Monitoring in Navarro Mills Lake, the Statewide PAH Survey, and the Atrazine Remediation Project. These projects are discussed in more detail in the Special Projects chapter.

Segment 0816 – Lake Waxahachie

Overview

This 690 acre segment impounds South Prong Creek in Ellis County up to a normal pool elevation of 531 feet. The watershed is entirely within the Blackland Prairie ecoregion and the land use is nearly all classified as agriculture/pasture. Lake Waxahachie was characterized as being a eutrophic reservoir by the TCEQ Trophic Classification of Texas Reservoirs report.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Fully Supporting, No Concern, or Not Assessed.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Fully Supporting, No Concern, or Not Assessed

Fish Consumption Use: Not Assessed

Assessments (Unclassified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Fully Supporting, No Concern, or Not Assessed

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Not Applicable

Fish Consumption Use: Not Assessed

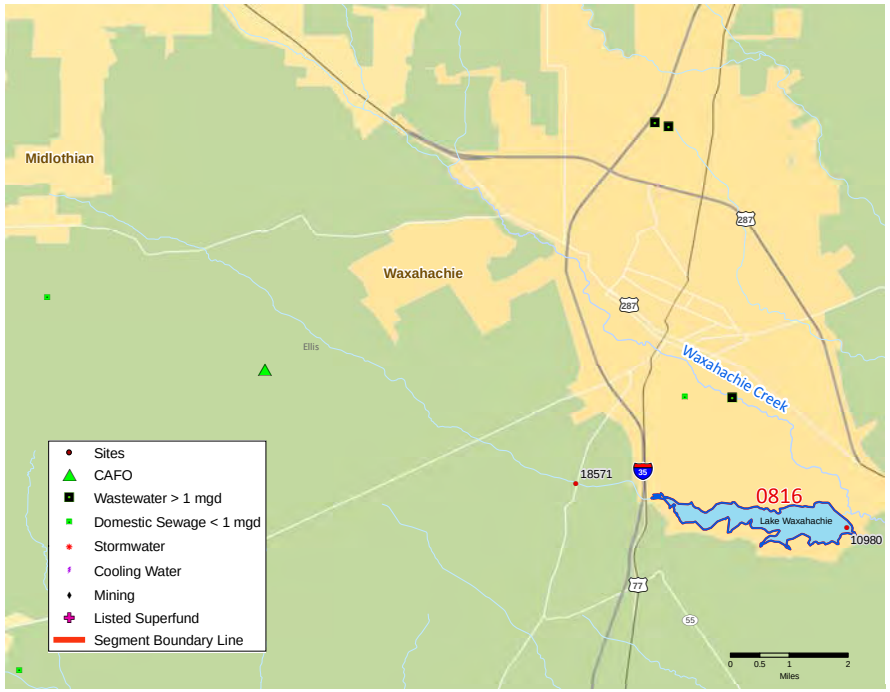


Figure L.1. Map of Segment 0816.

Trend Analysis Overview

There were 2 trends identified in this segment. For additional detail on trend methods and results, see the Data Review Methods appendix.

Richland Chambers		Sulfate			TDS Meas		
Seg_AU	Site	A	S	W	A	S	W
0816_01	10980	UP			UP		

Table L.2. Segment 0816 Trends.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Trends (Classified Segments):
Sulfate and TDS show upward trends (figs. L.2 and L.3). Both parameters track with lake elevation fairly well indicating that dilution during wet weather reduces sulfate and TDS levels in the reservoir (figs. L.2 and L.3). During dry weather these parameters increase. Aerial images show that most of the area around Lake Waxahachie is sparsely populated, aside from the City of Waxahachie, and is largely agricultural land. Irrigation runoff can contain high levels of TDS and sulfates which may be contributing to the upward trends seen in the reservoir. In addition, evaporation of water in the reservoir can cause sulfate and TDS levels to increase.

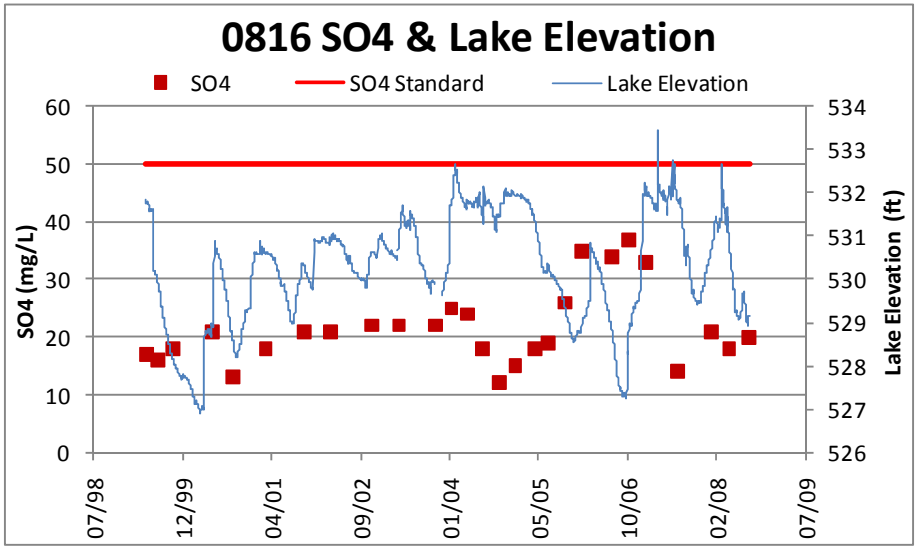


Figure L.2. Sulfate Values vs. Lake Elevation.

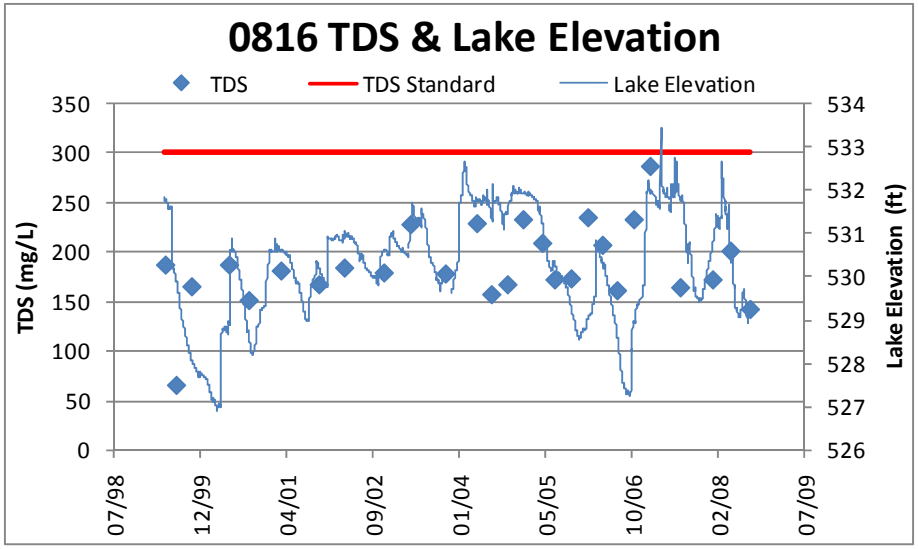


Figure L.3. TDS Levels vs. Lake Elevation

Segment 0815 – Bardwell Reservoir

Overview

This segment covers 3,500 acres and impounds Waxahachie Creek from Bardwell Dam in Ellis County up to the normal pool elevation of 421 feet. The watershed is nearly all classified as agriculture/pasture and is entirely within the Blackland Prairie ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: This segment was found to be Fully Supporting in both the 2008 and Draft 2010 Assessments. A Concern for depressed DO based on limited data was identified by the 5-year analysis. DO in this segment is generally well above the 24 hour average standard (fig. L.4). However, there is a small group of data collected in the spring and summer of 2006 that has lower observed values than the rest of the dataset and is the source of the Concern. This group of data correspond to high water temperatures expected for the season as well as slightly elevated chlorophyll-a. The corresponding temperature and chlorophyll-a data are not outside of the normal range of values seen in the reservoir. The most likely cause for the low observed DO values is the low lake elevations seen during the drought in 2006.

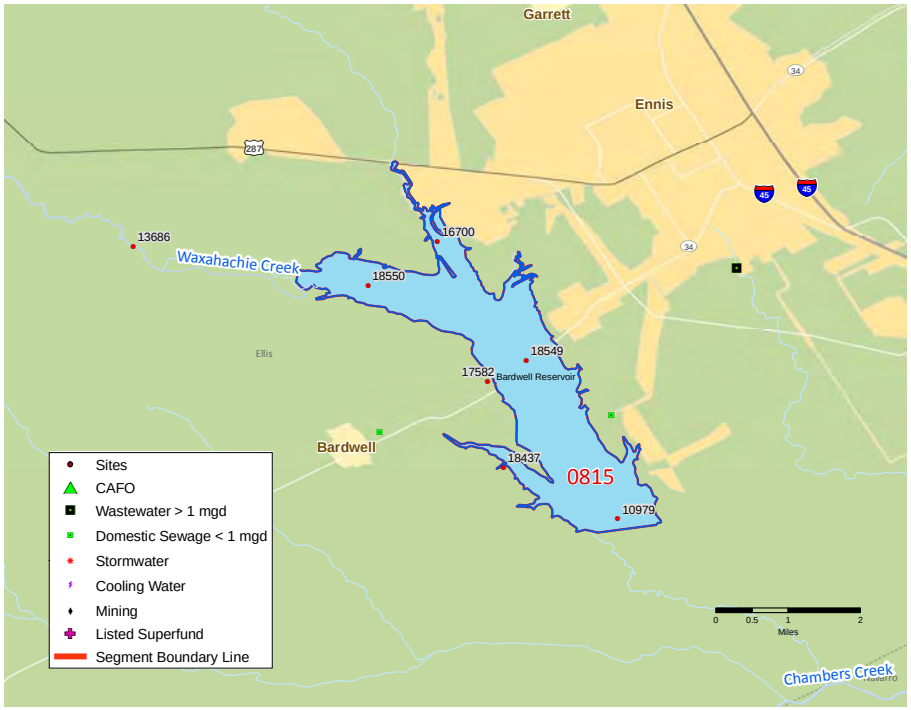


Figure L.5. Map of Segment 0815.

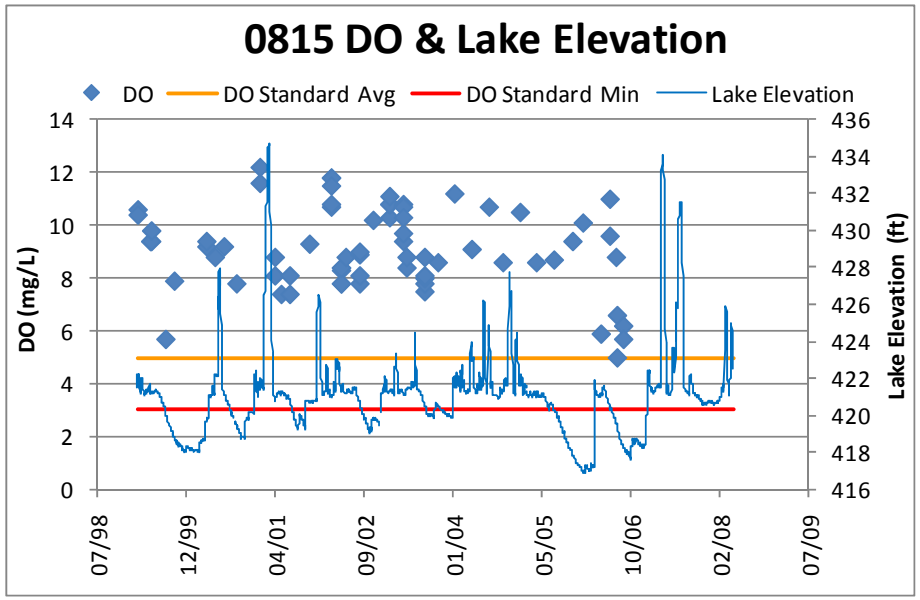


Figure L.4. Dissolved Oxygen and Lake Elevation in Segment 0815.

General Use: A Concern for nitrate was identified by the 2008 Assessment and was carried forward into the Draft 2010 Assessment. All other general use parameters were found to be Fully Supporting General Uses by both the 2008 and Draft 2010 Assessment. A Concern for chlorophyll-a was identified by the 5-year analysis.

The Concern for nitrate is based on a combination of both total and dissolved nitrate and total and dissolved nitrate plus nitrite. The observed values are consistently above the screening level of 0.37 mg/L (fig. L.6). It appears that the elevated values generally occur during precipitation events as measured at DFW International Airport indicating that the source of nitrates into the reservoir is runoff, rather

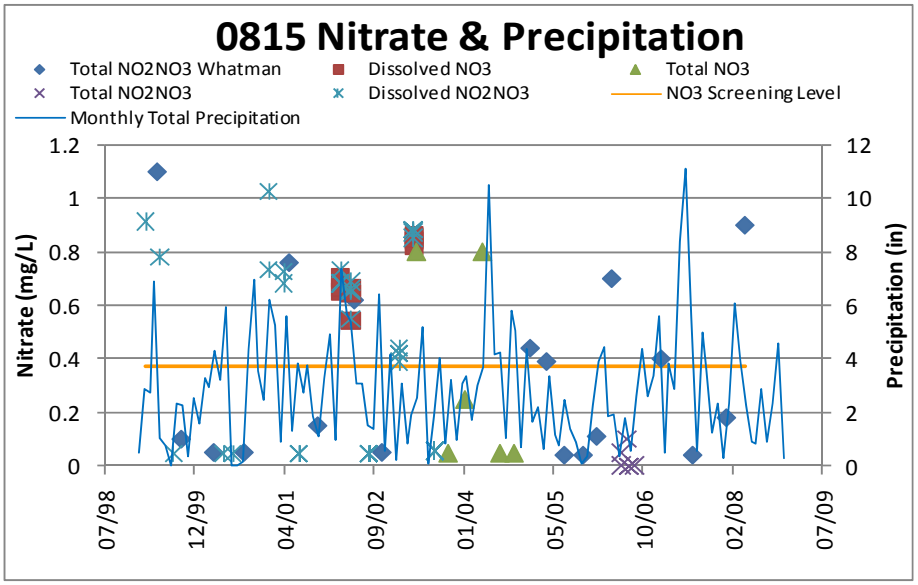


Figure L.6. Nitrate and Precipitation in Segment 0815.

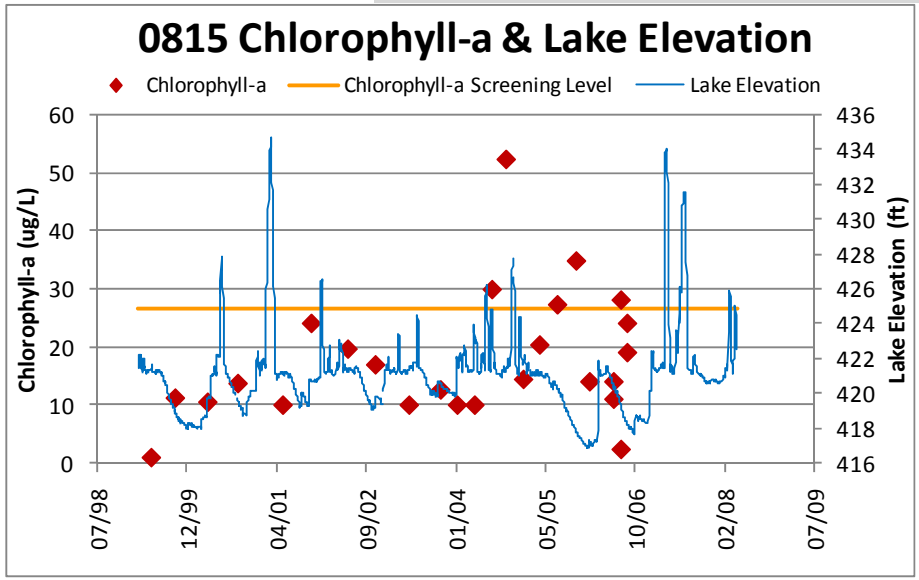


Figure L.7. Chlorophyll-a and Lake Elevation in Segment 0815.

than wastewater treatment plant dischargers. Similar to the area around Lake Waxahachie, the area around Lake Bardwell is sparsely populated, outside of the cities of Bardwell and Ennis, with large parcels of agricultural land. Runoff from agricultural fertilizers is a likely source of the elevated nitrates seen in the reservoir. Further, a majority of the values observed above the screening level occur in the spring when fertilizers are applied.

Bardwell Reservoir was characterized as being a hypereutrophic reservoir by the TCEQ Trophic Classification of Texas Reservoirs report. This report notes that reservoirs tend to accumulate nutrients and become more eutrophic as they age. Lake Bardwell began impounding water in 1965. Much of the observed chlorophyll-a data is near the screening level of 26.7 ug/L (fig. L.7). Several values are well above the screening level in more recent years, which may indicate that factors other than natural aging and eutrophication may have contributed to the elevated chlorophyll-a values. It is interesting to note that many of the elevated values occurred during extended periods of low lake elevation. The recent elevated values may be from algal blooms occurring during the periods of drought without additional flow inputs for dilution (fig. L.7).

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Fully Supporting, No Concern, or Not Assessed

Fish Consumption Use: Fully Supporting or Not Assessed

Assessments (Unclassified Segments):
Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: This segment was found to have Concerns for nitrate by both the 2008 and Draft 2010 Assessments. Nitrate values are frequently above the screening level of 1.95 mg/L (fig. L.8). Similar to the reservoir itself, it appears that the elevated nitrate values occur during runoff and high-flow events. As discussed for Bardwell Reservoir, the area surrounding Waxahachie Creek is sparsely populated and largely agricultural. It appears that agricultural fertilizer runoff is the source of the Concerns in this segment.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Not Applicable

Fish Consumption Use: Fully Supporting

Trend Analysis Overview
There were 5 trends identified in this segment. For additional detail on trend methods and results, see the Data Review Methods appendix.

Richland Chambers		OP			Sulfate			TDS Meas		
Seg_AU	Site	A	S	W	A	S	W	A	S	W
0815_01	10979			UP	UP	UP	UP			UP

Table L.3. Trends identified in Segment 0815.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Trends (Classified Segments):
Trends for sulfate and TDS steadily increased over the past 10 years (fig. L.9). There is an increase in the observed values that coincides with the drought in 2005 and 2006. Reasons for the increasing trends are similar to those discussed for Lake Waxahachie. Irrigation runoff from agricultural land and surface water evaporation can cause elevated TDS and sulfate levels.

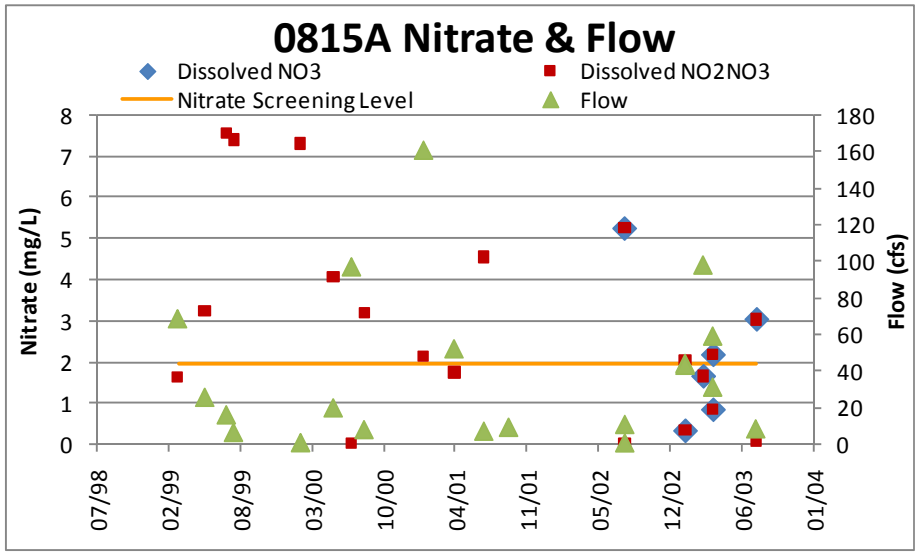


Figure L.8. Nitrate and Flow in Segment 0815A.

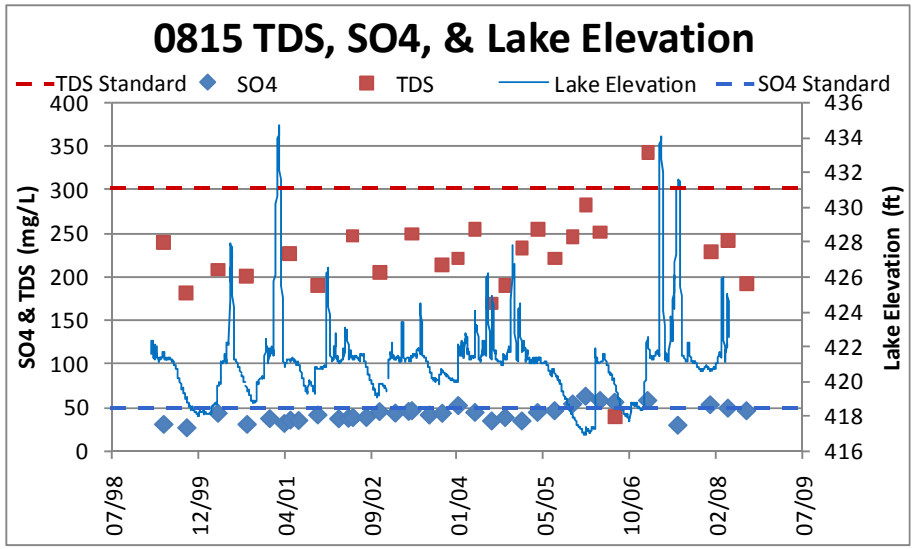


Figure L.9. TDS, Sulfate, and Lake Elevation in Segment 0815.

Segment 0814 – Chambers Creek Above Richland-Chambers Reservoir

Overview

This 49 mile segment starts at Chambers Creek above Richland-Chambers Reservoir and runs from a point 2.5 miles downstream of Tupelo Branch in Navarro County to the confluence of the North and South forks of Chambers Creek. This rural segment is entirely within the Blackland Prairie ecoregion and is nearly all classified as agriculture/pasture land use.

Assessments (Classified Segments):

Aquatic Life Use: The lower portion of this segment was found to have Concerns for depressed DO by the 2008 Assessment and 5-year analysis. This same portion and a middle portion of the segment was found to have Concerns for depressed DO on the Draft 2010 Assessment. In general, depressed DO observations occur during extended periods of low flow which occur in this segment in the late spring and summer (fig. L.10). A large portion of the low measurements shown in the graph occur during these times. Depressed DO in this segment can be attributed to high temperatures and low flows.

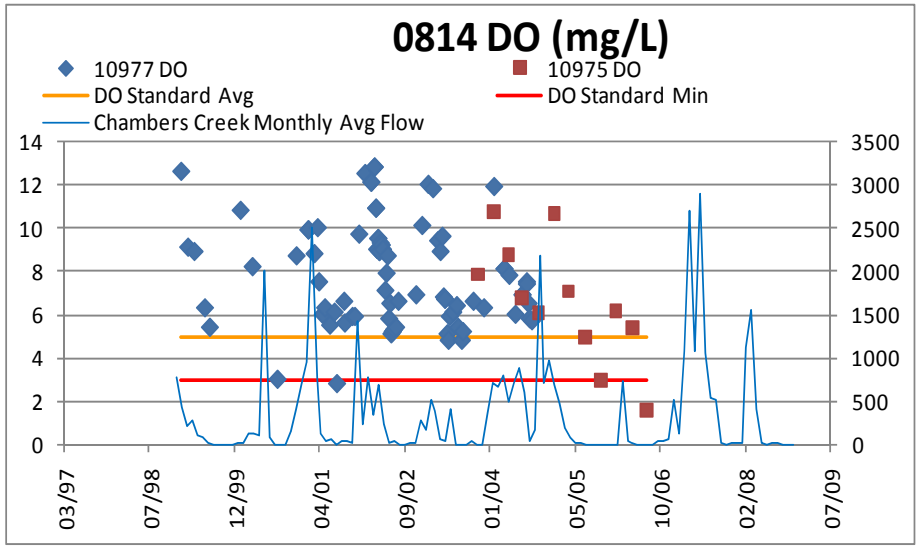


Figure L.10. Dissolved Oxygen in 0814.

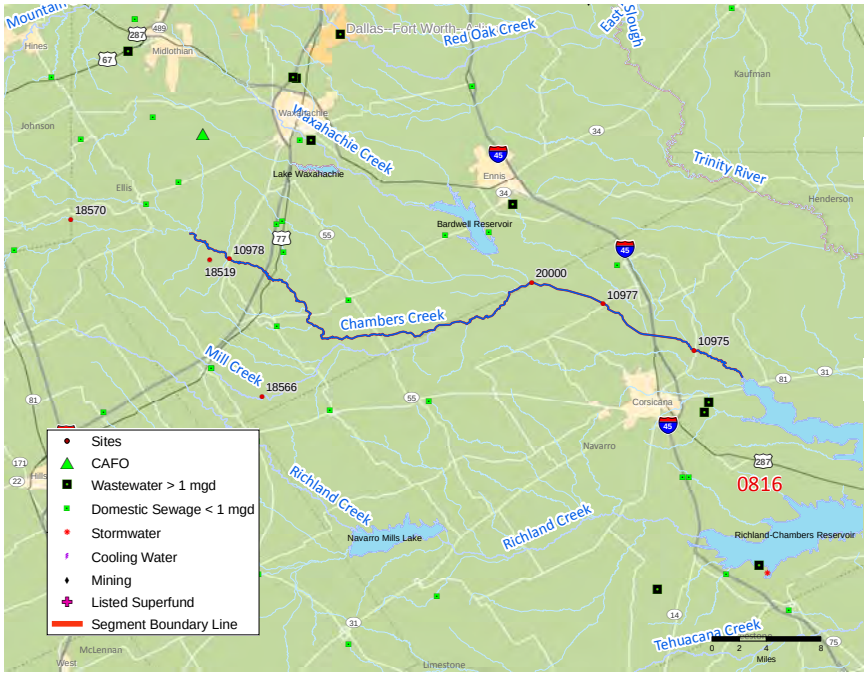


Figure L.11. Map of Segment 0814..

General Use: The lower portion of this segment was found to have Concerns for chlorophyll-a, OP, and TP by the 2008 Assessment. This same portion and a middle portion of the segment was found to have Concerns for chlorophyll-a, OP, and TP by the Draft 2010 Assessment. The 5-year analysis identified Concerns for OP and TP in the lower portion of the segment.

Elevated levels of TP and OP generally occur during high flow periods (fig. L.12), however, in late 2005 and 2006, elevated levels occur during low flows. In high flow periods, the most likely source of TP and OP into the segment is runoff from agricultural land. The period from 2005 to 2006 coincides with a severe drought. At this time, elevated TP and OP levels are most likely due to wastewater treatment plant dischargers; they provided a majority of stream flows during the drought without dilution from precipitation.

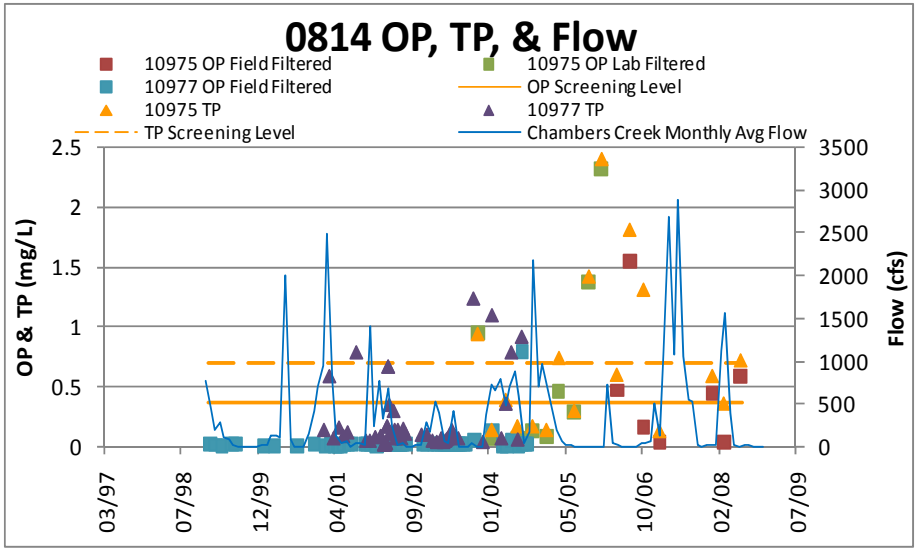


Figure L.12. OP, TP, and Flow in Segment 0814.

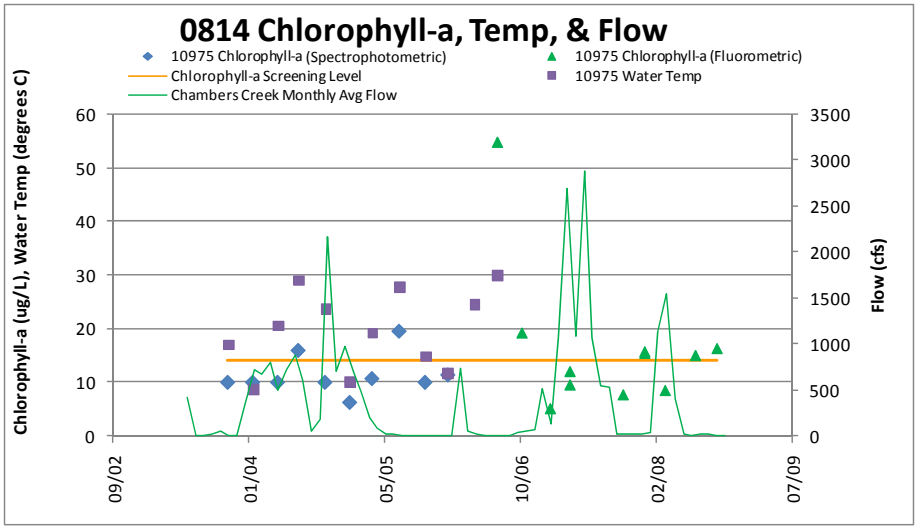


Figure L.13. Chlorophyll-a, Temperature, and Flow in Segment 0814.

Chlorophyll-a in this segment does not correspond to either phosphorous or nitrogen levels, but does appear to correlate with high water temperatures and low flows (fig. L.13).

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Fully Supporting, No Concern, or Not Assessed

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed

Assessments (Unclassified Segments):
Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Fully Supporting, No Concern, or Not Assessed

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Not Applicable

Fish Consumption Use: Not Assessed

Trend Analysis Overview
No trends identified in this segment.

Segment 0817 – Navarro Mills Lake

Overview

Navarro Mills Lake impounds Richland Creek and covers 5,070 acres when at its normal pool elevation of 242.5 feet. This rural segment's land use is classified mainly as agriculture/pasture, with some rangeland east of the lake. 0817 is located entirely within the Blackland Prairie ecoregion.

Assessments (Classified Segments):

Aquatic Life Use: This segment was found to be Fully Supporting the aquatic life use by both the 2008 and Draft 2010 Assessments. The 5-year analysis identified depressed DO values, based on limited data, in this segment. As expected, low DO observations in the reservoir typically occur during periods of low lake elevation and high water temperatures (fig. L.15).

General Use: This segment was found to have Concerns for nitrate by both the 2008 and Draft 2010 Assessments, and the 5-year analysis identified Concerns for OP. Figures L.16 and L.17 show how OP and nitrates correlate with lake elevation. Elevated nitrates generally occurred during high flow events resulting in lake elevation peaks. Elevated OP values, on the other hand, occurred during the drought of 2005 and 2006 (fig. L.17). This reservoir was characterized as being a eutrophic reservoir by the TCEQ Trophic Classification of Texas Reservoirs report. This eutrophic designation, along with the agricultural nature of the area around the reservoir, indicates that elevated nitrates are likely due to agricultural fertilizer runoff. Elevated OP levels may be due to wastewater treatment plant dischargers.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Fully Supporting, No Concern, or Not Assessed

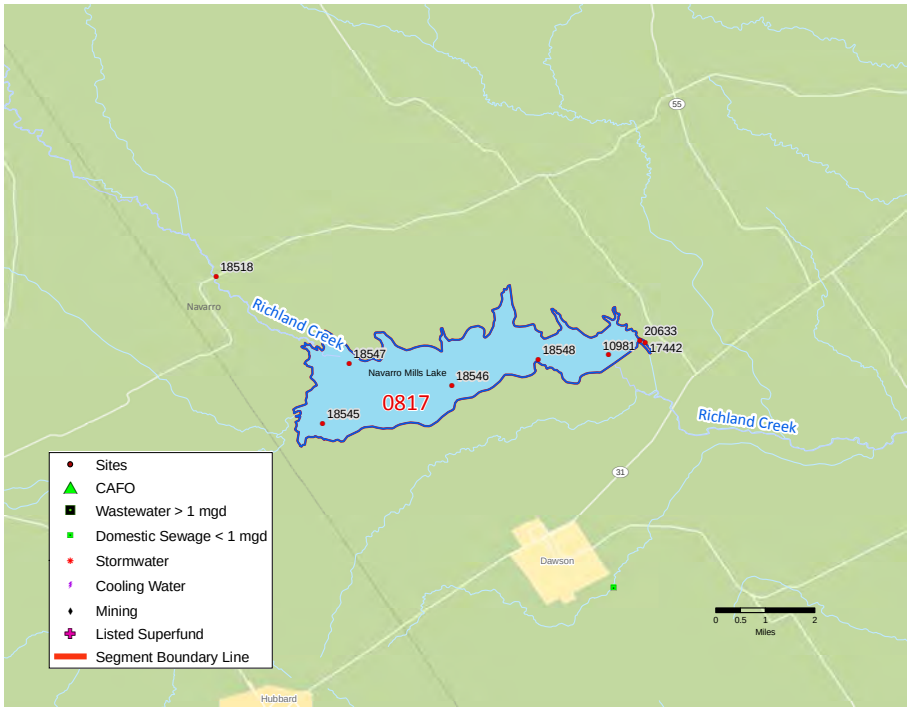


Figure L.14. Map of Segment 0817.

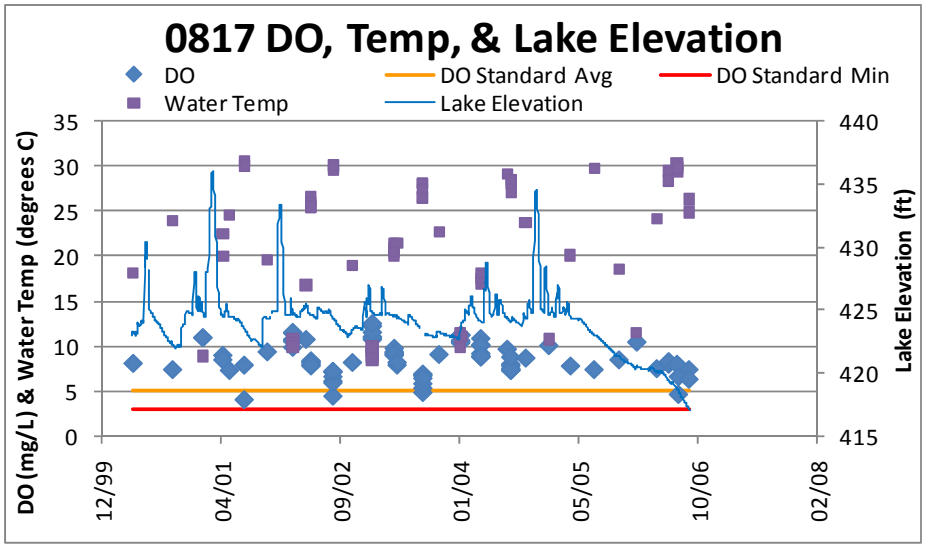


Figure L.15. DO, Temperature, and Lake Elevation in Segment 0817.

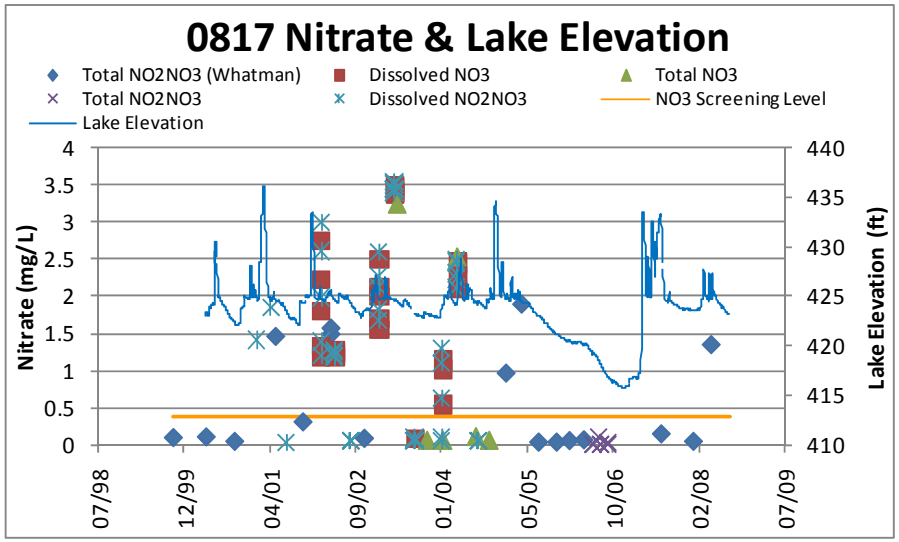


Figure L.16. Nitrate and Lake Elevation in Segment 0817.

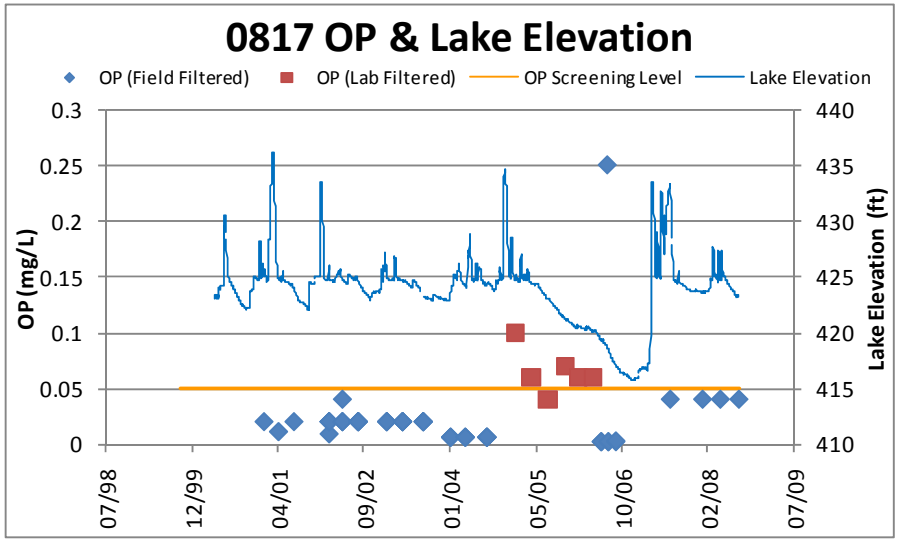


Figure L.17. OP and Lake Elevation in Segment 0817.

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed

Assessments (Unclassified Segments):
Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Fully Supporting, No Concern, or Not Assessed.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Not Applicable

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed

Trend Analysis Overview
There were 3 trends identified in this subwatershed. For additional detail on trend methods and results, see the Data Review Methods appendix.

Richland Chambers		Fluoride			W.Temp		
Seg_AU	Site	A	S	W	A	S	W
0817_01	10981		DN	DN		UP	

Table L.4. Trends in Segment 0817.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Trends (Classified Segments):
Fluoride shows a strong downward trend for summer and winter months. Water temperature shows a weak increasing trend (R^2 < 0.2) for summer months.

Segment 0837 – Richland Creek Above Richland-Chambers Reservoir

Overview

This 19 mile segment starts at the confluence of Pin Oak Creek in Navarro County and ends at the Navarro Mills dam in Navarro County. Segment 0837 is entirely within the Blackland Prairie ecoregion and is classified mostly as agriculture/pasture with interspersed tracts of rangeland and forest.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: Fully Supporting, No Concern, or Not Assessed

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Fully Supporting, No Concern, or Not Assessed

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed

Trend Analysis Overview

There were no trends identified in this segment.

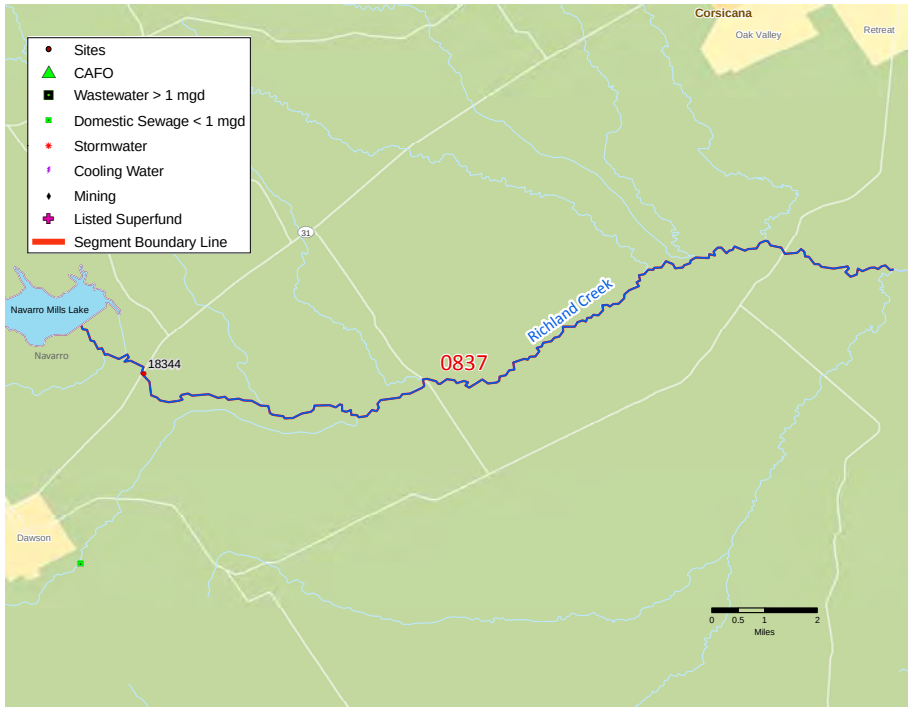


Figure L.18. Map of Segment 0837.

Segment 0836 – Richland-Chambers Reservoir

Overview

This 44,700 acre segment runs from the Richland-Chambers Dam in Freestone County up to the confluence of Pin Oak Creek on the Richland Creek Arm in Navarro County, and up to a point 2.5 miles downstream of Tupelo Branch on the Chambers Creek Arm in Navarro County. It impounds both Chambers Creek and Richland Creek up to the normal pool elevation of 315 feet. The reservoir is entirely within the Post Oak Savannah ecoregion and most of the land use is classified as agriculture/pasture with some portions of rangeland and forest.

Assessments (Classified Segments):

Aquatic Life Use: This segment was found to have Concerns for depressed DO by the Draft 2010 Assessment, as well as the 5-year analysis, in the lowermost portion of the lake near the dam. All other portions of the lake were found to be Fully Supporting or to have No Concern. In general, DO observations near the dam conform to expected patterns. DO decreases as water temperatures increase in the summer. Summer months are typically when lake elevations and DO levels tend to drop (fig. L.19). Several DO observations that are standard occurred around the time of the drought in 2005 and 2006. DO observations show no trend at this location.

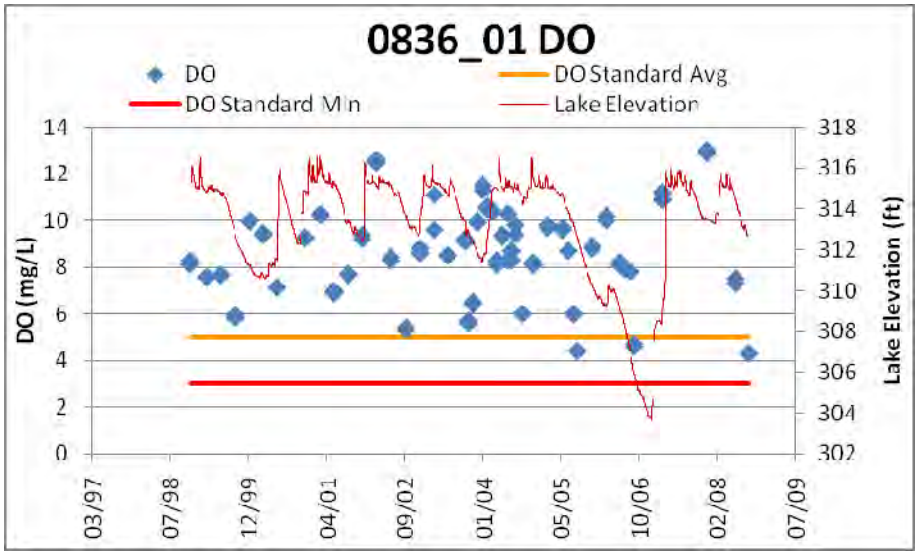


Figure L.19. Dissolved Oxygen in Segment 0836_01

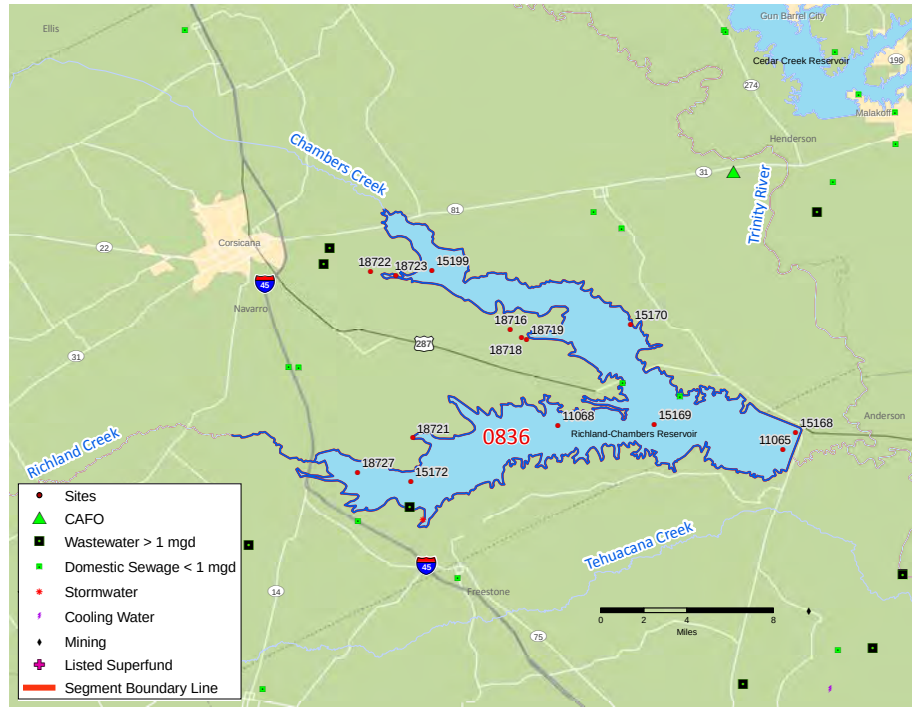


Figure L.20. Segment 0836 Map.

This reservoir was characterized as being eutrophic by the TCEQ Trophic Classification of Texas Reservoirs report. Eutrophication typically leads to low DO measurements during algal blooms. Therefore, it is important to closely monitor DO and chlorophyll-a levels to determine if DO levels will approach non-attainment levels in the future.

General Use: This segment was found to have a Concern for chlorophyll-a in the Richland and Chambers Creek arms by both the 2008 and Draft 2010 Assessments while the 5-year analysis identified a Concern in only the Chambers Creek arm. The 2008 Assessment and 5-year analysis identified a Concern for TP in the Chambers Creek arm. In addition, the 5-year analysis identified a Concern for TP in the Richland Creek arm. As mentioned above, this reservoir has been characterized as eutrophic. The buildup of nutrients in a reservoir as it ages can lead to increased chlorophyll-a levels from more frequent and larger algal blooms. Exceedances of TP and chlorophyll-a occur more frequently over time indicating that eutrophication is occurring (figs. L.21 and L.22). These Concerns are located in the arms of the reservoir. Much of the land around the reservoir is agricultural and it is possible that runoff from this land is contributing to the buildup of nutrients in the reservoir.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Fully Supporting, No Concern, or Not Assessed

Fish Consumption Use: Not Assessed

Assessments (Unclassified Segments):
Aquatic Life Use: Cedar Creek and Grape Creek were found to be Non-Supporting due to depressed DO on the Draft 2010 Assessment. In addition, Post Oak Creek was found to have Concerns for depressed DO on the Draft 2010 Assessment. DO data in these segments were collected during a special study within a two month period during the summer of one year. There are no nutrient, chlorophyll-a, or flow data available to determine the cause of the low DO in these segments. However, DO values in each creek are lower during sampling events with higher water temperatures (fig. L.23). More investigation is needed to determine the source of the DO impairments and Concerns in these segments.

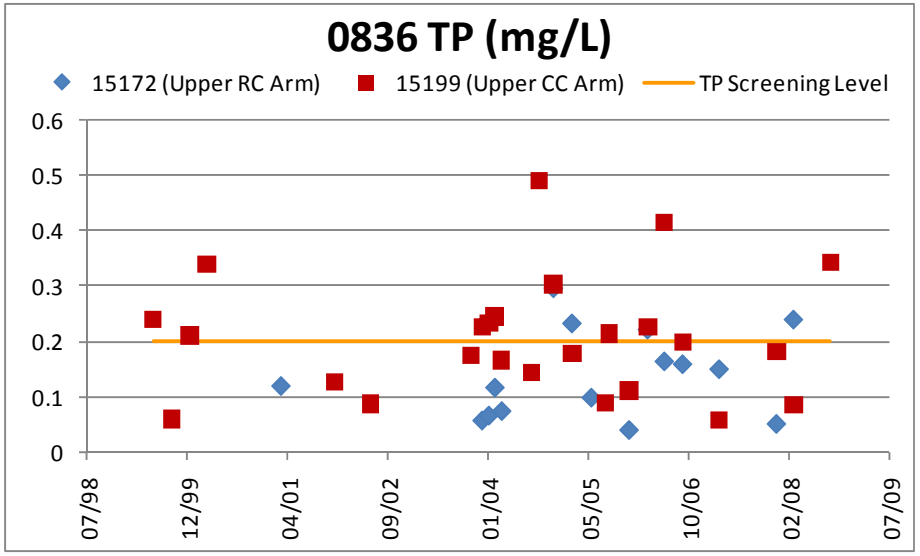


Figure L.21. Total Phosphorous in Segment 0836.

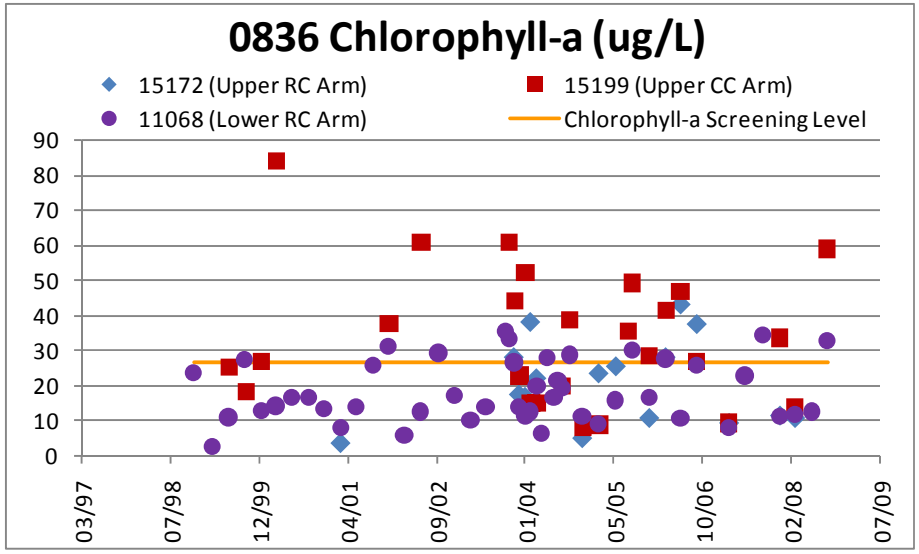


Figure L.22. Chlorophyll-a in Segment 0836.

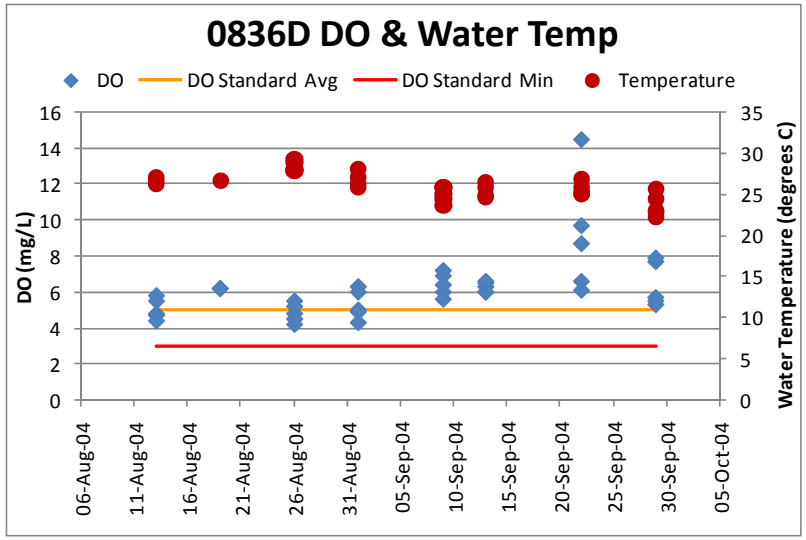


Figure L.23. DO and Water Temperature in Segment 0836D

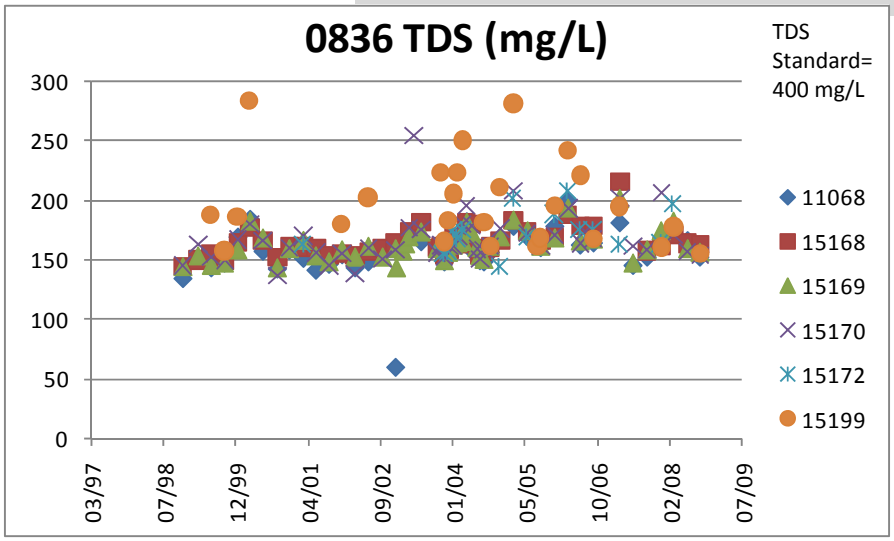


Figure L.24. TDS is Segment 0836.

General Use: Fully Supporting, No Concern, or Not Assessed

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Not Assessed

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed

Trend Analysis Overview

There were 32 trends identified in this segment. For additional detail on trend methods and results, see the Data Review Methods appendix.

Trends (Classified Segments):

As discussed above, increasing eutrophication in the reservoir explains the increasing trends for ammonia, OP, and TP. Sources of nutrients are likely runoff from agricultural land surrounding the reservoir.

TDS trends are increasing throughout the reservoir (fig. L.24). A possible source of TDS into the reservoir is irrigation runoff from agricultural land.

Richland Chambers		Amm			ChlA			Chloride			DO			OP			pH			S.Depth			Sulfate			TDS Calc			TDS Meas			TP			W.Temp		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0836_05	11068			UP										UP		UP					DN									UP			UP				
0836_01	15168															UP														UP			UP				
0836_02	15169			UP						UP						UP													UP		UP		UP				
0836_03	15170			UP								UP				UP		UP			DN			DN	DN			UP	UP		UP	UP					
0836_06	15172												UP																UP								
0836_04	15199						DN						UP																					DN		UP	

Table L.5. Trends in Segment 0836.

Trends Key

A-All Months

S-Summer/Growing Season (May-October)

W-Winter/Dormant Season (November-April)

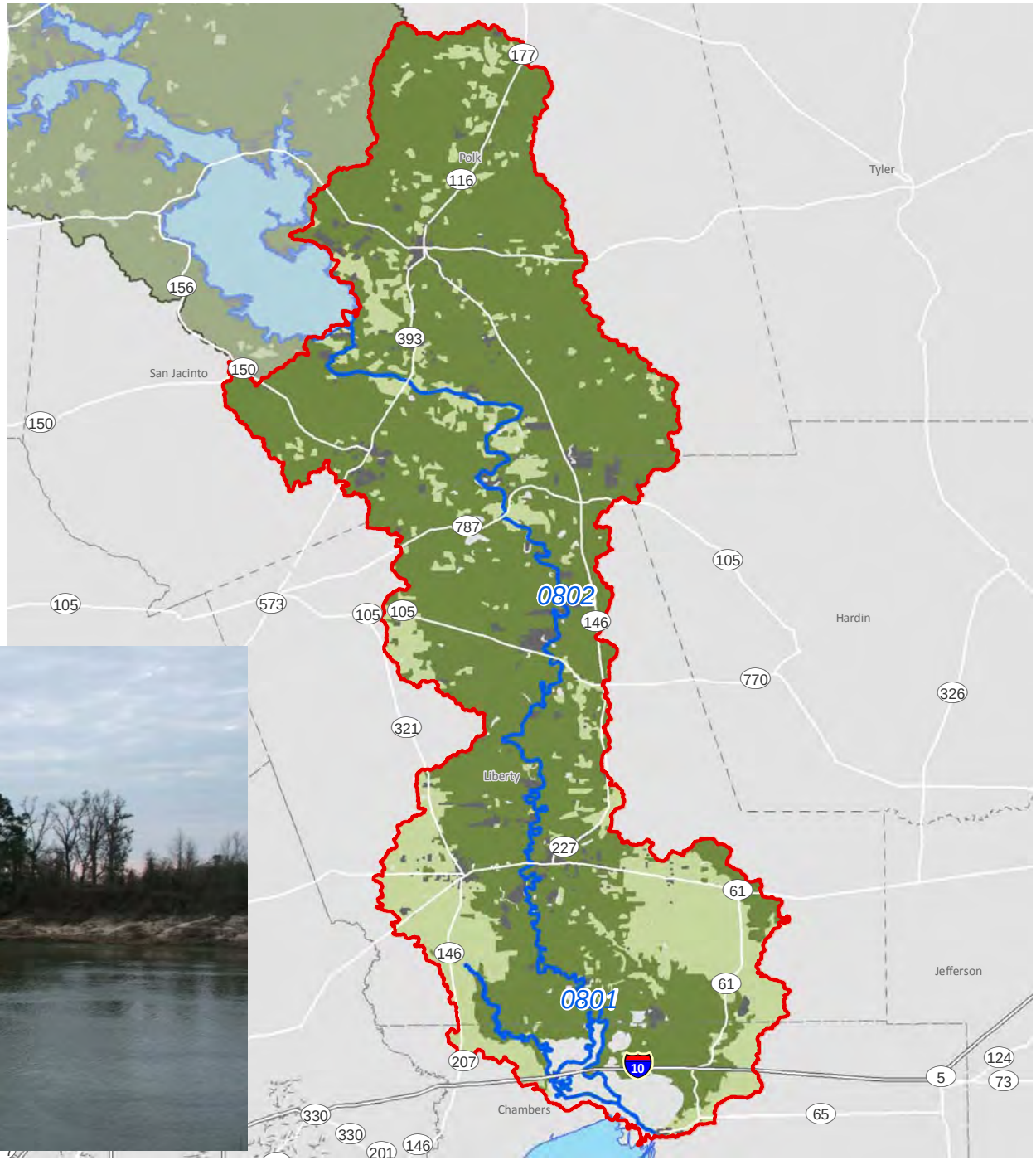
UP Increasing Trends

DN Decreasing Trends

Lower Trinity River

Land Use Type

- Crop/Pasture/Other Agricultural
- Forest
- Rangeland
- Urban/Industrial/Residential



LOWER TRINITY RIVER

Classified Segments – 2
Unclassified Segments – 8

0802 – Trinity River Below Lake Livingston
0802A – Choate's Creek
0802B – Long King Creek
0802C – Unnamed Tributary of Coley Creek
0802D – Menard Creek
0801 – Trinity River Tidal
0801A – Lost River
0801B – Old River
0801C – Cotton Bayou
0801D – Coastal Water Authority Canal/Lynchburg Canal

Sites Used for Analysis:

2008 Assessment	6
Draft 2010 Assessment	20
5-Year Analysis	12
Valid Trends	4

Lower Trinity - Count of Discharges by Type and County							
County	Cooling Water	Domestic Sewage <1mgd	Mining	Stormwater	Wastewater >1 mgd	CAFO	Total Dischargers
CHAMBERS		5					5
LIBERTY		4			4		8
POLK		10			1		11
SAN JACINTO		2					2
Total		21			5		26

Table M.1. Count of Dischargers by Type and County in the Lower Trinity River Subwatershed.

The Lower Trinity River subwatershed extends 119 river miles from the Lake Livingston Dam in San Jacinto and Polk counties to the mouth of the river in Chambers County. The subwatershed is largely rural and major population centers include the cities of Livingston and Liberty. The City of Houston, which lies outside of the basin, pulls water from the river in this area. This subwatershed receives between 46 and 54 inches of rain annually.

The Petro-Chemical Systems, Inc. (Turtle Bayou) Superfund site is located in this subwatershed near the town of Liberty. Assessment and cleanup of this site took place in the mid-1980's. However, monitoring has identified high levels of benzene in the soil near a contaminated groundwater monitoring well. The site is currently being assessed and previous groundwater monitoring indicates the contamination is localized. Special projects in this subwatershed include the National Rivers and Streams Assessment. This and other projects are discussed in more detail in the Special Projects chapter.

Segment 802 – Trinity River Below Lake Livingston

Overview

This 85 mile segment runs from a point 1.9 miles downstream of US 90 in Liberty County to the Livingston Dam on the border of Polk and San Jacinto counties. It begins in the Piney Woods and ends in the Coastal Prairie and Marsh ecoregion. The vast majority of the land use is classified as forest.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: All three methodologies identified a Concern for chlorophyll-a. A Concern for high pH based on limited data was identified by the Draft 2010 Assessment in one of the lower reaches of this segment (0802_02).

Chlorophyll-a levels throughout the segment are consistently high with a majority of the values above the screening level of 14.1 ug/L. As expected, Secchi depth measurements decrease as chlorophyll-a levels increase. Chlorophyll-a levels seem to follow the same general pattern as OP levels (fig. M.1). Chlorophyll-a and OP levels across the segment steadily increased and peaked in 2006 before beginning to fall closer to the chlorophyll-a screening level. Prior to this peak, Lake Livingston was maintained at lower than normal elevations (fig. M.3) for dam repair after damage from Hurricane Rita. In addition, the lack of additional flow for dilution from the Lake Livingston outfall likely contributed to the lower values seen at the end of 2005 and early 2006. As the lake started to fill in the fall of 2006 and began to release more water, the measurements peaked and lead to the high levels of chlorophyll-a observed and the resulting Concern. This indicates that the source of high chlorophyll-a levels may be the reservoir. The screening level for chlorophyll-a in the reservoir is 26.7 ug/L as compared to 14.1 ug/L in the river downstream of the reservoir.

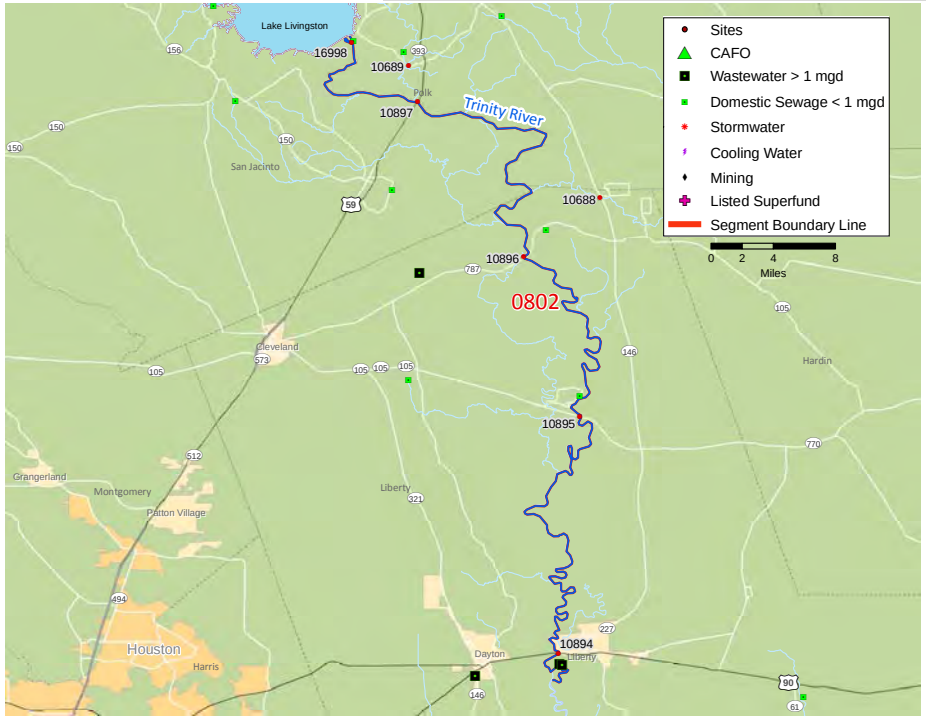


Figure M.2. Map of Segment 0802.

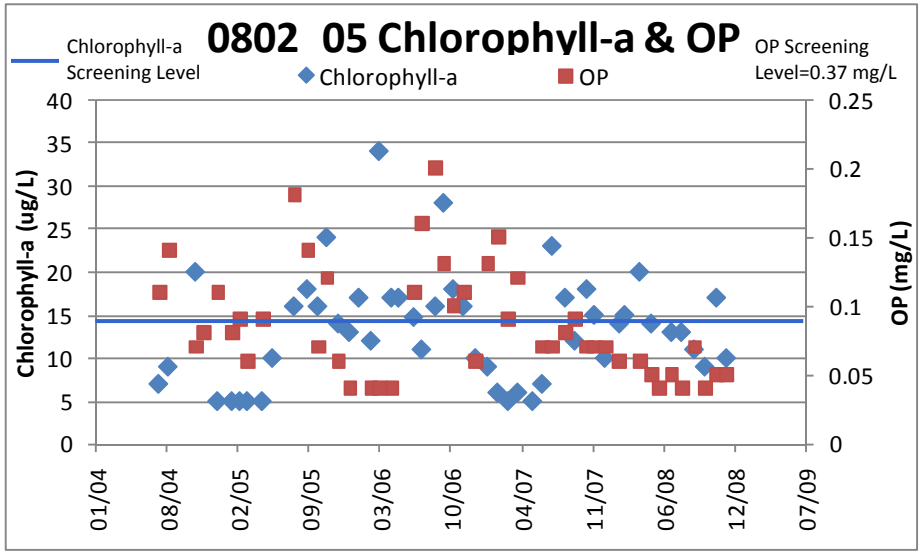


Figure M.1. Chlorophyll-a and OP in Segment 0802_05.

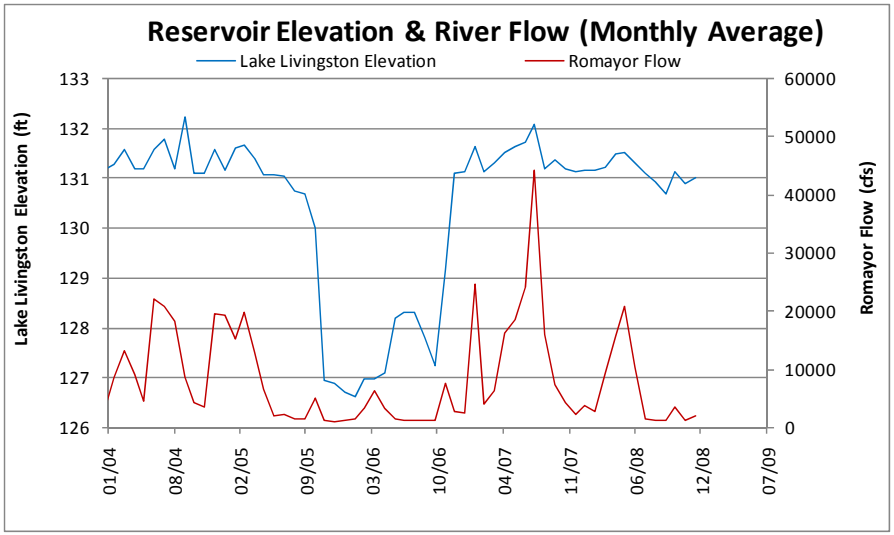


Figure M.3. Lake Livingston Reservoir Elevation and Flow at Romayor.

The pH levels throughout the segment are high as well. However, only one portion, near the lower end of the segment, had a Concern for elevated pH. Unfortunately, there were no chlorophyll-a data to confirm the source of the elevated readings.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Fully Supporting or No Concern

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed

Assessments (Unclassified Segments):
Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed.

General Use: The 5-year analysis identified a Concern for low pH based on limited data in Menard Creek. Investigation of aerial images and GIS data showed that Menard Creek drains an area of pine forest and the water in the creek appears to be tannin stained. The staining is caused by high levels of humic acid that is picked up by water running over the ground and into the stream. The result of tannin staining in waterbodies is typically low pH, and this is likely the cause of the low pH values observed in this creek.

Contact Recreation Use: A Concern for elevated E. coli levels was identified in Menard Creek by the Draft 2010 Assessment and 5-year analysis. These findings are based on a limited dataset with two values well above the single and geomean standards. One high value occurred during high flow and the other high value occurred during relatively normal flows. Further investigation will be needed to determine the sources and the extent of this finding.

Public Water Supply Use: Not Applicable

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed

Trend Analysis Overview
There were 18 trends identified in this segment. For additional detail on trend methods and results, see the Data Review Methods appendix.

Trends Key
A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

Lower Trinity River		Amm			Chloride			Hard			OP			Sulfate			TDS Meas		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0802_01	10894				UP		UP				UP	UP				UP	UP		UP
0802_03	10896				UP		UP				UP	UP				UP		UP	
0802_04	10897			UP				UP	UP								UP	UP	

Table M.2. Trends identified in Segment 0802.

Trends (Classified Segments):
Ammonia in 0802_04 shows an increasing trend in winter months. This data set is weighted on the front end by values below the detection limit. In addition, the highest value in the data set is 0.06 mg/L which is well below the screening level of 0.33 mg/L.

Trends for chloride, hardness, sulfate, and TDS are increasing throughout the segment. As shown in Figure M.4, the pattern for each parameter is similar across stations, and indicates that conditions along the segment are similar. The observed values are each well below their standards of 125 mg/L for chloride, 100 mg/L for sulfate, and 600 mg/L for TDS. Peaks in observed values correspond very well with flows. Again, the highest peaks are seen during the period when Lake Livingston was maintained at low levels for dam repairs.

The same is true for OP values (fig. M.5). The observed values are also well below the screening level of 0.37 mg/L, indicating that water released from Lake Livingston dilutes downstream inputs. When releases from Lake Livingston are low, observed values for conventional and nutrients rise. Potential sources for these constituents include irrigation runoff and local soils (clays and sandy loams). Further investigation will be needed to determine if the sources are natural or anthropogenic.

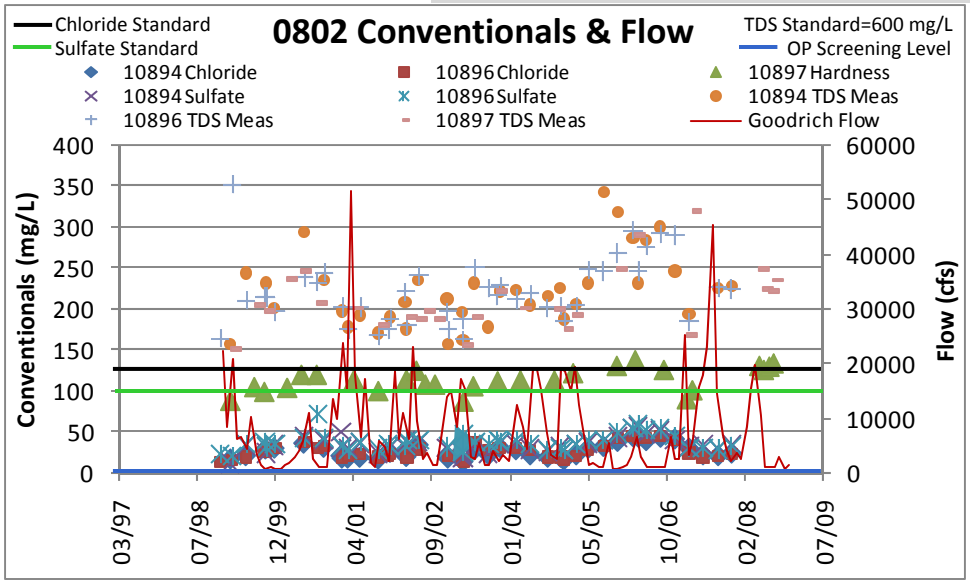


Figure M.4. Conventionals and Flow in Segment 0802.

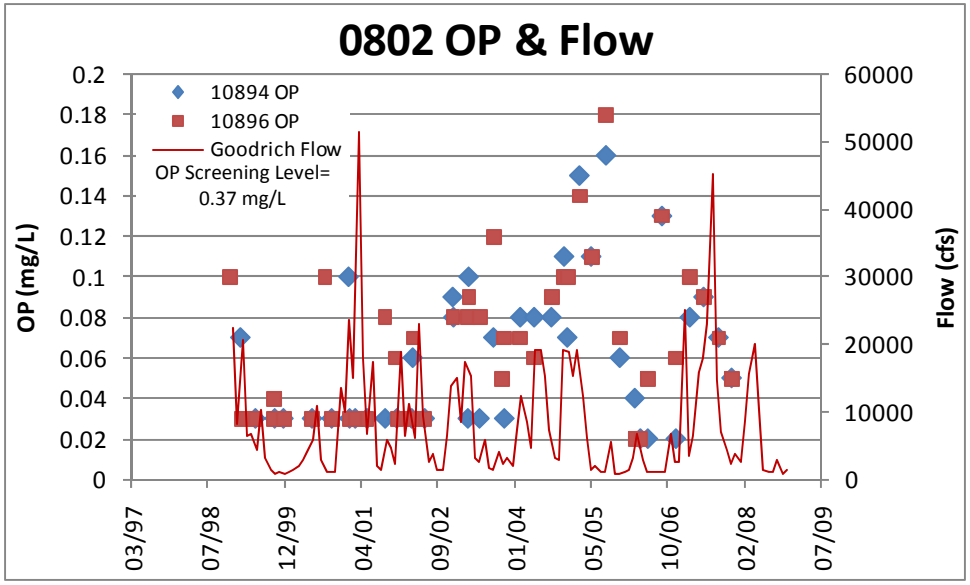


Figure M.5. OP and Flow in Segment 0802.

Segment 0801 – Trinity River Tidal

Overview

This 34 mile segment is tidally influenced and runs from the confluence of Anahuac Channel in Chambers County to a point 1.9 miles downstream of US 90 in Liberty County. This rural segment is all within the Coastal Prairie and Marsh ecoregion and is almost evenly split between forest and agriculture/pasture land uses.

Assessments (Classified Segments):

Aquatic Life Use: Fully Supporting, No Concern, or Not Assessed

General Use: A Concern for chlorophyll-a was identified by the Draft 2010 Assessment. Figure M.6 displays chlorophyll-a, TP, and OP data which, prior to the summer of 2004, were below their screening levels of 21 ug/L, 0.46 mg/L, and 0.66 mg/L, respectively. Shortly after the summer of 2004, observed values for chlorophyll-a, TP, and OP began increasing. Additional analysis of the historical data in this area indicates that the apparent increase may be an artifact of the period of record used for this report. Further investigation is ongoing.

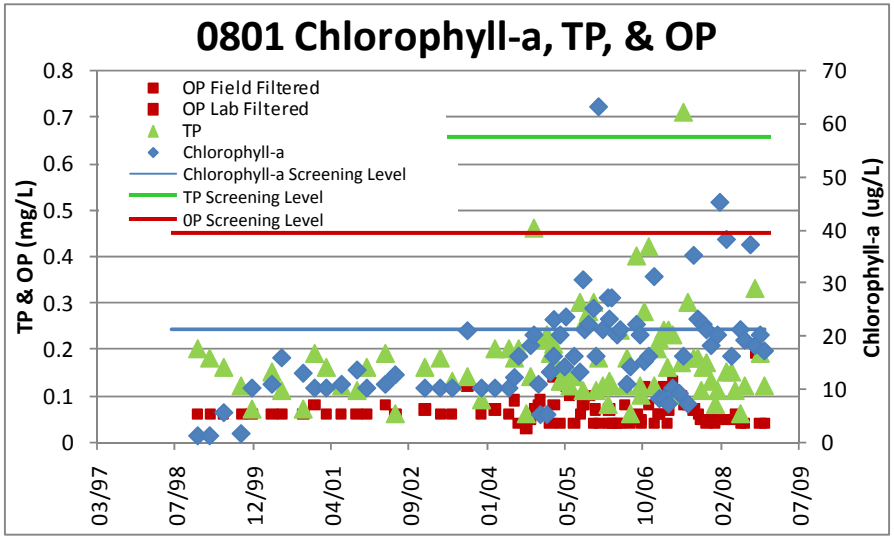


Figure M.6. Chlorophyll-a, TP, and OP in Segment 0801.

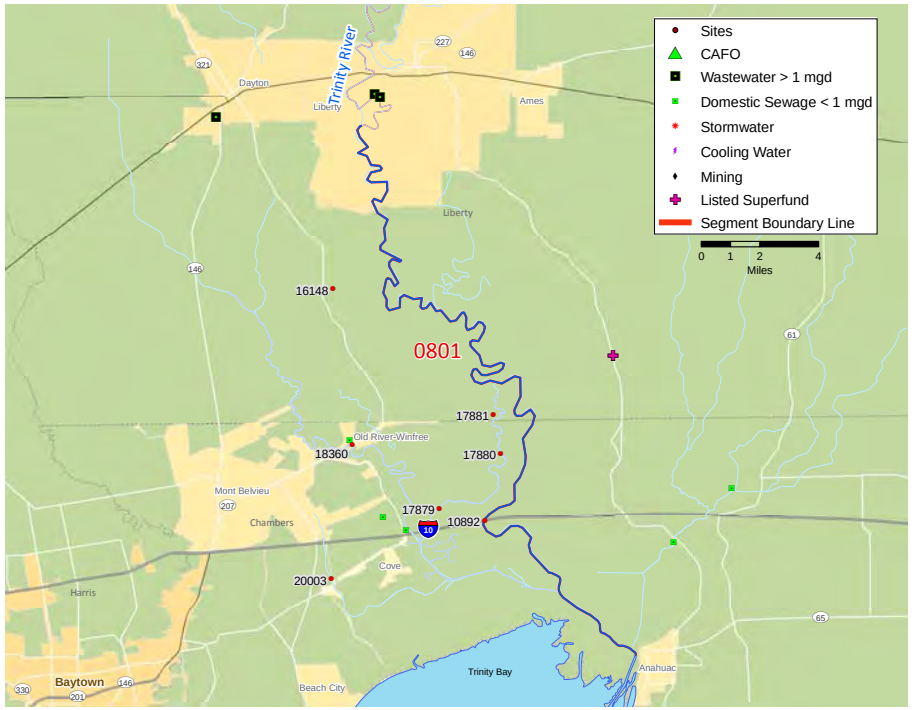


Figure M.7. Map of Segment 0801.

Contact Recreation Use: Fully Supporting, No Concern, or Not Assessed

Public Water Supply Use: Not Applicable

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed

Assessments (Unclassified Segments):

Aquatic Life Use: Cotton Bayou was found to be Non-Supporting due to depressed DO on the 2008 Assessment. As a result of a special study, this finding was removed in the Draft 2010 Assessment.

General Use: A Concern for chlorophyll-a in Old River (0801B) was identified by both the 2008 and Draft 2010 Assessments. Concerns for nitrate, OP, and TP were identified in the Draft 2010 Assessment for Cotton Bayou (0801C). The 5-year analysis identified Concerns for pH and dissolved zinc based on limited data for the Lynchburg canal. These Concerns are based on one high dissolved zinc value and one low pH value.

Figure M.8 shows data for chlorophyll-a, TP, and OP in Old River (0801B). No data prior to the summer of 2004 is available, but the data after this time follows a pattern similar to that seen in the segment 0801 graph (fig. M.6).

Figure M.9 shows data for TP, OP, and nitrate data for Cotton Bayou (0801C). As discussed for 0801 and 0801B, the reason for the increasing values after the summer of 2004 appears to be an artifact of the period of record used for this report.

Contact Recreation Use: The Draft 2010 Assessment identified Cotton Bayou as Non-Supporting due to elevated levels of E. coli and enterococci (fig. M.10). Review of NOAA precipitation maps showed that the highly elevated measurements occurred during, or immediately after, a heavy precipitation event. However, the slightly elevated values did not occur during precipitation events. Exact sources of the bacteria in this segment are unknown. There is a large wooded area on the right bank and a large residential area on the left bank, therefore, pets and wildlife are the likely sources of bacteria into Cotton Bayou.

Public Water Supply Use: Not Applicable

Fish Consumption Use: Fully Supporting, No Concern, or Not Assessed

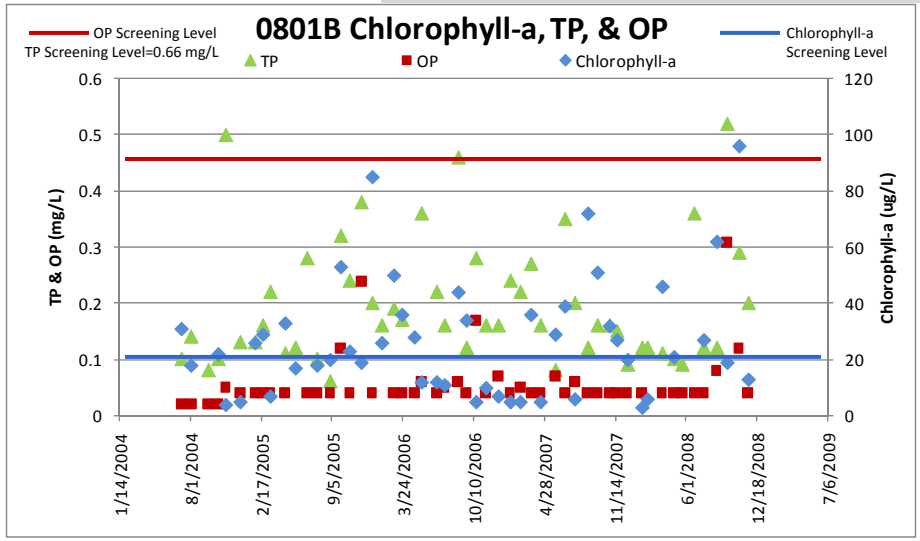


Figure M.8. Chlorophyll-a , TP, and OP in Segment 0801B (Old River).

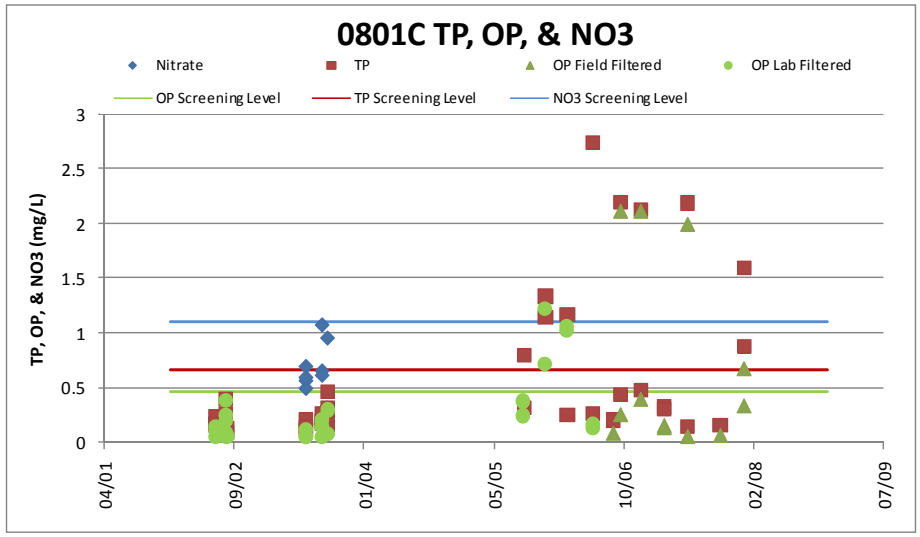


Figure M.9. TP, OP, and Nitrate in Segment 0801C (Cotton Bayou).

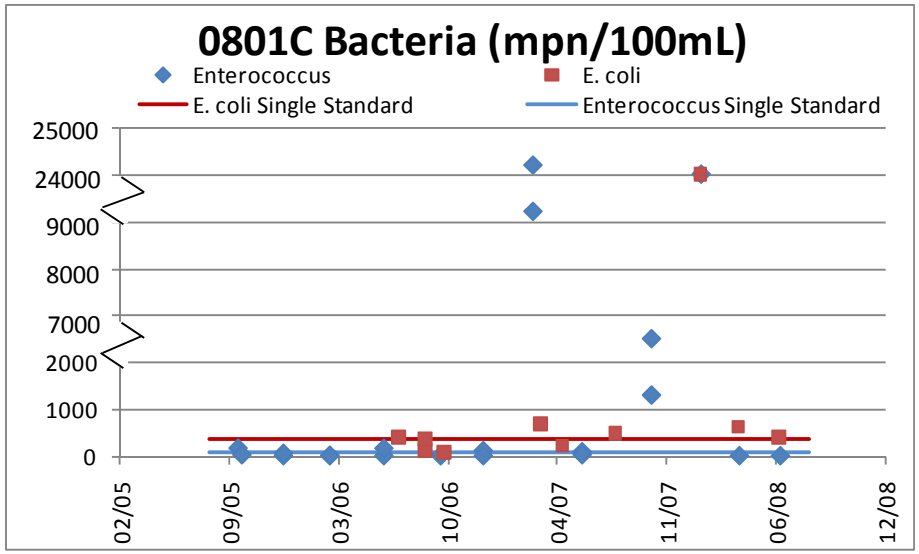


Figure M.10. Bacteria in Segment 0801C (Cotton Bayou).

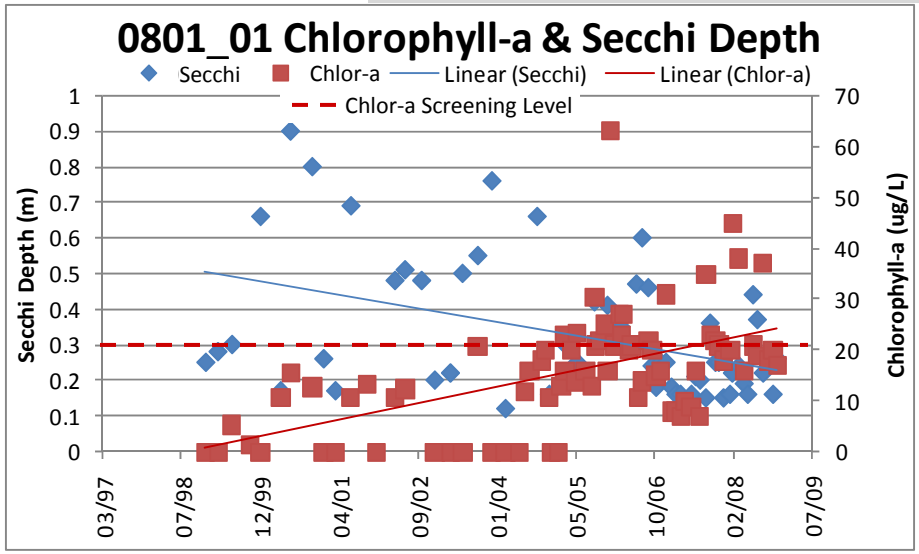


Figure M.11. Chlorophyll-a and Secchi Depth in Segment 0801.

Trend Analysis Overview

There were 9 trends identified in this segment. For additional detail on trend methods and results, see the Data Review Methods appendix.

Trends (Classified Segments):

As discussed in the Assessments section, chlorophyll-a shows an increasing trend. This trend is the most likely cause of the decreasing Secchi depth measurements observed in this segment. Figure M.11 shows the chlorophyll-a and Secchi depth values for the period of record, although the significant trend for chlorophyll-a was confined to the summer months.

The trend for DO in this segment is increasing for the winter months (fig. M.12). As expected, DO correlates with the water temperature. As the temperature decreases the amount of oxygen dissolved in the water increases.

TDS measurements in the winter months displayed an increasing trend (fig. M.13). However, these measurements occurred during high flow events and there is no standard for TDS in this segment as it is tidally influenced.

Lower Trinity River		ChlA			DO			Entero			Nitrate			S.Depth			TDS Meas		
Seg_AU	Site	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W	A	S	W
0801_01	10892		UP				UP	DN	DN	DN			DN	DN	DN				UP

Table M.3. Trends identified in Segment 0801.

Trends Key

A-All Months
S-Summer/Growing Season (May-October)
W-Winter/Dormant Season (November-April)
UP Increasing Trends
DN Decreasing Trends

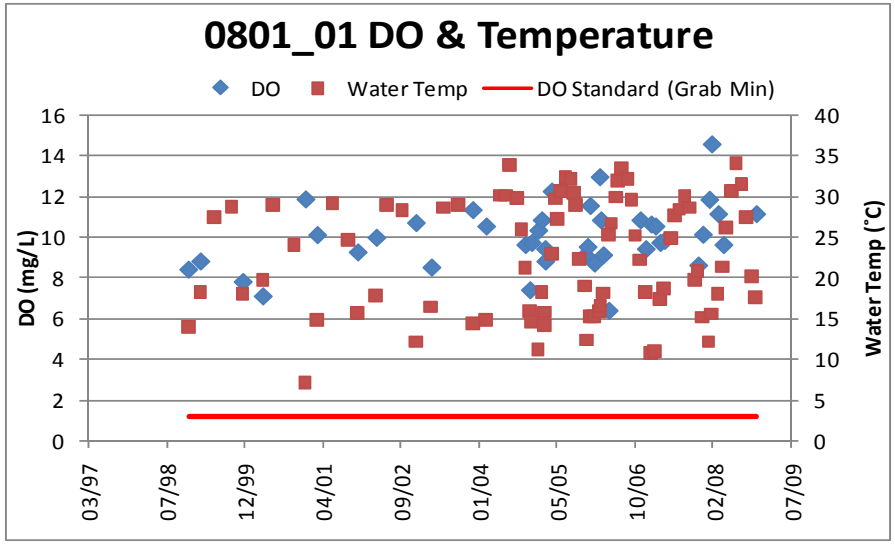


Figure M.12. DO and Temperature in Segment 0801_01.

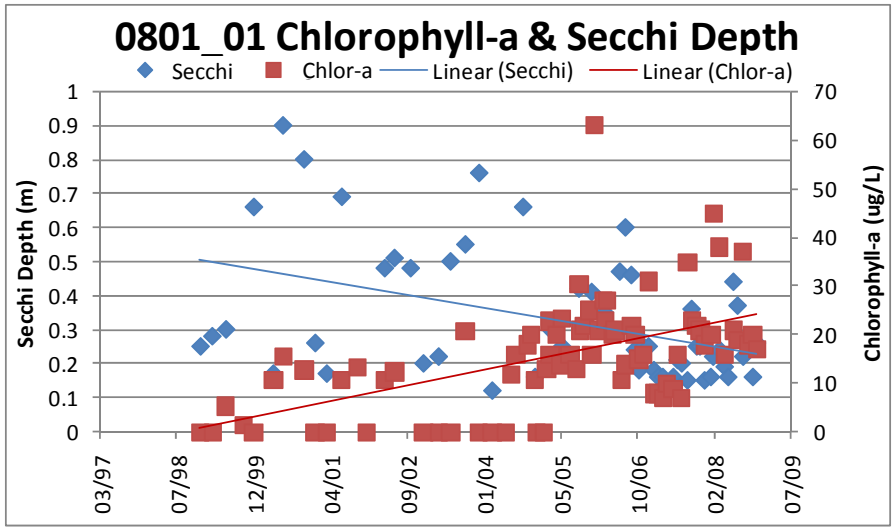


Figure M.13. Chlorophyll-a and Secchi Depth in Segment 0801_01.

Appendices

Acronyms

BMP - Best Management Practices

CFC - Chlorofluorocarbon

CFS - Cubic feet per second

CRP - Clean Rivers Program

DDD - Dichlorodiphenyldichloroethane

DDE - Dichlorodiphenyldichloroethylene

DDT - Dichlorodiphenyltrichloroethane

DO - Dissolved Oxygen

DSHS - Texas Department of State Health Services

ECHO - Enforcement and Compliance History Online

EPA - Environmental Protection Agency

GIS - Geographic Information System

mg/L - milligrams/Liter

MPN - Most Probable Number

N- Number of values evaluated

NPL - National Priority List

NH3 - Ammonia

NTMWD - North Texas Municipal Water District

NPS - Non-Point Source

NTMWD - North Texas Municipal Water District

OP - Orthophosphate

PAH - Polycyclic Aromatic Hydrocarbons

PCB's - Polychlorinated Biphenyl

POR - Period of Record

RCRA - Resource Conservation and Recovery Act

SU - Standard Units

SWCD - Soil and Water Conservation District

TCE - Trichloroethylene

TCEQ - Texas Commission on Environmental Quality

TDS - Total Dissolved Solids

TMDL - Total Maximum Daily Load

TP - Total Phosphorous

TRWD - Tarrant Regional Water District

TSI - Trophic State Index

TXI - Texas Industries

ug/L - micrograms/Liter

umhos/cm - micromhos/centimeter

UP Railroad - Union Pacific Railroad

USGS - United States Geological Survey

WWTP - Waste Water Treatment Plant

A

algae - Aquatic plants that are either attached or free floating in the water. Can affect DO and PH levels through photosynthesis and respiration.

algal blooms - Increase in algal population which can be caused by excessive nutrients and can lead to DO depletion.

ammonia (NH3)- Substance found in water and wastewater that is a nutrient for algal growth. Sources can include human and animal waste and fertilizers.

C

chloride (Cl) - One of the major ions in water and wastewater. Concentrations can be increased by industrial processes. High chloride concentrations can affect metallic objects and growing plants.

chlorofluorocarbon (CFC) - Organic compound that contains carbon , chlorine, and fluorine, produced as a volatile derivative of methane and ethane. Widely used as refrigerants, propellants, and solvents.

chlorophyll-a - Photosynthetic pigment that is found in all green plants. The concentration of chlorophyll-a is used to estimate phytoplankton biomass in surface water.

conventionals - A grouping of water chemistry parameters which does not include field, nutrients, bacteria, or metals. Includes parameters such as solids, sulfate, turbidity, chlorophyll-a, hardness, and alkalinity.

D

dichlorodiphenyldichloroethane (DDD)– A metabolite of DDT, that is colorless and crystalline.

dichlorodiphenyldichloroethylene (DDE) – A common breakdown product of DDT formed by the loss of hydrogen chloride.

dichlorodiphenyltrichloroethane (DDT)– A highly toxic synthetic pesticide that is non-biodegradable. This chemical was banned in the U.S. in 1972.

dissolved oxygen (DO) - The measure of the amount of oxygen that is freely available in water. It is vital to fish and other aquatic life. DO is widely accepted as the single most important indicator of a water body's ability to support desirable aquatic life.

(DSHS) Texas Department of State Health Services - ecoregion - State agency which conducts tissue surveys and issues fish consumption bans in order to protect the public health as part of their many state health services.

E

Enforcement and Compliance History Online (ECHO) - Online EPA database that includes information on facilities regulated by the Clean Air Act, Clean Water Act, and RCRA.

Environmental Protection Agency (EPA) - Federal regulatory agency responsible for protection of human and environmental health.

Escherichia coli (E. coli) - A gram negative rod-shaped bacterium that can be an ideal indicator of environmental samples for fecal contamination. 0157:H7 is the illness causing strain of E. Coli.

eutrophic - Nutrient rich body of water which typically has high algal concentration and poor water quality.

F

flow - Quantity of water moving through a stream at a given point measured in cubic feet per second.

G

Geographic Information System (GIS) - Used in special analysis of water quality and data.

H

hypereutrophic - highest classification of eutrophication.

L

legacy pollutants - Contaminants which have been banned from production sale or use but which may persist in the environment.

M

most probable number (MPN) - Unit for E. coli values based on a statistical range for the analytical method.

N

national priority list (NPL) - List of sites threatened by hazardous contamination which can lead to further investigation and classification of a superfund.

nitrate (NO_3) - The fraction of nitrogen that is readily available for plants and algae. High levels of nitrate in drinking water can cause methemoglobinemia, especially in infants.

nitrite (NO_2) - Reduction of nitrate. Nitrite is the intermediate that oxidizes iron in the blood to methemoglobin and reduces oxygen -carrying capacity.

non-point source (NPS) - All sources of pollution not discharged from a pipe, includes runoff, atmospheric deposition, and precipitation.

North Texas Municipal Water District (NTMWD)- A conservation and reclamation district and political subdivision of the State of Texas. Authorized to acquire, treat, and distribute potable water, and to collect, treat and dispose of wastes, both liquid and solid, in order to reduce pollution, conserve and develop the natural resources of Texas.

nutrient - Any substance used by living things to promote growth.

O

orthophosphate (OP) - The inorganic fraction of phosphorous most commonly found in water, generally the limiting nutrient for plant growth.

P

photosynthetic - The process of photosynthesis which is the conversion of sunlight and carbon dioxide and water into carbohydrates used for plant growth.

polycyclic aromatic hydrocarbons (PAH) - Commonly found in oil and gas byproducts including parking lot sealants, and asphalt. They are carcinogenic, mutagenic, teratogenic, and lipophylic. Typically found in soil and sediments.

polychlorinated biphenyl (PCB's) - Highly toxic class of organic compounds that were banned in by the United States Congress in 1979. PCB's were widely used as dielectric fluids in transformers, capacitors, and coolants.

R

Resource Conservation and Recovery Act (RCRA) - Federal regulations governing the disposal of solid and hazardous waste.

S

screening level - Water quality criterion for parameters which do not have standards.

sediment - Bottom layers composed of particles of sand, clay, silt, and plant or animal matter carried in water which are deposited in reservoirs and slow-moving areas of streams and rivers.

standard units (SU) - Unit of measurement for pH. Usually ranges from 0 to 14 with 7 as neutral.

subwatershed - A portion of a larger watershed.

sulfate (SO4)- A naturally occurring substance commonly found in the water column that may cause digestive issues when in drinking water at high concentration levels.

superfund site - Abandoned sites and facilities that are determined by the EPA to be contaminated and are in need of clean up.

T

Tarrant Regional Water District (TRWD)- A raw water supplier for the north central Texas area covering an eleven county area. Maintains dams for reservoirs and more than 150 miles of pipeline. Also manages a flood control system in Tarrant county.

Texas Commission on Environmental Quality (TCEQ) – Environmental Agency for the State of Texas.

total dissolved solids (TDS) – The total amount of inorganic and organic material dissolved in water.

total phosphorus (TP) - The total of all phosphorus and can lead to eutrophication.

total maximum daily load (TMDL) – A value of the maximum amount of a pollutant that a body of water can receive and still meet water quality standards.

tributary - A stream or river that flows into a larger stream or river.

trichloroethylene (TCE) – A chlorinated hydrocarbon commonly

used as an industrial solvent.

trophic state index (TSI) - Quantification of the eutrophication of reservoirs ranging from oligotrophic with low nutrient levels hyper eutrophic with high nutrient levels.

turbidity - A measure of water clarity which can be due to algae and other suspended particles.

U

United States Geological Survey (USGS) - Federal scientific research agency that gathers information on biology, geography, geology, and hydrology.

W

watershed - The area of land from which precipitation drains to a particular stream, river, or lake.

waste water treatment plant (WWTP) - Regional or local facility that treats municipal and industrial waste to acceptable levels which is then released into receiving waterbodies.

DATA REVIEW METHODOLOGY

Data Preparation

Data from both the SWQMIS database as well as the TRA in-house database were compiled to obtain the dataset used for trend analysis in this report. Both databases were used in order to ensure that all data that was submitted to TCEQ for inclusion into SWQMIS over the period of record was included in the trend analysis. Data for the period from December 1, 1998 to November 30, 2008 were selected in order to be somewhat comparable to the data used in the 2008 TCEQ Water Quality Inventory and to include more recently collected data. Data collected at greater than 1.01 meters depth were removed in order to prevent at-depth samples from biasing the dataset. In addition, data collected under monitoring programs other than those for routine, diurnal, intensive, and SWQM acquired routine monitoring were removed to prevent biasing the dataset to conditions such as flow and weather.

There are many ways to handle datasets containing greater than and less than values. These methods range from simply removing the greater than and less than symbols to deleting the data points associated with the symbols. For this report, data reported at greater than a certain upper limit were taken as the upper limit value. Data reported at less than the detection limit were censored to one half the lowest detection limit found in the dataset for each parameter. This prevents influencing trends with changes in detection limits over time when the censored values are scattered throughout a dataset. However, when the censored values are concentrated at the beginning or end of a dataset, they can introduce false trends as seen in Figure Q.1. The data points in green are censored to *half of the lowest* detection limit while the data points in red are the uncensored values at the detection limits. The detection limit decreased from 6 to 1 ug/L over time. The method of censoring all less than values to one half the lowest detection limit converts these values to 0.5 and introduces a false increasing trend.

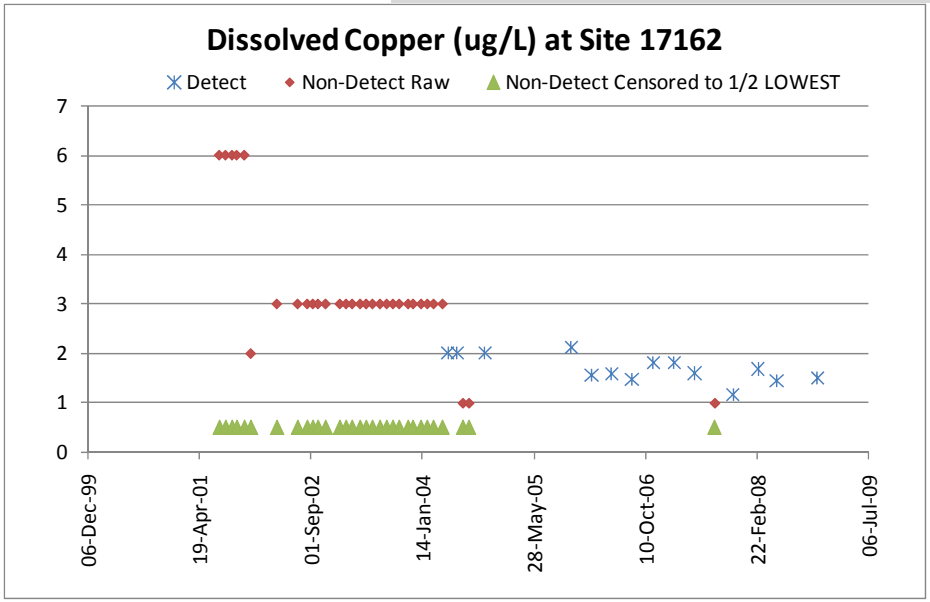


Figure Q.1. Dissolved Copper at Site 17162.

The resultant dataset was then averaged by station, sample date, and parameter code to reduce multiple samples collected at different depths less than 1.01 meters and at different times of the day to one value. From this, parameter combinations were made to increase the data available for some parameters. Combinations were based on a priority order and no averages across parameter codes were made. The resultant combinations were given a new parameter code to group the values together for analysis (Table Q.1). For specific conductance, pH, and turbidity, results analyzed in the lab were used if there were no field records. For Fecal Coliforms, the data analyzed using M-FC broth were used first followed by data analyzed with M-FC and a 0.7 um membrane then by data analyzed using agar. Orthophosphate phosphorous (OP) that had been filtered in the lab was used when there were no data for OP that had been field filtered. Direct analysis of Total Nitrate plus Nitrite (NO2+NO3) was supplemented with Total NO2+NO3 analyzed using the Whatman method then with a calculated NO2+NO3 value using individual Nitrate and

Parameters for Trend Analysis	
Parameter Code	Parameter Description
00010	TEMPERATURE, WATER (DEGREES CENTIGRADE)
00061	FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)
00078	TRANSPARENCY, SECCHI DISC (METERS)
00300	OXYGEN, DISSOLVED (MG/L)
00610	NITROGEN, AMMONIA, TOTAL (MG/L AS N)
00620	NITRATE NITROGEN, TOTAL (MG/L AS N)
00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)
00900	HARDNESS, TOTAL (MG/L AS CACO3)
00940	CHLORIDE (MG/L AS CL)
00945	SULFATE (MG/L AS SO4)
00951	FLUORIDE, TOTAL (MG/L AS F)
01000	ARSENIC, DISSOLVED (UG/L AS AS)
01005	BARIUM, DISSOLVED (UG/L AS BA)
01025	CADMIUM, DISSOLVED (UG/L AS CD)
01030	CHROMIUM, DISSOLVED (UG/L AS CR)
01040	COPPER, DISSOLVED (UG/L AS CU)
01049	LEAD, DISSOLVED (UG/L AS PB)
01065	NICKEL, DISSOLVED (UG/L AS NI)
01090	ZINC, DISSOLVED (UG/L AS ZN)
01106	ALUMINUM, DISSOLVED (UG/L AS AL)
01147	SELENIUM, TOTAL (UG/L AS SE)
31699	E. COLI, COLILERT, IDEXX METHOD, MPN/100ML
31701	ENTEROCOCCI, ENTEROLERT, IDEXX, (MPN/100 ML)
32102	CARBON TETRACHLORIDE,WHOLE WATER,UG/L
32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID METH
34215	ACRYLONITRILE, TOTW (UG/L)
34301	CHLOROBENZENE TOTW (UG/L)

Parameters for Trend Analysis	
Parameter Code	Parameter Description
34396	HEXACHLOROETHANE TOTWUG/L
34501	1,1-DICHLOROETHYLENE TOTWUG/L
34506	1,1,1-TRICHLOROETHANE, TOTW (UG/L)
39175	VINYL CHLORIDE-WHOLE WATER SAMPLE-UG/L
39180	TRICHLOROETHYLENE-WHOLE WATER SAMPLE-UG/L
77651	1,2-DIBROMOETHANE WHOLE WATER (UG/L)
81595	METHYL ETHYL KETONE WHOLE WATER SAMPLE (UG/L)
FecalColi	COMBINED FECAL COLIFORM PARAMETERS
OP	COMBINED ORTHOPHOSPHATE PARAMETERS
pH	COMBINED pH PARAMETERS
TDS Calc	SPECIFIC CONDUCTANCE*0.65
TDS Meas	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C) (MG/L)

Table Q.1. Parameters and Combinations Used for Trend Analysis

Nitrite results. Total Dissolved Solids (TDS) were calculated from Specific Conductance using a conversion factor of 0.65 when no other TDS results were available.

After all parameter combinations were completed, data were deleted for which there were less than 20 data points for each station and parameter as these are inadequate for trend analysis. The remaining parameters were compared to existing standards and screening levels. Those parameters having standards and screening levels, as well as some additional critical parameters, were retained in the dataset. All other data was removed. The remaining parameters are listed in Table Q.1 and represent the data used for trend analyses.

Trend analyses were conducted for each station and parameter for the entire period of record, for the summer months (growing season), and for the winter months (dormant season). The summer

(growing season) months were designated as May through October while the winter (dormant season) months were designated as November through April. The seasons were based on temperature data recorded at a continuously operating NOAA weather station currently located at DFW International Airport. The period of record for the data spans from 1899 to 2008. The designation of seasons based on temperature also fairly evenly split the average total rainfall amounts for the entire period of record with 14.82 inches in the winter and 18.15 inches in the summer. For the 10 year period used in the trend analysis, the average total rainfall amounts are more similar with 16.79 inches in the winter and 17.62 inches in the summer.

Data for which there were ten or more data points for each station, parameter, and summer/winter season were passed to the next step in preparing for trend analysis. Sample dates were converted to decimal times based on quarters. For example, all samples collected from December 1998 through February 1999 were assigned a time of 0. All samples collected from September 2008 through November 2008 were assigned a time of 9.75. This resulted in 40 unique times. These times were used to determine if the data for each station and parameter were fairly evenly distributed over the ten year period of record. This prevents influencing trends with weighting of data to the beginning or end of the period of record. It also ensures accurate trends by removing datasets where only a small amount of data exists for one or two years.

The decimal times were assigned bin numbers from 0 to 39. The data were crosstabed on station, date, and parameter with the bin number standing in for the value. From this crosstab, 30 columns of data were randomly selected using a random number generator to determine the distribution of the data over the period of record. The data for these columns were placed in a separate document where all identifying information was made invisible. The resultant document appeared simply as a page with columns of black boxes representing where data existed. Three qualified personnel reviewed the document and marked whether or not a column looked evenly distributed. The results were compiled and columns where two or more people agreed that it was evenly distributed were returned to their numeric states. The mean and standard deviation of the bin number values for these columns ranged from 17.95 to 26.61 and from 8.01 to 12.56, respectively. These values were rounded up or down to the nearest whole number and used to select columns of data from the whole with bin number means between 17 and 27 and standard deviations between 8 and 13. This resulted in 1,440 unique stations and parameters that were determined to be evenly distributed across the ten year period of record and for which trend analyses were conducted.

Trend Analysis

Most water quality data are inherently non-normal, while most statistics are based on the assumption of a normality. This can make the results of statistical analyses performed on water quality data less reliable. To increase the reliability of trend analyses, only datasets that fell within predefined boundaries of adequate normality were used. To determine normality and significance, the data were run through a statistical program written in SAS.

Water quality data results are a “sample” of the “population” of water quality data. In other words, they are a single word in the story. With enough words, the story becomes more complete. Therefore, inferences about a waterbody’s population of overall water quality can be made from the samples. The first step in determining if a dataset is appropriate for statistical analysis is to determine normality. Normality can be determined by the skewness and kurtosis of the dataset.

Skewness refers to the length of one tail compared to the other on a distribution plot. In a normally distributed dataset, the skewness is zero. This indicates that the length of the tails on either side of the peak are equal. If skewness is less than zero, the data is skewed to

the left indicating that the left tail is longer compared to the right tail. If skewness is greater than zero, the data is skewed to the right indicating that the right tail is longer than the left tail. To extend these findings to a population, a test statistic must be calculated. Skewness divided by the standard error of skewness is a common test statistic. If the test statistic for the sample set is greater than two or less than negative 2, then it can be inferred that the population is likely to be skewed in the same direction as the sample set.

Kurtosis is a measure of peakness of a dataset. The standard kurtosis calculation for a normally distributed dataset results in a value of three. Excess kurtosis simply subtracts a value of three from the standard calculation, resulting in a value of zero. This is a matter of convention and ease of comprehension. For this report, excess kurtosis is used. If excess kurtosis is positive, the peak is taller and narrower with longer tails indicating that there are more values around the mean than a normal distribution. If excess kurtosis is negative, the peak is shorter and flatter with shorter tails indicating that there are more values at the extremes than a normal distribution. Similar to skewness, a test statistic is calculated by dividing excess kurtosis by the standard error of excess kurtosis. If the test statistic is greater than three or less than negative three, then it can be inferred that the population is peaked in a manner similar to the sample set.

Datasets, either in their raw or natural log transformed states, meeting the requirements below were determined to be within the acceptable range of normality to result in reliable statistical analysis. These range values increase the number of datasets included in trend analysis.

Skewness Test Statistic	-2<=Skewness/SES<=2
Excess Kurtosis Test Statistic	-3<=Excess Kurtosis/SEK<=3

Datasets passing the normality test were then tested for significance of trends. The R^2 value is used as a measure of how well the predicted line, or the regression line, fits the observed data. R^2 values range from zero to one with one being a perfect fit. In order to be more inclusive, R^2 values greater than 0.1 were considered significant. Figure Q.2 shows the percentage of data that falls under each R^2 value range. The null hypothesis for temporal trend analysis is that there is no correlation between time and measured values, in other words, there is no significant trend. The p-value is the probability of a null hypothesis being true or a measure of confidence that a dataset can be used to make predictions and that the observed values are not random. A significance level of 0.1 gives a 90% confidence level. If the p-value is greater than 0.1, the trend is not significant. If the p-value is less than 0.1, the trend is significant and the observed values are not random. The t-statistic is the probability that a correlation (or slope) is due to chance. If the regression line falls entirely within one standard error away from the slope, then the t-statistic value is close to zero and the correlation is due to chance

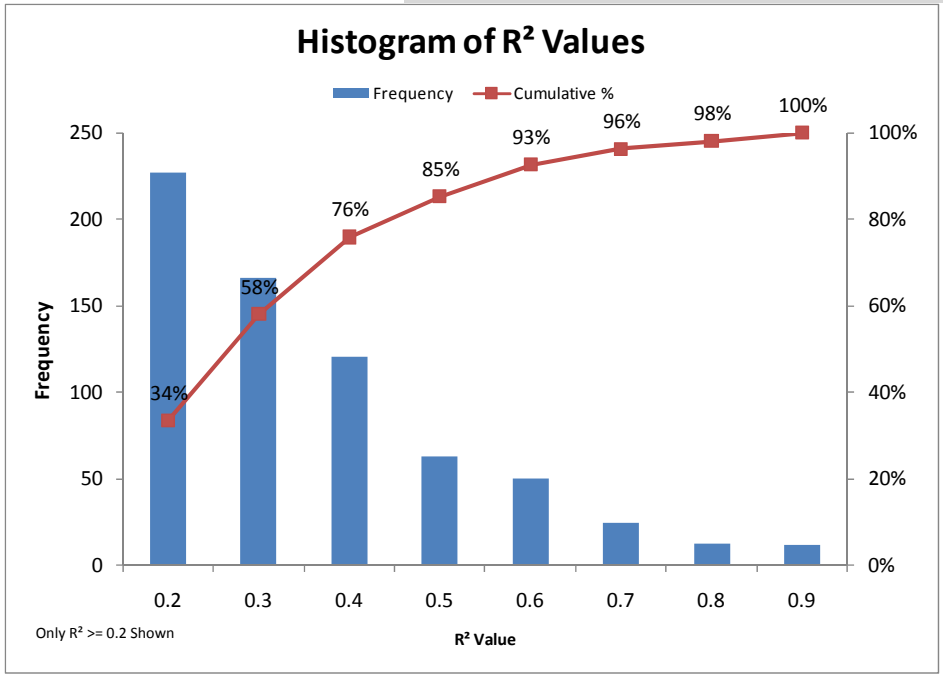


Figure Q.2. Histogram of R^2 Values.

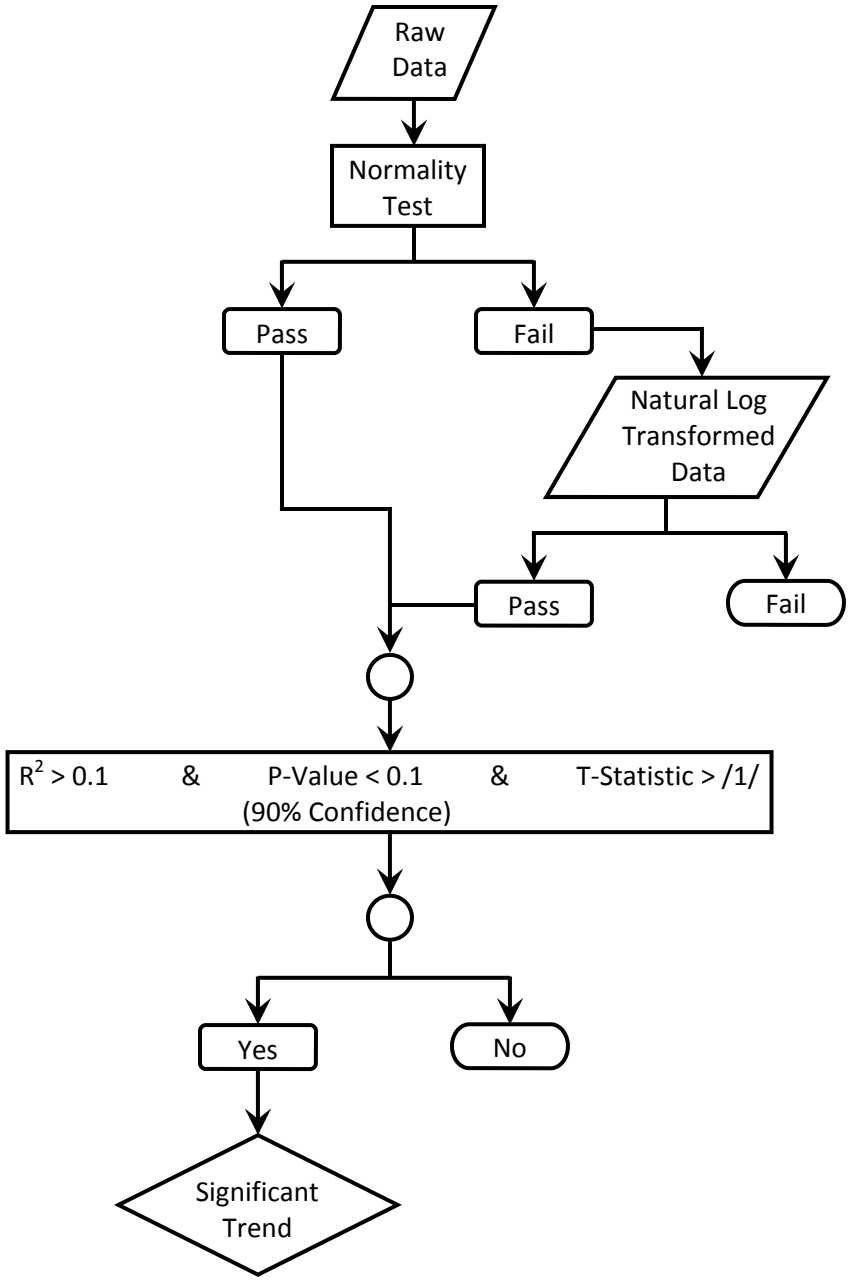


Figure Q.3. Flowchart Diagram of Methods Used to Determine Normality and Trend Significance.

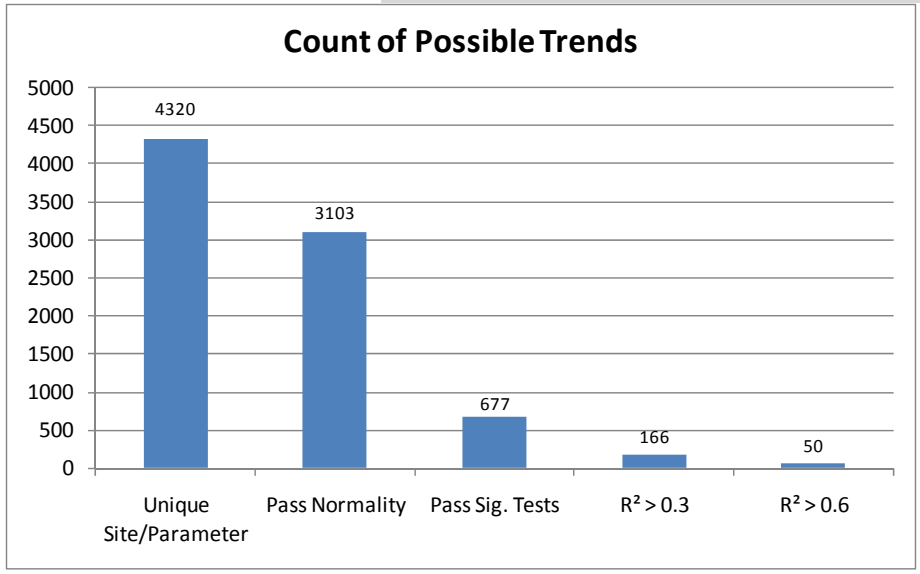


Figure Q.4. Count of Possible Trends.

and therefore not significant. If the regression line crosses over the lines one standard error away from the slope, then the t-statistic is greater than the absolute value of one and the correlation is not due to chance and is significant. If the R^2 , p-value, and t-statistic values each passed their individual significance tests, then the trend was considered significant.

Figure Q.3 illustrates the process of determining normality and trend significance. A large amount of data passed the normality tests but failed to pass trend significance tests (fig Q.4).

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
Cedar Creek	0818	16747	00940	POR	0.12	0.03	0.02	0.22	2.52	0.16	0.51	47	13.71	22.10	14.60	13.40	11.50	7.70	3.10	2/17/99	10/1/08
	0818	16747	00940	Winter	0.22	0.50	0.03	3.29	2.38	0.95	1.72	22	13.39	22.10	13.90	13.20	11.50	7.70	2.40	2/17/99	4/8/08
	0818	16747	00945	Summer	0.32	-1.72	0.01	9.47	-3.10	0.45	1.23	22	25.64	48.20	28.20	24.20	21.62	6.20	6.58	5/11/99	10/1/08
	0818	16747	OP	POR	0.18	0.12	0.00	0.84	3.13	-0.42	-0.7	46	0.02	0.06	0.02	0.01	0.01	0.00	0.02	2/17/99	10/1/08
	0818	16747	OP	Summer	0.28	0.12	0.01	0.75	2.88	-0.63	0.16	23	0.02	0.06	0.02	0.02	0.01	0.00	0.01	5/11/99	10/1/08
	0818	16747	TDS Calc	Summer	0.35	0.05	0.00	0.20	3.93	0.10	0.77	31	137.36	230.43	156.00	136.50	119.28	91.98	36.73	6/1/99	5/23/07
	0818	16747	TDS Calc	Winter	0.25	0.05	0.02	0.30	2.60	1.02	2.72	22	138.53	322.73	157.30	134.42	105.30	79.30	52.00	1/6/99	11/12/08
	0818	16747	TDS Meas	POR	0.40	0.03	0.00	0.12	5.51	0.54	-0.1	48	124.10	167.00	133.00	120.50	113.00	98.40	20.00	2/17/99	10/1/08
	0818	16747	TDS Meas	Summer	0.30	2.85	0.00	16.08	3.14	0.83	0.96	25	123.12	167.00	132.00	121.00	113.00	98.40	19.00	5/11/99	10/1/08
	0818	16747	TDS Meas	Winter	0.53	3.76	0.00	15.47	4.90	0.90	-0.2	23	125.17	158.00	136.00	120.00	115.00	103.00	21.00	2/17/99	4/8/08
	0818	16748	00665	Winter	0.17	0.00	0.05	0.02	2.04	0.41	0.70	23	0.06	0.11	0.08	0.06	0.06	0.03	0.02	2/17/99	4/8/08
	0818	16748	00940	Winter	0.16	0.03	0.09	0.21	1.82	0.69	0.31	20	13.94	22.40	14.55	13.55	11.79	9.90	2.77	11/10/99	4/8/08
	0818	16748	TDS Meas	POR	0.31	2.93	0.00	16.13	4.45	0.60	-0.2	47	122.00	163.00	132.00	120.00	110.00	93.80	22.00	2/17/99	10/1/08
	0818	16748	TDS Meas	Summer	0.35	3.41	0.00	18.16	3.43	0.57	-0.3	24	121.80	163.00	132.50	119.00	107.50	93.80	25.00	5/11/99	10/1/08
	0818	16748	TDS Meas	Winter	0.26	2.38	0.01	14.11	2.70	0.71	-0.1	23	122.21	152.00	130.00	120.00	114.00	101.00	16.00	2/17/99	4/8/08
	0818	16749	00665	Summer	0.14	0.00	0.07	0.02	1.91	-0.19	-0.1	25	0.07	0.10	0.09	0.07	0.06	0.04	0.03	5/11/99	10/1/08
	0818	16749	TDS Meas	POR	0.30	2.66	0.00	14.64	4.46	0.40	-0.7	48	121.39	155.00	132.50	120.50	109.00	98.30	23.50	2/17/99	10/1/08
	0818	16749	TDS Meas	Summer	0.29	2.68	0.01	15.29	3.09	0.21	-1.2	25	121.31	150.00	134.00	124.00	109.00	98.30	25.00	5/11/99	10/1/08
	0818	16749	TDS Meas	Winter	0.31	2.64	0.01	14.25	3.08	0.70	0.04	23	121.47	155.00	129.00	120.00	108.00	102.00	21.00	2/17/99	4/8/08
	0818	16750	00078	POR	0.16	-0.03	0.01	0.20	-2.86	0.06	0.34	44	0.71	1.22	0.86	0.70	0.59	0.20	0.27	2/17/99	10/1/08
	0818	16750	00078	Summer	0.16	-0.02	0.07	0.17	-1.89	0.56	0.06	21	0.81	1.22	0.91	0.81	0.66	0.56	0.25	5/11/99	10/1/08
	0818	16750	00078	Winter	0.19	-0.03	0.04	0.18	-2.22	-0.02	0.33	23	0.63	1.02	0.76	0.61	0.50	0.20	0.26	2/17/99	4/8/08
	0818	16750	00665	Summer	0.17	0.04	0.04	0.27	2.15	0.65	-0.2	25	0.10	0.19	0.12	0.09	0.08	0.07	0.04	5/11/99	10/1/08
	0818	16750	OP	POR	0.14	0.11	0.01	0.93	2.71	-0.09	-0.9	46	0.02	0.07	0.02	0.01	0.01	0.00	0.02	2/17/99	10/1/08
	0818	16750	OP	Summer	0.42	0.16	0.00	0.79	3.86	-0.26	-0.1	23	0.02	0.07	0.02	0.02	0.01	0.00	0.02	5/11/99	10/1/08
	0818	16750	TDS Meas	POR	0.29	0.02	0.00	0.12	4.31	0.60	-0.2	48	124.24	165.00	131.00	120.00	112.50	98.00	18.50	2/17/99	10/1/08
	0818	16750	TDS Meas	Summer	0.23	2.48	0.02	15.93	2.63	0.81	0.55	25	124.76	165.00	132.00	121.00	114.00	98.00	18.00	5/11/99	10/1/08
	0818	16750	TDS Meas	Winter	0.37	3.05	0.00	15.11	3.50	0.96	0.00	23	123.68	158.00	129.00	120.00	112.00	104.00	17.00	2/17/99	4/8/08
	0818	16753	00078	POR	0.13	-0.02	0.02	0.15	-2.43	0.09	-0.9	42	0.42	0.71	0.56	0.42	0.30	0.13	0.26	2/17/99	10/1/08
	0818	16753	00078	Winter	0.34	-0.02	0.00	0.10	-3.20	0.31	0.33	22	0.33	0.56	0.38	0.31	0.28	0.13	0.10	2/17/99	4/8/08
	0818	16753	00665	Summer	0.11	0.03	0.10	0.32	1.73	0.22	0.87	25	0.14	0.30	0.16	0.14	0.11	0.07	0.05	5/11/99	10/1/08
	0818	16753	OP	POR	0.16	0.16	0.01	1.21	2.88	-0.50	-1	46	0.03	0.14	0.05	0.03	0.01	0.00	0.04	2/17/99	10/1/08
	0818	16753	pH	Summer	0.13	0.06	0.04	0.54	2.10	-0.06	0.05	31	8.59	9.80	8.95	8.60	8.23	7.47	0.73	5/11/99	10/1/08
	0818	16753	TDS Meas	POR	0.22	0.02	0.00	0.13	3.55	0.52	0.44	47	129.48	183.60	135.00	128.00	119.00	102.00	16.00	2/17/99	10/1/08
	0818	16753	TDS Meas	Summer	0.20	2.43	0.03	16.84	2.39	0.85	0.87	25	128.40	173.00	132.00	128.00	117.00	102.00	15.00	5/11/99	10/1/08
	0818	16753	TDS Meas	Winter	0.29	3.36	0.01	18.76	2.85	1.03	1.81	22	130.71	183.60	138.00	128.50	119.00	102.00	19.00	2/17/99	4/8/08
	0818	16772	pH	Summer	0.15	0.01	0.03	0.07	2.26	0.37	2.07	31	8.67	10.80	8.95	8.78	8.27	7.50	0.68	5/11/99	10/1/08
	0818	16772	TDS Calc	POR	0.11	3.07	0.01	27.95	2.53	0.22	0.76	54	131.96	213.43	149.50	128.75	119.28	64.03	30.23	2/17/99	10/1/08

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
Cedar Creek	0818	16772	TDS Calc	Summer	0.19	3.87	0.01	26.97	2.60	-0.14	-0.3	31	134.95	185.90	157.95	134.55	120.90	83.85	37.05	5/11/99	10/1/08
Clear Fork	0829	11045	00610	Summer	0.18	0.01	0.08	0.04	1.87	0.21	-1.5	18	0.05	0.11	0.08	0.06	0.01	0.01	0.07	7/13/99	8/13/08
	0829	11045	00610	Winter	0.24	-0.01	0.03	0.05	-2.38	1.00	-0.4	20	0.04	0.14	0.08	0.01	0.01	0.01	0.07	1/6/99	2/13/08
	0829	11045	00940	Winter	0.16	0.65	0.08	4.68	1.87	0.16	-1.1	20	22.95	31.00	27.00	22.00	19.50	16.00	7.50	1/6/99	2/13/08
	0829	11045	00945	Summer	0.23	-1.36	0.04	8.22	-2.24	0.10	-1.4	19	34.63	47.00	42.00	34.00	27.00	23.00	15.00	7/13/99	8/13/08
	0830	15151	00665	Summer	0.14	0.00	0.08	0.02	1.83	0.88	1.25	23	0.06	0.11	0.07	0.05	0.05	0.03	0.03	6/23/99	9/9/08
	0830	15151	00940	POR	0.10	0.46	0.03	4.00	2.19	0.68	0.21	45	21.14	30.40	23.10	20.80	18.40	13.90	4.70	3/24/99	9/9/08
	0830	15151	00945	POR	0.38	-0.06	0.00	0.27	-4.57	0.41	-0.3	36	31.82	54.60	37.05	28.40	25.34	17.40	11.72	3/24/99	9/9/08
	0830	15151	00945	Summer	0.38	-0.05	0.00	0.24	-3.33	0.49	0.73	20	29.28	50.40	33.23	27.50	24.90	17.40	8.33	6/23/99	9/9/08
	0830	15151	00945	Winter	0.39	-2.17	0.01	9.80	-3.02	0.67	-0.5	16	35.00	54.60	41.50	34.20	27.25	22.20	14.25	3/24/99	12/13/07
	0830	15151	pH	Winter	0.14	-0.04	0.09	0.29	-1.79	0.21	0.75	22	8.03	8.75	8.19	8.10	7.80	7.50	0.39	3/24/99	3/11/08
	0830	15151	TDS Meas	Summer	0.14	2.19	0.07	16.40	1.90	0.42	0.18	24	187.55	224.00	196.00	187.00	177.10	161.00	18.90	6/23/99	9/9/08
	0830	15156	00610	Winter	0.18	-0.01	0.05	0.07	-2.10	0.57	-0.7	22	0.10	0.25	0.14	0.09	0.04	0.01	0.10	3/24/99	3/11/08
	0830	15156	00665	Summer	0.21	0.00	0.03	0.02	2.33	0.54	-0.5	22	0.06	0.11	0.07	0.05	0.05	0.03	0.03	6/23/99	9/9/08
	0830	15156	00940	POR	0.25	1.23	0.00	4.62	3.31	0.50	-0.6	34	21.19	30.90	23.69	20.50	17.99	14.40	5.70	12/12/01	9/9/08
	0830	15156	00940	Summer	0.20	1.13	0.07	4.72	1.98	0.71	-0.1	18	21.04	30.90	23.48	20.50	17.50	14.40	5.98	6/12/02	9/9/08
	0830	15156	00940	Winter	0.35	1.39	0.02	4.64	2.73	0.30	-0.8	16	21.36	28.90	25.05	20.80	18.50	14.40	6.55	12/12/01	3/11/08
	0830	15156	32211	POR	0.13	2.06	0.02	16.02	2.51	0.67	-0.1	46	24.06	65.40	36.00	20.15	14.00	0.10	22.00	3/24/99	9/9/08
	0830	15156	pH	Winter	0.19	-0.04	0.04	0.28	-2.14	-0.19	-0.3	22	8.06	8.65	8.26	8.10	7.81	7.55	0.46	3/24/99	3/11/08
	0830	15158	00610	POR	0.17	-0.17	0.00	1.15	-2.97	0.41	-1.3	46	0.06	0.30	0.11	0.03	0.01	0.01	0.10	3/24/99	9/9/08
	0830	15158	00610	Winter	0.14	-0.16	0.08	1.18	-1.84	-0.14	-1.4	22	0.08	0.30	0.14	0.05	0.01	0.01	0.13	3/24/99	3/11/08
	0830	15158	00665	Winter	0.15	0.00	0.08	0.03	1.83	-0.02	1.51	21	0.09	0.16	0.11	0.08	0.08	0.01	0.03	3/24/99	3/11/08
	0830	15158	00940	POR	0.26	1.31	0.00	4.91	3.26	0.37	-0.9	33	22.09	30.90	25.41	20.90	18.40	14.40	7.01	12/12/01	9/9/08
	0830	15158	00940	Summer	0.18	1.12	0.09	4.75	1.83	0.59	-0.2	17	21.68	30.90	24.09	20.87	17.98	14.40	6.11	6/12/02	9/9/08
	0830	15158	00940	Winter	0.38	1.63	0.01	5.20	2.95	0.18	-1.3	16	22.52	30.00	28.55	21.40	18.45	14.80	10.10	12/12/01	3/11/08
	0830	15158	32211	POR	0.13	2.15	0.01	16.15	2.61	0.30	-1	46	28.27	59.40	39.00	25.95	14.00	2.90	25.00	3/24/99	9/9/08
	0830	15158	32211	Winter	0.26	3.22	0.02	17.34	2.66	0.52	-1.3	22	23.82	54.80	42.00	18.30	9.30	2.90	32.70	3/24/99	3/11/08
	0831	17445	31699	POR	0.21	-0.58	0.02	0.97	-2.57	0.59	2.17	27	70.53	730.00	74.00	44.00	21.00	6.30	53.00	2/4/04	7/26/06
	0831	17445	31699	Summer	0.39	-0.97	0.02	1.21	-2.76	1.07	2.45	14	83.66	730.00	52.00	35.00	14.00	6.30	38.00	5/4/04	7/26/06
	0832	11061	00940	POR	0.39	-1.70	0.00	7.06	-3.64	-0.29	-0.5	23	30.22	43.00	34.00	31.00	25.00	18.00	9.00	11/16/99	8/28/08
	0832	11061	00940	Summer	0.24	-1.26	0.09	6.86	-1.84	-0.36	-0.3	13	28.92	41.00	33.00	30.00	26.00	18.00	7.00	5/22/00	8/28/08
	0832	11061	00940	Winter	0.58	-2.26	0.01	7.32	-3.29	-0.40	-0.4	10	31.90	43.00	36.00	33.50	25.00	19.00	11.00	11/16/99	2/28/08
East Fork	0819	10990	31699	Summer	0.25	0.51	0.01	1.36	2.98	0.52	-0.4	28	164.25	911.00	107.50	52.50	21.50	6.00	86.00	5/10/01	8/1/05
	0819	10991	00078	POR	0.45	0.16	0.00	0.43	3.97	0.32	0.23	21	0.27	0.61	0.33	0.20	0.20	0.10	0.13	9/25/00	7/17/06
	0819	10991	00078	Summer	0.44	0.05	0.03	0.15	2.65	1.02	-0.3	11	0.32	0.61	0.46	0.25	0.20	0.20	0.26	9/25/00	7/17/06
	0819	10991	00078	Winter	0.56	0.03	0.01	0.08	3.18	0.46	-0.5	10	0.22	0.36	0.30	0.20	0.20	0.10	0.10	2/1/01	4/17/06
	0819	10991	00610	POR	0.16	0.17	0.02	0.99	2.37	-0.78	1.01	31	0.28	0.87	0.44	0.19	0.09	0.01	0.35	9/25/00	7/8/08
	0819	10991	00665	Winter	0.24	0.22	0.06	1.05	2.04	0.57	-0.5	15	1.26	3.52	2.00	1.25	0.19	0.15	1.81	2/1/01	3/27/08

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
East Fork	0819	10991	00940	POR	0.17	0.10	0.01	0.73	2.93	-0.61	0.50	43	83.74	265.00	107.00	69.00	48.00	10.23	59.00	1/21/99	7/8/08
	0819	10991	00945	POR	0.18	0.08	0.00	0.57	3.00	-0.46	0.30	43	93.04	246.00	119.00	80.49	60.00	21.34	59.00	1/21/99	7/8/08
	0819	10991	00945	Summer	0.24	0.10	0.02	0.60	2.53	-0.73	1.32	22	99.40	246.00	121.00	89.05	65.00	21.34	56.00	5/26/99	7/8/08
	0819	10991	00945	Winter	0.20	6.55	0.04	44.62	2.17	0.95	0.93	21	86.38	203.00	115.00	78.23	52.00	30.00	63.00	1/21/99	3/27/08
	0819	10991	TDS Meas	POR	0.17	35.83	0.02	203.08	2.43	0.79	0.66	31	499.77	1020	618.00	486.00	352.00	216.00	266	9/25/00	7/8/08
	0819	10991	TDS Meas	Winter	0.31	46.59	0.03	193.66	2.44	0.33	-1.2	15	447.40	808.00	624.00	410.00	242.00	216.00	382	2/1/01	3/27/08
	0819	10996	00610	POR	0.13	-0.20	0.09	0.97	-1.75	0.27	-0.4	23	0.45	2.04	0.59	0.22	0.15	0.05	0.44	10/17/02	7/8/08
	0820	10998	00078	POR	0.12	0.13	0.07	0.31	1.89	0.41	1.20	29	0.94	2.10	1.06	0.89	0.75	0.51	0.31	3/3/03	11/1/05
	0820	10998	00078	Summer	0.21	0.12	0.07	0.22	1.97	-0.13	-0.3	17	0.88	1.30	1.00	0.88	0.75	0.51	0.25	5/12/03	10/5/05
	0820	16828	pH	Winter	0.25	-0.04	0.00	0.22	-4.08	-0.47	0.74	53	7.63	8.08	7.80	7.60	7.50	7.00	0.30	1/12/99	4/28/08
	0820	16828	TDS Calc	Winter	0.15	35.17	0.03	179.78	2.29	0.16	-1.1	31	394.86	708.50	513.50	378.30	262.60	113.75	250.9	4/12/00	4/28/08
	0820	17845	TDS Calc	POR	0.24	30.34	0.00	113.71	4.29	0.38	0.35	61	406.95	734.50	490.75	390.00	338.00	139.10	152.8	12/9/99	10/31/08
	0820	17845	TDS Calc	Summer	0.22	0.08	0.01	0.28	2.86	0.08	-0	31	397.76	734.50	479.05	375.05	318.50	213.85	160.6	5/8/03	10/31/08
	0820	17845	TDS Calc	Winter	0.29	32.35	0.00	113.55	3.42	-0.15	0.01	30	416.46	638.95	520.00	409.83	351.00	139.10	169	12/9/99	4/28/08
Elm Fork	0822	17162	00610	POR	0.17	-0.20	0.00	1.03	-3.08	-0.61	-0.3	50	0.11	0.56	0.14	0.10	0.04	0.01	0.10	7/17/01	11/20/08
	0822	17162	00610	Summer	0.21	-0.19	0.02	0.85	-2.53	-0.34	0.74	26	0.11	0.56	0.14	0.11	0.04	0.01	0.10	7/17/01	8/5/08
	0822	17162	00610	Winter	0.15	-0.21	0.06	1.18	-1.95	-0.49	-1.1	24	0.10	0.42	0.14	0.09	0.02	0.01	0.12	11/6/01	11/20/08
	0822	17162	01040	Winter	0.68	0.23	0.00	0.58	6.33	1.01	-0.7	21	0.89	2.12	1.50	0.50	0.50	0.50	1.00	11/6/01	11/20/08
	0822	17162	31699	Summer	0.14	-0.27	0.08	1.37	-1.82	0.80	-0.1	22	447.68	3460	380.00	120.00	49.00	26.00	331	7/3/02	8/5/08
	0822	17163	00300	Summer	0.32	1.36	0.06	1.32	2.15	-0.09	0.25	12	5.01	7.40	5.60	5.15	4.40	2.70	1.20	5/6/03	10/18/04
	0822	17163	00900	Summer	0.19	-10.17	0.09	18.52	-1.79	-0.23	0.66	16	137.31	172.00	149.00	137.00	127.50	96.00	21.50	7/3/02	10/18/04
	0822	17163	00900	Winter	0.24	12.47	0.06	18.80	2.05	0.74	1.18	15	159.20	204.00	168.00	158.00	148.00	132.00	20.00	2/13/02	4/12/04
	0822	17165	00900	POR	0.36	114.02	0.00	161.31	3.95	-0.52	-0.5	30	483.13	748.00	600.00	554.00	348.00	120.00	252	1/9/02	10/19/04
	0822	17165	00900	Summer	0.41	103.14	0.01	135.70	2.89	0.00	-1.6	14	497.43	700.00	588.00	554.00	360.00	328.00	228	7/2/02	10/19/04
	0822	17165	00900	Winter	0.36	138.42	0.01	184.36	2.78	-0.61	-0.7	16	470.63	748.00	600.00	532.00	324.00	120.00	276	1/9/02	4/19/04
	0822	17165	31699	POR	0.11	-0.31	0.06	1.34	-1.98	-0.46	-0.1	34	1422	4838	2830	651.00	313.00	19.00	2517	12/4/01	4/23/08
	0822	17165	31699	Summer	0.27	-909.5	0.05	1420.2	-2.20	0.90	-0.8	15	1499	3970	3110	656.00	626.00	97.00	2484	7/2/02	10/19/04
	0822	17165	pH	POR	0.12	0.09	0.09	0.37	1.75	-0.87	1.79	25	7.47	8.10	7.70	7.50	7.39	6.40	0.31	11/4/02	4/23/08
	0822	17166	00610	POR	0.38	-0.75	0.00	1.18	-4.26	-0.18	0.07	32	0.22	1.80	0.25	0.12	0.05	0.01	0.21	7/18/01	10/19/04
	0822	17166	00610	Summer	0.53	-0.06	0.00	0.09	-4.36	0.20	-1.4	19	0.13	0.28	0.21	0.12	0.04	0.01	0.17	7/18/01	10/19/04
	0822	17166	00610	Winter	0.42	-1.20	0.02	1.31	-2.81	0.06	-0.6	13	0.34	1.80	0.33	0.21	0.07	0.02	0.26	11/7/01	4/19/04
	0822	17166	31699	Summer	0.59	-0.82	0.00	0.83	-4.53	0.71	-0.1	16	1131	4840	1305	670.50	420.00	259.00	885	7/2/02	10/19/04
	0822	17168	00900	Summer	0.27	-20.93	0.05	32.78	-2.19	0.07	-0.2	15	170.93	238.00	194.00	178.00	140.00	120.00	54.00	7/2/02	10/19/04
	0822	17170	00610	POR	0.40	-0.31	0.00	1.00	-5.37	-0.63	-0.6	45	0.09	0.28	0.13	0.08	0.04	0.01	0.09	7/25/01	11/20/08
	0822	17170	00610	Summer	0.32	-0.02	0.00	0.08	-3.35	0.92	0.07	26	0.09	0.28	0.14	0.08	0.02	0.01	0.12	7/25/01	8/5/08
	0822	17170	00610	Winter	0.29	-0.01	0.02	0.05	-2.65	0.81	0.49	19	0.09	0.21	0.11	0.08	0.04	0.01	0.07	11/13/01	11/20/08
	0822	17170	01040	POR	0.56	0.28	0.00	0.74	7.23	0.62	-1.5	43	1.18	3.60	2.00	0.50	0.50	0.50	1.50	7/25/01	11/20/08
	0822	17170	01040	Summer	0.54	0.29	0.00	0.76	5.06	0.60	-1.5	24	1.23	3.60	2.00	0.50	0.50	0.50	1.50	7/25/01	5/20/08

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
Elm Fork	0822	17170	01040	Winter	0.53	0.32	0.00	0.88	4.41	0.98	-0.6	19	1.11	3.00	1.78	0.50	0.50	0.50	1.28	11/13/01	11/20/08
	0822	17172	00900	Summer	0.35	93.75	0.02	125.26	2.73	0.86	0.53	16	298.25	596.00	360.00	284.00	181.00	146.00	179	7/3/02	10/18/04
	0822	17172	32211	Summer	0.35	-0.89	0.04	1.22	-2.32	0.86	1.26	12	1.73	4.50	2.40	1.70	0.85	0.10	1.55	7/3/02	10/18/04
	0822	17532	00945	Winter	0.31	31.70	0.04	119.58	2.32	-0.11	1.73	14	474.71	727.00	536.00	468.00	415.00	212.00	121	11/5/01	3/17/08
	0822	17532	TDS Meas	Winter	0.28	48.40	0.05	193.23	2.14	0.12	2.26	14	881.71	1320	952.00	878.00	788.00	466.00	164	11/5/01	3/17/08
	0822	17849	TDS Calc	Summer	0.12	4.98	0.07	25.43	1.91	0.19	0.29	30	238.27	298.35	257.40	236.28	221.65	182.00	35.75	5/20/03	10/28/08
	0822	17938	00610	POR	0.35	-0.06	0.00	0.06	-3.53	0.71	0.53	25	0.12	0.28	0.15	0.11	0.08	0.01	0.07	10/2/02	10/18/04
	0822	17938	00610	Summer	0.34	-0.07	0.04	0.07	-2.37	0.96	0.83	13	0.12	0.28	0.15	0.11	0.07	0.03	0.08	10/2/02	10/18/04
	0822	17938	00610	Winter	0.52	-0.08	0.01	0.06	-3.26	0.24	0.41	12	0.12	0.23	0.15	0.11	0.08	0.01	0.07	11/5/02	4/12/04
	0822	17938	00900	POR	0.17	-28.71	0.04	42.31	-2.20	0.27	-0.5	25	184.56	268.00	208.00	180.00	158.00	116.00	50.00	10/2/02	10/18/04
	0822	17938	00900	Summer	0.23	-22.27	0.10	29.30	-1.81	-0.33	-0.9	13	161.08	208.00	184.00	168.00	140.00	116.00	44.00	10/2/02	10/18/04
	0822	17938	01040	Summer	0.65	1.68	0.00	1.29	4.31	0.92	-0.6	12	1.46	4.00	2.50	0.50	0.50	0.50	2.00	10/2/02	10/18/04
	0822	17938	32211	POR	0.17	-2.61	0.05	3.83	-2.09	0.80	-0.2	23	5.63	14.00	8.80	4.10	2.90	0.10	5.90	10/2/02	10/18/04
	0822	17938	32211	Winter	0.27	-2.69	0.09	2.82	-1.91	0.95	0.42	12	5.20	11.10	6.85	4.15	3.65	1.20	3.20	11/5/02	4/12/04
	0822	17938	pH	POR	0.21	-0.29	0.02	0.37	-2.41	-0.96	1.07	24	7.80	8.30	8.10	7.90	7.60	6.80	0.50	11/5/02	10/18/04
	0822	17938	pH	Summer	0.35	-0.31	0.04	0.29	-2.31	-0.10	-0.9	12	7.80	8.21	8.02	7.85	7.60	7.30	0.42	5/6/03	10/18/04
	0822	17938	TDS Meas	POR	0.17	-53.49	0.05	80.01	-2.07	0.65	0.34	23	335.65	534.00	368.00	340.00	273.00	212.00	95.00	10/2/02	10/18/04
	0822	17938	TDS Meas	Summer	0.37	-48.81	0.05	51.85	-2.31	-0.31	-1.8	11	310.55	368.00	360.00	310.00	246.00	240.00	114	10/2/02	10/18/04
	0822	17939	00010	Winter	0.25	1.40	0.07	4.99	1.99	0.34	-0.5	14	12.66	22.00	16.90	11.75	8.00	4.70	8.90	11/5/02	4/23/08
	0822	17939	00610	POR	0.57	-1.43	0.00	1.20	-5.64	0.21	-0.3	26	0.09	0.91	0.10	0.08	0.01	0.01	0.09	9/3/02	10/18/04
	0822	17939	00610	Summer	0.59	-0.05	0.00	0.05	-4.11	0.18	-1.5	14	0.06	0.13	0.09	0.07	0.01	0.01	0.08	9/3/02	10/18/04
	0822	17939	00610	Winter	0.69	-2.08	0.00	1.36	-4.67	0.52	0.26	12	0.13	0.91	0.10	0.08	0.02	0.01	0.09	11/5/02	4/12/04
	0822	17939	00665	POR	0.30	-1.37	0.01	1.66	-2.88	0.40	-1.2	21	0.09	0.57	0.09	0.03	0.01	0.01	0.09	9/3/02	10/18/04
	0822	17939	00665	Summer	0.40	-1.50	0.04	1.78	-2.46	0.23	-1.8	11	0.09	0.39	0.17	0.03	0.01	0.01	0.17	9/3/02	10/18/04
	0822	17939	00665	Winter	0.35	-1.95	0.07	1.62	-2.08	0.71	-0.1	10	0.09	0.57	0.06	0.03	0.01	0.01	0.06	11/5/02	2/2/04
	0822	17939	01040	Summer	0.69	1.35	0.00	1.11	4.89	0.79	-1.3	13	1.31	3.00	2.00	0.50	0.50	0.50	1.50	9/3/02	10/18/04
	0822	17939	32211	Summer	0.47	-1.61	0.02	1.55	-2.85	-1.22	3.23	11	9.06	39.50	8.40	4.90	2.70	0.10	5.70	9/3/02	10/18/04
	0822	18359	00900	POR	0.16	-29.06	0.06	46.45	-1.99	0.30	-0.8	23	194.70	284.00	224.00	196.00	148.00	128.00	76.00	10/1/02	10/19/04
	0822	18359	FecalColi	POR	0.13	1.47	0.09	2.56	1.80	-0.34	0.17	24	1087	16500	604.75	110.00	30.00	0.50	574.8	10/1/02	10/19/04
	0823	10860	00061	Summer	0.37	1.45	0.06	4.19	2.17	-0.09	-0.5	10	9.47	16.00	12.50	8.95	6.40	2.20	6.10	10/2/00	10/27/05
	0823	10860	00665	POR	0.49	0.24	0.00	0.77	5.14	-0.03	0.14	29	2.23	3.82	2.56	2.29	1.83	0.64	0.73	11/29/99	7/17/07
	0823	10860	00665	Summer	0.34	0.15	0.03	0.56	2.51	1.25	1.30	14	2.60	3.82	2.82	2.44	2.29	1.81	0.53	7/11/00	7/17/07
	0823	10860	00665	Winter	0.59	0.27	0.00	0.78	4.29	0.22	-0.6	15	1.88	3.27	2.44	1.83	1.21	0.64	1.23	11/29/99	4/27/06
	0823	10860	00940	POR	0.21	0.10	0.01	0.49	2.72	-0.09	-0.1	30	80.88	198.00	93.00	77.50	55.00	29.00	38.00	11/29/99	7/17/07
	0823	10860	00940	Summer	0.40	0.11	0.01	0.40	2.95	0.71	0.04	15	95.90	198.00	110.00	84.00	61.00	51.00	49.00	7/11/00	7/17/07
	0823	10860	00945	Summer	0.36	0.06	0.02	0.21	2.69	0.91	0.57	15	156.90	250.00	170.00	143.00	136.50	116.00	33.50	7/11/00	7/17/07
	0823	10860	00945	Winter	0.48	5.50	0.00	17.37	3.43	0.19	0.51	15	150.47	188.00	162.00	154.00	139.00	120.00	23.00	11/29/99	4/27/06
	0823	10860	00951	Summer	0.26	-0.05	0.07	0.18	-1.97	-0.05	1.70	13	0.86	1.24	0.93	0.90	0.79	0.50	0.14	7/18/01	7/17/07

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
Elm Fork	0823	10860	00951	Winter	0.36	0.05	0.05	0.13	2.23	0.42	-0.7	11	0.73	0.95	0.81	0.71	0.62	0.56	0.19	4/3/01	4/27/06
	0823	10860	TDS Meas	POR	0.50	0.05	0.00	0.16	5.30	0.71	0.33	30	578.77	889.00	636.00	549.00	505.00	437.00	131	11/29/99	7/17/07
	0823	10860	TDS Meas	Summer	0.42	33.55	0.01	116.13	3.07	1.26	1.75	15	593.33	889.00	648.00	564.00	504.00	452.00	144	7/11/00	7/17/07
	0823	10860	TDS Meas	Winter	0.59	29.53	0.00	83.75	4.31	0.57	-0.4	15	564.20	740.00	618.00	516.00	506.00	437.00	112	11/29/99	4/27/06
	0823	11027	00078	POR	0.19	0.15	0.03	0.29	2.30	0.29	-1.1	25	0.87	1.40	0.99	0.91	0.60	0.47	0.39	2/12/03	10/27/05
	0823	11027	00078	Winter	0.46	0.31	0.03	0.34	2.61	0.54	-1.3	10	0.83	1.40	1.10	0.76	0.55	0.47	0.55	2/12/03	4/2/05
	0823	11027	TDS Calc	Winter	0.27	8.77	0.01	31.26	2.97	-0.26	-0.9	26	209.45	253.50	232.05	214.50	182.00	148.85	50.05	2/27/01	4/28/08
	0823	16808	TDS Calc	Winter	0.18	29.80	0.02	149.48	2.51	-0.12	0.13	31	495.38	780.00	611.00	476.45	435.50	132.60	175.5	12/9/99	11/5/08
	0823	16826	pH	POR	0.15	-0.05	0.00	0.36	-4.23	0.06	0.53	100	7.89	8.95	8.11	7.90	7.70	6.90	0.41	1/12/99	11/5/08
	0823	16826	pH	Winter	0.19	-0.06	0.00	0.38	-3.57	-0.52	1.16	55	7.99	8.95	8.20	8.00	7.80	6.90	0.40	1/12/99	11/5/08
	0823	16827	TDS Calc	Summer	0.22	23.47	0.02	112.32	2.55	0.44	-0.1	25	296.56	581.75	388.70	286.00	189.80	143.00	198.9	5/11/99	10/24/08
	0823	17830	00078	POR	0.12	0.13	0.09	0.30	1.77	0.70	-0.3	25	0.71	1.28	0.78	0.64	0.56	0.45	0.22	2/12/03	10/27/05
	0823	17830	00078	Winter	0.36	0.12	0.07	0.14	2.13	0.52	-1.1	10	0.63	0.86	0.78	0.59	0.52	0.45	0.26	2/12/03	4/21/05
	0824	15635	00061	Winter	0.18	-0.65	0.02	2.70	-2.57	-0.41	-0.7	32	55.51	417.00	68.50	11.15	0.70	0.01	67.80	1/26/00	4/24/06
	0824	15635	00951	POR	0.29	-0.26	0.00	1.04	-3.29	-0.83	-0.5	28	0.20	0.85	0.24	0.20	0.10	0.03	0.14	5/31/01	7/15/08
	0824	15635	00951	Winter	0.55	-0.03	0.00	0.10	-3.87	-0.36	-1.7	14	0.15	0.29	0.22	0.19	0.03	0.03	0.20	12/3/01	4/9/08
	0825	14244	00300	Summer	0.20	0.31	0.00	1.19	3.01	-0.12	0.32	39	6.53	9.60	7.30	6.60	5.80	4.00	1.50	9/12/02	10/28/08
	0825	14244	00610	Winter	0.29	0.51	0.09	1.61	1.93	0.10	-0.1	11	0.33	1.53	0.25	0.11	0.06	0.01	0.19	12/5/02	3/17/08
	0825	14244	00665	Winter	0.28	0.07	0.08	0.22	1.97	1.30	1.37	12	0.29	0.81	0.39	0.24	0.13	0.08	0.26	12/5/02	3/17/08
	0825	14244	00945	Winter	0.26	4.18	0.09	14.58	1.89	-0.31	-0.8	12	51.17	73.00	62.50	54.00	40.00	24.00	22.50	12/5/02	3/17/08
	0825	14244	00951	Summer	0.52	-0.06	0.01	0.15	-3.26	-0.51	-1.6	12	0.22	0.39	0.33	0.27	0.03	0.03	0.31	9/12/02	7/8/08
	0825	14244	TDS Meas	Winter	0.54	18.25	0.01	44.56	3.40	-0.14	-1.1	12	280.67	344.00	311.00	283.00	237.00	212.00	74.00	12/5/02	3/17/08
	0826	14483	01000	POR	0.32	-0.19	0.01	0.99	-3.09	0.75	-1.1	22	1.01	3.00	2.00	0.25	0.25	0.25	1.75	2/19/99	11/4/08
	0826	14483	01000	Summer	0.57	-0.31	0.00	1.14	-3.61	0.56	-1.7	12	1.15	3.00	2.23	0.25	0.25	0.25	1.98	5/25/99	5/21/08
	0826	14483	01005	POR	0.19	3.21	0.04	20.94	2.25	0.27	0.54	24	101.22	152.00	114.94	102.00	87.41	58.00	27.53	2/19/99	11/4/08
	0826	14483	01005	Summer	0.34	4.35	0.05	20.54	2.28	0.62	0.31	12	109.65	152.00	119.11	108.01	94.50	81.42	24.61	5/25/99	5/21/08
	0826	14483	01065	POR	0.25	0.26	0.01	1.49	2.68	0.02	-0.8	24	2.10	5.19	3.04	2.21	0.72	0.03	2.32	2/19/99	11/4/08
	0826	14483	01065	Summer	0.38	0.29	0.03	1.27	2.50	-0.42	-1.5	12	1.90	3.40	3.01	2.21	0.72	0.03	2.29	5/25/99	5/21/08
	0826	14483	TDS Calc	Summer	0.20	21.88	0.02	106.98	2.50	-0.78	0.60	27	374.21	583.70	439.40	407.55	312.00	117.00	127.4	5/11/99	10/29/08
	0826	14485	TDS Calc	Winter	0.12	21.65	0.06	125.54	1.94	-0.02	-0.5	31	406.75	637.00	508.30	377.00	325.00	150.15	183.3	1/17/01	11/4/08
Main Stem	0803	10899	00900	POR	0.21	2.21	0.00	12.51	4.88	0.16	0.22	90	110.84	147.00	119.00	112.00	104.00	85.00	15.00	12/31/98	9/30/08
	0803	10899	00900	Summer	0.22	1.97	0.00	11.60	3.62	0.59	0.41	49	113.17	147.00	120.00	113.00	104.00	94.00	16.00	5/26/99	9/30/08
	0803	10899	00900	Winter	0.18	2.30	0.01	13.12	2.88	-0.04	-0.3	41	108.05	143.00	118.00	110.00	96.00	85.00	22.00	12/31/98	11/28/07
	0803	10899	01000	Summer	0.19	0.22	0.00	1.21	3.01	0.28	-1.8	41	1.43	5.00	2.20	0.25	0.25	0.25	1.95	5/26/99	9/30/08
	0803	10899	32211	Summer	0.13	1.05	0.02	7.94	2.41	-0.18	-0.2	41	18.89	35.00	25.00	17.00	14.00	0.10	11.00	5/26/99	9/30/08
	0803	10909	00078	Summer	0.48	-0.03	0.03	0.13	-2.71	-0.14	-1.4	10	0.50	0.68	0.59	0.53	0.38	0.31	0.21	6/23/99	9/29/08
	0803	10909	00900	POR	0.25	4.09	0.00	23.35	3.14	-0.83	1.51	31	98.17	138.00	110.00	102.00	85.00	30.00	25.00	1/28/99	9/29/08
	0803	10909	00900	Summer	0.33	2.33	0.03	12.57	2.44	0.77	-0.4	14	111.39	135.00	116.00	108.00	102.00	94.00	14.00	6/23/99	9/29/08

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
Main Stem	0803	10909	00900	Winter	0.20	4.28	0.07	24.80	1.93	-0.38	1.22	17	87.29	138.00	102.00	86.00	76.00	30.00	26.00	1/28/99	4/23/07
	0803	10909	00940	POR	0.11	1.20	0.08	10.03	1.84	0.50	0.62	29	24.05	50.00	30.00	24.00	18.00	4.00	12.00	1/28/99	9/29/08
	0803	10909	00945	POR	0.13	1.95	0.07	15.78	1.90	-0.06	-0.8	27	30.48	61.00	40.00	34.00	18.00	5.00	22.00	1/28/99	9/29/08
	0803	10909	01065	POR	0.30	0.62	0.00	3.13	3.25	0.58	-1.8	27	6.69	30.00	15.00	0.03	0.03	0.03	14.97	4/28/99	9/29/08
	0803	10909	01065	Summer	0.45	1.68	0.01	7.72	2.99	1.05	-0.2	13	5.48	22.00	10.00	0.03	0.03	0.03	9.97	6/23/99	9/29/08
	0803	10911	00078	Summer	0.39	-0.03	0.02	0.15	-2.64	-0.86	0.29	13	0.50	0.70	0.60	0.52	0.42	0.19	0.18	6/22/99	9/29/08
	0803	10911	00940	POR	0.22	2.11	0.01	12.26	2.87	0.83	0.35	31	31.47	65.00	40.00	27.00	23.00	13.00	17.00	1/27/99	9/29/08
	0803	10911	00940	Summer	0.45	3.27	0.00	14.21	3.37	0.69	-0.5	16	34.53	65.00	46.50	28.00	24.25	15.00	22.25	6/22/99	9/29/08
	0803	10911	01065	POR	0.13	0.43	0.06	3.25	1.99	0.48	-1.9	28	8.45	35.00	18.50	0.03	0.03	0.03	18.47	4/28/99	9/29/08
	0803	10911	01065	Summer	0.38	0.64	0.02	3.21	2.71	0.69	-1.8	14	7.23	35.00	15.00	0.03	0.03	0.03	14.97	6/22/99	9/29/08
	0803	10911	OP	Summer	0.24	-0.01	0.06	0.08	-2.02	0.90	-0.1	15	0.10	0.26	0.14	0.10	0.04	0.01	0.10	8/24/99	9/29/08
	0803	10913	00078	Summer	0.23	-0.01	0.08	0.08	-1.90	-0.29	0.42	14	0.26	0.38	0.28	0.26	0.22	0.09	0.06	6/22/99	9/29/08
	0803	10913	01065	Summer	0.21	0.51	0.07	3.18	1.92	0.66	-1.7	16	8.18	46.00	9.00	0.03	0.03	0.03	8.97	6/22/99	9/29/08
	0803	10913	pH	Winter	0.31	-0.08	0.04	0.40	-2.33	0.70	-0.9	14	7.95	8.70	8.30	7.85	7.60	7.50	0.70	1/27/99	4/23/07
	0803	10914	00078	POR	0.24	-0.09	0.00	0.66	-4.47	-0.08	-0.5	67	0.31	0.90	0.43	0.25	0.16	0.06	0.27	1/27/99	11/25/08
	0803	10914	00078	Summer	0.33	-0.12	0.00	0.70	-4.14	-0.20	-0.5	36	0.32	0.90	0.48	0.26	0.17	0.06	0.31	5/26/99	10/28/08
	0803	10914	00078	Winter	0.15	-0.07	0.03	0.61	-2.24	0.07	-0.3	31	0.29	0.89	0.41	0.22	0.16	0.07	0.25	1/27/99	11/25/08
	0803	10914	00620	Summer	0.23	-0.32	0.02	2.00	-2.56	0.53	-0.2	24	2.93	7.70	4.12	3.14	1.15	0.19	2.97	5/26/99	7/30/08
	0803	10914	01000	Summer	0.10	0.15	0.04	1.17	2.14	0.46	-1.7	43	1.28	5.00	2.20	0.25	0.25	0.25	1.95	5/26/99	9/30/08
	0803	10917	01000	Summer	0.11	0.15	0.03	1.13	2.25	0.39	-1.7	43	1.20	5.00	2.00	0.25	0.25	0.25	1.75	5/25/99	9/30/08
	0804	10717	00610	Winter	0.42	-0.02	0.03	0.06	-2.57	1.15	0.05	11	0.05	0.16	0.08	0.01	0.01	0.01	0.07	2/5/03	3/25/08
	0804	10717	00940	Summer	0.37	-0.86	0.05	2.73	-2.32	0.83	1.93	11	14.41	20.50	15.00	14.00	13.00	10.00	2.00	10/24/02	7/2/08
	0804	10717	00951	POR	0.61	-0.02	0.00	0.04	-5.70	1.01	0.45	23	0.06	0.17	0.08	0.06	0.03	0.03	0.06	10/24/02	7/2/08
	0804	10717	00951	Summer	0.59	-0.02	0.01	0.05	-3.58	0.73	-0.6	11	0.07	0.17	0.10	0.07	0.03	0.03	0.08	10/24/02	7/2/08
	0804	10717	00951	Winter	0.83	-0.02	0.00	0.03	-7.10	0.59	-1	12	0.05	0.11	0.08	0.04	0.03	0.03	0.06	2/5/03	3/25/08
	0804	10919	00078	Winter	0.15	-0.10	0.01	0.63	-2.69	-0.27	0.43	44	0.12	0.40	0.15	0.10	0.07	0.02	0.08	12/17/98	11/11/08
	0804	10922	00610	POR	0.22	-0.25	0.00	1.03	-4.51	-0.18	-1	74	0.07	0.44	0.11	0.05	0.02	0.01	0.09	9/18/01	11/11/08
	0804	10922	00610	Summer	0.48	-0.02	0.00	0.05	-5.60	0.23	-1.6	36	0.06	0.14	0.12	0.05	0.02	0.01	0.10	9/18/01	8/19/08
	0804	13690	01025	Summer	0.12	-0.19	0.03	1.47	-2.20	0.71	-1.3	39	0.13	0.70	0.20	0.02	0.02	0.02	0.19	5/25/99	9/30/08
	0805	10839	31699	Summer	0.19	-0.51	0.07	1.19	-1.97	0.08	-0.3	19	61.00	326.00	84.00	26.00	15.00	3.00	69.00	5/7/02	7/21/05
	0805	10925	00061	Summer	0.20	0.20	0.00	1.05	3.72	0.57	-0.3	58	3488	19500	4060	1449.50	898.00	182.00	3162	5/26/99	8/19/08
	0805	10925	00078	Summer	0.11	-0.01	0.03	0.06	-2.19	0.48	-0.3	41	0.12	0.27	0.16	0.11	0.07	0.02	0.09	9/25/00	8/19/08
	0805	10925	00610	Summer	0.22	-0.01	0.00	0.05	-3.37	0.21	-1	42	0.08	0.18	0.12	0.08	0.04	0.01	0.08	9/25/00	8/19/08
	0805	10925	31699	Winter	0.12	-0.29	0.03	1.81	-2.30	0.24	-1	42	510.48	3110	523.00	140.50	26.00	8.00	497	2/1/01	11/11/08
	0805	10925	OP	Summer	0.16	-0.10	0.00	0.61	-3.15	0.08	-1.4	56	0.95	1.96	1.45	0.99	0.28	0.09	1.17	5/26/99	8/19/08
	0805	10934	00061	POR	0.11	0.11	0.00	0.93	2.95	0.49	-0.7	74	2836	12000	3350	1605.00	876.00	370.00	2474	12/16/98	11/12/08
	0805	10934	00061	Summer	0.25	0.18	0.00	0.98	3.42	0.30	-0.9	37	2962	12000	3640	1610.00	876.00	370.00	2764	5/17/99	8/20/08
	0805	10934	00610	POR	0.14	-0.20	0.00	1.09	-3.54	-0.54	-0.5	80	0.12	0.66	0.16	0.11	0.04	0.01	0.12	11/16/00	11/12/08

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
Main Stem	0805	10934	00610	Summer	0.34	-0.02	0.00	0.06	-4.34	0.28	-0.4	38	0.10	0.26	0.15	0.11	0.05	0.01	0.10	8/13/01	8/20/08
	0805	10934	OP	Summer	0.11	-0.09	0.00	0.65	-2.95	0.11	-1.4	76	1.00	2.21	1.66	0.96	0.38	0.00	1.28	5/17/99	8/20/08
	0805	10934	TDS Calc	Summer	0.12	-16.87	0.00	94.17	-3.02	-0.14	-1.1	67	379.56	542.10	462.80	365.95	302.90	180.05	159.9	8/29/00	8/20/08
	0805	10937	00010	Winter	0.15	0.65	0.01	3.68	2.80	0.10	-0.5	45	16.25	24.20	18.20	16.30	13.50	8.75	4.70	11/16/00	11/10/08
	0805	10937	00610	Summer	0.27	-0.28	0.00	1.05	-3.57	-0.46	-1	36	0.08	0.30	0.12	0.08	0.02	0.01	0.10	8/13/01	8/18/08
	0805	10937	OP	Winter	0.13	0.15	0.02	0.95	2.39	-0.57	-0.5	41	0.95	3.10	1.43	0.88	0.34	0.06	1.09	11/16/00	11/10/08
	0805	10937	TDS Calc	Summer	0.11	-16.08	0.03	108.83	-2.31	-0.09	-1.5	45	397.64	575.25	500.50	395.85	286.00	227.50	214.5	8/29/00	8/18/08
	0805	17506	31699	POR	0.17	-0.27	0.01	1.02	-2.91	0.60	0.42	44	112.64	980.00	88.50	70.50	26.00	11.00	62.50	2/20/01	8/3/06
	0805	17506	31699	Summer	0.30	-0.34	0.01	0.96	-2.73	0.48	-0.8	19	67.37	272.00	83.00	40.00	18.00	11.00	65.00	10/17/01	8/3/06
	0806	10938	TDS Calc	POR	0.14	-12.18	0.00	81.52	-4.62	-0.21	-0.8	138	225.29	395.20	280.15	234.00	162.50	65.00	117.7	8/29/00	11/11/08
	0806	10938	TDS Calc	Summer	0.15	-11.40	0.00	73.86	-3.44	-0.02	-0.6	70	206.74	366.60	260.00	214.18	136.50	71.50	123.5	8/29/00	10/14/08
	0806	10938	TDS Calc	Winter	0.12	-12.04	0.00	85.10	-2.99	-0.55	-0.6	68	244.39	395.20	305.50	259.68	196.95	65.00	108.6	11/16/00	11/11/08
	0806	16120	31699	POR	0.12	-0.41	0.00	2.28	-3.42	0.40	0.06	86	2120	98040	579.40	85.00	21.60	0.50	557.8	1/9/01	8/14/07
	0806	16120	TDS Calc	POR	0.13	-0.07	0.00	0.43	-3.80	-0.02	0.43	100	223.39	936.00	282.75	221.00	143.00	73.45	139.8	1/9/01	11/11/08
	0806	16120	TDS Calc	Summer	0.11	-10.03	0.02	69.45	-2.49	0.20	-1	50	195.75	357.50	247.00	192.73	125.45	86.45	121.6	5/8/01	10/14/08
	0806	16120	TDS Calc	Winter	0.14	-0.07	0.01	0.46	-2.77	-0.12	1.06	50	251.03	936.00	307.45	249.28	162.50	73.45	145	1/9/01	11/11/08
	0813	10973	00951	POR	0.17	-0.01	0.03	0.03	-2.31	0.84	-1.1	28	0.04	0.09	0.07	0.03	0.03	0.03	0.05	8/13/01	4/17/08
	0827	18517	00061	Winter	0.13	0.23	0.08	0.69	1.82	0.71	0.91	25	80.44	410.00	86.00	68.00	32.00	20.00	54.00	2/13/02	11/8/06
	0827	18517	00300	Summer	0.12	-0.92	0.08	2.02	-1.83	-0.51	1.60	27	9.21	13.40	10.30	9.20	8.30	3.90	2.00	5/7/02	8/17/04
	0827	18517	00665	Winter	0.20	0.03	0.03	0.07	2.35	0.44	-0.9	24	0.21	0.35	0.26	0.19	0.14	0.11	0.12	2/13/02	11/8/06
	0827	18517	00940	POR	0.22	5.66	0.01	9.20	2.77	0.21	-1	30	32.74	49.00	36.00	34.15	23.90	18.80	12.10	2/13/02	8/17/04
	0827	18517	00940	Winter	0.33	7.08	0.03	9.00	2.43	0.26	-0.9	14	32.51	49.00	36.00	35.05	23.70	20.00	12.30	2/13/02	4/5/04
	0827	18517	OP	Winter	0.26	0.23	0.01	0.47	2.80	0.42	-0.8	24	0.12	0.26	0.15	0.11	0.08	0.05	0.07	2/13/02	11/8/06
	0841	10719	00665	Winter	0.19	-0.27	0.09	1.47	-1.81	-0.21	-1.4	16	0.07	0.25	0.12	0.04	0.01	0.01	0.12	11/14/00	3/4/08
	0841	10722	00665	POR	0.11	-0.21	0.06	1.61	-1.95	0.21	-0.9	33	0.11	1.04	0.09	0.04	0.01	0.01	0.09	5/11/00	8/13/08
	0841	10722	00665	Summer	0.30	-0.35	0.02	1.76	-2.53	0.04	-0.9	17	0.17	1.04	0.12	0.06	0.01	0.01	0.12	5/11/00	8/13/08
	0841	10722	00900	Winter	0.31	-17.25	0.03	73.73	-2.51	0.09	-0.5	16	274.88	420.00	322.00	278.00	212.00	148.00	110	11/13/00	3/10/08
	0841	10722	pH	Winter	0.33	-0.07	0.07	0.29	-2.09	0.13	-0.2	11	8.06	8.60	8.20	8.10	7.80	7.60	0.40	11/13/00	3/10/08
	0841	10723	01040	POR	0.14	-0.17	0.05	1.15	-2.10	0.09	-1.6	30	3.00	12.30	4.80	2.25	0.50	0.50	4.30	5/10/00	8/13/08
	0841	10723	01040	Summer	0.30	-0.72	0.03	3.45	-2.47	1.02	0.78	16	4.16	12.30	5.80	3.30	1.35	0.50	4.45	5/10/00	8/13/08
	0841	10723	31699	POR	0.14	0.36	0.06	1.90	1.98	0.17	-1.3	26	1701	7940	2800	300.50	83.00	26.00	2717	1/15/02	8/13/08
	0841	10723	31699	Summer	0.33	905.55	0.04	3036.6	2.34	0.84	-0.9	13	2568	7940	4800	651.00	108.00	26.00	4692	7/25/02	8/13/08
	0841	10724	31699	POR	0.23	0.36	0.01	1.48	2.64	-0.29	0.14	25	672.56	4800	722.00	330.00	113.00	8.00	609	1/15/02	6/23/08
	0841	10724	31699	Summer	0.41	0.44	0.03	1.34	2.62	-0.22	0.28	12	1080	4800	1095	560.00	255.00	37.00	840	7/24/02	6/23/08
	0841	10724	TDS Calc	POR	0.21	38.12	0.01	204.84	2.77	0.26	###	31	459.47	951.60	603.20	443.30	273.65	150.80	329.6	5/11/00	6/23/08
	0841	10724	TDS Calc	Summer	0.25	42.56	0.06	225.04	2.06	0.67	0.02	15	453.48	951.60	603.20	418.60	253.50	156.00	349.7	5/11/00	6/23/08
	0841	10725	32211	POR	0.14	0.43	0.07	3.00	1.92	0.97	-0.3	24	2.50	9.30	4.30	0.65	0.10	0.10	4.20	5/11/00	8/14/08
	0841	10725	32211	Summer	0.35	0.72	0.05	3.68	2.22	0.74	-1.2	11	3.03	9.30	6.60	0.10	0.10	0.10	6.50	5/11/00	8/14/08

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
Main Stem	0841	10725	OP	Summer	0.56	0.00	0.00	0.00	4.11	-1.18	-0.7	15	0.02	0.02	0.02	0.02	0.01	0.01	0.01	5/11/00	8/14/08
	0841	10791	00010	Winter	0.27	-1.37	0.04	6.29	-2.26	0.39	-1.1	16	14.55	26.00	19.35	13.70	8.65	6.90	10.70	11/14/00	3/5/08
	0841	10791	TDS Calc	POR	0.19	39.86	0.02	225.38	2.54	-0.30	-1	30	540.63	881.40	757.25	510.58	396.50	104.00	360.8	5/11/00	8/12/08
	0841	10791	TDS Calc	Winter	0.29	54.90	0.03	242.82	2.39	-0.65	-0.9	16	569.56	806.00	790.73	637.00	394.55	104.00	396.2	11/14/00	3/5/08
	0841	10792	pH	Winter	0.47	-0.06	0.02	0.20	-2.83	1.15	0.85	11	7.67	8.10	7.80	7.60	7.50	7.50	0.30	11/14/00	3/4/08
	0841	10815	00610	POR	0.24	-0.31	0.01	1.32	-2.87	0.02	-1.1	28	0.12	0.72	0.15	0.08	0.01	0.01	0.14	2/19/02	11/19/08
	0841	10815	00610	Summer	0.55	-0.02	0.00	0.07	-3.80	0.70	-1.1	14	0.07	0.19	0.14	0.05	0.01	0.01	0.13	5/29/02	8/20/08
	0841	10815	00945	Summer	0.26	11.53	0.07	47.16	1.97	0.35	0.01	13	111.38	195.00	123.00	103.00	85.00	27.00	38.00	5/29/02	8/20/08
	0841	10815	FecalColi	Winter	0.12	0.35	0.02	2.07	2.35	0.07	-0.2	42	281.90	5000	190.00	40.00	10.00	0.50	180	12/11/01	11/19/08
	0841	10866	pH	POR	0.26	-0.18	0.01	0.21	-2.77	-0.06	-0.9	24	7.74	8.15	7.90	7.80	7.50	7.40	0.40	11/6/02	10/19/04
	0841	10866	pH	Winter	0.41	-0.21	0.02	0.18	-2.66	-1.16	0.65	12	7.78	8.00	7.90	7.85	7.70	7.40	0.20	11/6/02	4/19/04
	0841	10867	00610	POR	0.15	-0.24	0.04	1.28	-2.18	0.17	-1.5	28	0.08	0.38	0.12	0.05	0.01	0.01	0.11	2/18/02	11/19/08
	0841	10867	00610	Summer	0.31	-0.34	0.04	1.26	-2.30	-0.18	-1.5	14	0.09	0.35	0.12	0.07	0.01	0.01	0.11	5/28/02	8/20/08
	0841	10867	pH	POR	0.25	-0.10	0.00	0.41	-5.09	-0.51	0.40	79	7.56	8.50	7.80	7.70	7.30	6.40	0.50	12/10/01	11/19/08
	0841	10867	pH	Summer	0.23	-0.10	0.00	0.41	-3.27	-0.67	0.26	38	7.50	8.20	7.77	7.60	7.20	6.40	0.57	5/28/02	10/22/08
	0841	10867	pH	Winter	0.28	-0.11	0.00	0.42	-3.86	-0.44	0.63	41	7.62	8.50	7.80	7.70	7.50	6.60	0.30	12/10/01	11/19/08
	0841	10868	01040	Winter	0.61	0.62	0.00	1.51	3.76	1.03	-0.7	11	1.53	4.20	2.83	0.50	0.50	0.50	2.33	11/14/01	4/25/07
	0841	10868	31699	POR	0.16	-0.50	0.04	2.09	-2.20	-0.23	0.19	28	350.17	2400	228.50	58.00	19.00	0.50	209.5	1/23/01	7/25/06
	0841	10868	31699	Summer	0.35	-0.84	0.03	2.22	-2.55	-0.21	-0.2	14	510.50	2400	731.00	90.00	18.00	1.00	713	7/23/01	7/25/06
	0841	11081	00610	POR	0.14	-0.21	0.00	1.23	-3.31	0.17	-0.6	67	0.09	1.52	0.11	0.06	0.01	0.01	0.10	11/16/00	11/10/08
	0841	11081	00610	Summer	0.14	-0.01	0.03	0.05	-2.21	0.75	0.66	32	0.07	0.23	0.11	0.07	0.01	0.01	0.10	8/13/01	8/18/08
	0841	11081	00665	Winter	0.26	0.11	0.00	0.51	3.43	0.26	-0.9	35	0.99	2.00	1.48	0.89	0.64	0.06	0.84	11/16/00	11/10/08
	0841	11081	OP	Winter	0.12	0.07	0.02	0.48	2.47	0.32	-0.7	46	0.75	1.82	1.09	0.75	0.42	0.02	0.67	2/5/99	11/10/08
	0841	17089	31699	POR	0.18	-0.38	0.05	1.51	-2.07	0.80	-0.1	22	370.73	2419	185.00	65.00	47.00	12.00	138	1/23/01	6/13/06
	0841	17173	31699	POR	0.33	1.96	0.00	2.86	3.82	-0.01	-0.4	32	1093	24200	208.50	46.00	9.00	0.50	199.5	12/12/01	10/19/04
	0841	17173	31699	Winter	0.50	2.17	0.00	2.51	3.73	0.27	-1.2	16	83.75	922.00	47.00	9.00	0.50	0.50	46.50	12/12/01	4/19/04
	0841	17173	32211	Summer	0.45	1.21	0.03	1.45	2.56	0.31	-0.2	10	2.41	5.00	3.80	2.30	1.40	0.10	2.40	7/8/02	10/19/04
	0841	17173	pH	POR	0.14	-0.18	0.07	0.28	-1.90	0.70	1.02	24	7.75	8.50	7.95	7.70	7.60	7.20	0.35	11/6/02	10/19/04
	0841	17173	pH	Winter	0.47	-0.24	0.01	0.19	-2.98	0.35	-0.7	12	7.84	8.20	8.00	7.85	7.70	7.60	0.30	11/6/02	4/19/04
	0841	17174	00900	POR	0.13	-35.15	0.05	78.33	-2.09	0.78	0.72	30	200.97	392.00	220.00	192.00	144.00	72.00	76.00	12/12/01	10/18/04
	0841	17174	00900	Winter	0.26	-54.06	0.05	83.76	-2.11	0.93	-0.1	15	228.93	392.00	292.00	204.00	184.00	126.00	108	12/12/01	4/19/04
	0841	17176	pH	POR	0.12	-0.25	0.08	0.40	-1.80	-0.34	1.15	25	8.00	8.90	8.20	8.10	7.80	7.00	0.40	11/7/02	10/20/04
	0841	17176	pH	Summer	0.70	-0.60	0.00	0.39	-4.85	0.70	-0.4	12	8.12	8.90	8.45	8.05	7.80	7.70	0.65	5/7/03	10/20/04
	0841	17177	00900	POR	0.28	-64.34	0.01	96.12	-3.05	0.58	-0.5	26	189.96	418.00	280.00	164.50	102.00	66.00	178	1/14/02	10/20/04
	0841	17177	00900	Summer	0.32	-55.13	0.03	78.26	-2.39	1.29	0.60	14	145.00	312.00	152.00	120.00	98.00	66.00	54.00	7/10/02	10/20/04
	0841	17177	31699	Summer	0.27	-1198	0.05	1894.5	-2.17	1.00	-0.7	15	1619	4840	3110	540.00	176.00	0.50	2934	7/10/02	10/20/04
	0841	17177	32211	Winter	0.38	1.38	0.06	1.19	2.21	-1.41	3.80	10	13.62	49.10	15.90	10.40	7.00	0.50	8.90	11/7/02	4/20/04
	0841	17177	pH	POR	0.33	0.61	0.00	0.64	3.23	0.70	-0.6	23	8.70	10.10	9.10	8.54	8.20	7.90	0.90	11/7/02	10/20/04

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
Main Stem	0841	17178	00610	POR	0.33	-0.35	0.00	1.21	-4.60	0.31	-1.5	44	0.07	0.33	0.12	0.03	0.01	0.01	0.11	7/24/01	11/20/08
	0841	17178	00610	Summer	0.24	-0.01	0.02	0.06	-2.58	0.89	-0.3	23	0.06	0.21	0.12	0.03	0.01	0.01	0.11	7/24/01	8/5/08
	0841	17178	00610	Winter	0.39	-0.38	0.00	1.27	-3.46	0.43	-1.3	21	0.07	0.33	0.12	0.03	0.01	0.01	0.11	1/14/02	11/20/08
	0841	17178	00665	Winter	0.17	-0.28	0.07	1.52	-1.93	-0.45	-1.2	20	0.09	0.42	0.13	0.07	0.01	0.01	0.13	11/12/01	11/20/08
	0841	17178	00900	Winter	0.45	-23.80	0.00	74.69	-3.70	0.63	-0.8	19	182.53	336.00	246.00	170.00	120.00	96.00	126	1/14/02	11/20/08
	0841	17178	01040	POR	0.63	0.29	0.00	0.73	8.69	0.54	-1.6	47	1.18	3.20	2.00	0.50	0.50	0.50	1.50	7/24/01	11/20/08
	0841	17178	01040	Summer	0.44	0.33	0.00	0.94	4.25	0.81	-0.7	25	1.25	3.20	2.00	0.50	0.50	0.50	1.50	7/24/01	5/20/08
	0841	17178	01040	Winter	0.74	0.35	0.00	0.88	7.55	1.04	-0.4	22	1.11	3.06	1.84	0.50	0.50	0.50	1.34	11/12/01	11/20/08
	0841	17179	00900	Winter	0.34	-96.80	0.03	121.76	-2.46	0.48	-0.7	14	224.43	460.00	320.00	212.00	116.00	60.00	204	1/16/02	4/12/04
	0841	17179	pH	Winter	0.29	-0.21	0.07	0.22	-2.04	-0.46	-0.7	12	7.39	7.70	7.55	7.45	7.25	7.00	0.30	11/4/02	4/12/04
	0841	17189	31699	POR	0.13	0.32	0.07	1.82	1.89	0.55	0.22	27	782.59	9200	370.00	99.00	27.00	4.00	343	1/15/02	8/13/08
	0841	17189	31699	Summer	0.24	0.49	0.08	2.05	1.93	0.42	0.23	14	1011	9200	370.00	92.00	62.00	4.00	308	7/25/02	8/13/08
	0841	17189	TDS Calc	POR	0.11	0.08	0.05	0.58	1.99	-0.53	0.19	33	485.87	1352	630.50	456.30	281.45	109.20	349.1	8/16/00	8/13/08
	0841	17190	pH	Summer	0.33	-0.04	0.08	0.15	-2.00	1.20	0.27	10	7.71	8.00	7.80	7.64	7.60	7.60	0.20	5/8/01	8/12/08
	0841	17190	TDS Calc	POR	0.13	0.08	0.05	0.54	2.02	-0.32	1.67	30	562.21	2081	689.00	537.55	364.00	133.25	325	8/16/00	8/12/08
	0841	17191	32211	POR	0.27	1.66	0.01	7.63	3.02	0.77	-0.7	27	7.96	23.00	13.90	5.00	1.60	0.10	12.30	11/14/00	6/18/08
	0841	17191	32211	Summer	0.35	2.07	0.04	8.16	2.32	0.55	-1.3	12	10.19	23.00	17.75	7.35	3.85	0.10	13.90	5/8/01	6/18/08
	0841	17663	00610	POR	0.10	-0.22	0.09	1.37	-1.74	0.55	-0.9	28	0.10	0.86	0.13	0.03	0.01	0.01	0.12	2/18/02	11/19/08
	0841	17663	00610	Summer	0.23	-0.30	0.09	1.33	-1.87	-0.09	-1.8	14	0.09	0.33	0.13	0.07	0.01	0.01	0.12	5/28/02	8/20/08
	0841	17663	00945	Winter	0.26	13.44	0.09	50.98	1.87	0.31	0.85	12	120.42	229.00	139.50	133.50	83.50	44.00	56.00	11/12/02	11/19/08
	0841	17663	pH	POR	0.14	-0.07	0.00	0.37	-3.64	-0.17	0.64	82	7.62	8.60	7.80	7.70	7.40	6.60	0.40	12/10/01	11/19/08
	0841	17663	pH	Summer	0.21	-0.09	0.00	0.40	-3.23	-0.67	-0.2	41	7.59	8.20	7.90	7.70	7.20	6.60	0.70	5/28/02	10/22/08
	0841	17664	32211	Winter	0.43	-0.55	0.02	1.75	-2.72	0.02	-1.8	12	1.94	8.30	2.80	1.25	0.10	0.10	2.70	12/10/01	2/25/08
	0841	17669	00610	POR	0.17	-0.25	0.03	1.24	-2.32	0.40	-0.3	28	0.11	1.03	0.12	0.05	0.02	0.01	0.10	2/18/02	11/19/08
	0841	17669	00610	Winter	0.29	-0.32	0.05	1.23	-2.23	0.82	0.65	14	0.15	1.03	0.12	0.06	0.03	0.01	0.09	2/18/02	11/19/08
	0841	17669	00665	POR	0.12	0.10	0.09	0.58	1.77	-0.27	-1.4	24	1.25	2.04	1.73	1.38	0.73	0.34	1.00	2/18/02	11/19/08
	0841	17669	00665	Winter	0.38	0.18	0.03	0.62	2.57	-0.04	-1.3	13	1.18	2.04	1.68	1.10	0.71	0.34	0.97	2/18/02	11/19/08
	0841	17669	00945	Summer	0.34	-3.17	0.04	11.29	-2.40	0.31	1.28	13	59.00	83.00	65.00	57.00	56.00	37.00	9.00	5/28/02	8/20/08
	0841	17672	00665	POR	0.34	-0.44	0.00	1.54	-3.36	0.48	-1.5	24	0.05	0.33	0.09	0.01	0.01	0.01	0.08	2/19/02	11/19/08
	0841	17672	00665	Summer	0.55	-0.63	0.01	1.70	-3.34	0.13	-1.9	11	0.08	0.33	0.10	0.05	0.01	0.01	0.10	5/30/02	8/20/08
	0841	17672	00665	Winter	0.27	-0.01	0.07	0.04	-2.03	1.23	0.05	13	0.03	0.13	0.07	0.01	0.01	0.01	0.07	2/19/02	11/19/08
	0841	17672	00900	Summer	0.53	-13.29	0.02	38.31	-2.98	1.54	2.82	10	124.00	214.00	144.00	118.00	96.00	84.00	48.00	5/30/02	8/20/08
	0841	17672	00900	Winter	0.51	-30.73	0.01	87.74	-3.21	1.23	0.02	12	177.67	352.00	222.00	146.00	122.00	96.00	100	11/13/02	11/19/08
	0841	17672	00940	Winter	0.62	-4.50	0.01	11.09	-3.59	0.64	-0.2	10	31.00	50.00	34.00	30.50	25.00	16.00	9.00	11/13/02	11/19/08
	0841	17672	31699	POR	0.16	-0.42	0.00	2.08	-3.86	-0.03	-0.8	79	816.53	4840	1160	150.00	30.00	2.00	1130	12/11/01	11/19/08
	0841	17672	31699	Winter	0.38	-0.67	0.00	2.24	-4.93	0.23	-0.7	41	728.63	4840	480.00	82.00	23.00	2.00	457	12/11/01	11/19/08
	0841	17672	32211	POR	0.55	-0.71	0.00	2.05	-5.33	0.61	-1.1	25	3.83	30.00	3.40	0.10	0.10	0.10	3.30	12/11/01	11/19/08
	0841	17672	32211	Summer	0.68	-0.92	0.00	2.18	-4.61	0.78	-1.2	12	3.98	28.90	4.80	0.10	0.10	0.10	4.70	5/30/02	8/20/08

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
Main Stem	0841	17672	32211	Winter	0.48	-0.59	0.01	2.00	-3.16	0.53	-0.9	13	3.70	30.00	2.50	0.70	0.10	0.10	2.40	12/11/01	11/19/08
	0841	17672	FecalColi	POR	0.12	-0.40	0.00	2.29	-3.20	0.18	-0.2	77	6944	3E+05	2000	530.00	70.00	5.00	1930	12/11/01	11/19/08
	0841	17672	FecalColi	Winter	0.30	-0.62	0.00	2.34	-4.12	0.52	-0.6	42	2391	26500	1040	160.00	30.00	5.00	1010	12/11/01	11/19/08
	0841	17672	TDS Meas	POR	0.38	-0.16	0.00	0.51	-3.53	0.67	-0.3	22	355.59	862.00	364.00	288.00	216.00	142.00	148	2/19/02	11/19/08
	0841	17672	TDS Meas	Summer	0.36	-14.97	0.07	48.23	-2.13	0.47	-1.7	10	246.80	320.00	288.00	226.00	202.00	196.00	86.00	5/30/02	8/20/08
	0841	17672	TDS Meas	Winter	0.56	-87.94	0.01	248.99	-3.56	0.50	-1.2	12	446.25	862.00	683.00	351.50	269.00	142.00	414	2/19/02	11/19/08
	0841	17673	00610	POR	0.19	-0.30	0.05	1.24	-2.09	-0.43	-0.9	21	0.13	0.49	0.16	0.10	0.03	0.01	0.13	8/29/02	5/20/08
	0841	17673	00610	Winter	0.38	-0.03	0.04	0.09	-2.35	0.73	-0.1	11	0.13	0.29	0.16	0.12	0.06	0.01	0.10	11/12/02	2/19/08
	0841	17673	pH	Winter	0.12	-0.06	0.03	0.33	-2.28	0.07	1.11	41	7.91	8.80	8.10	7.90	7.70	7.00	0.40	12/11/01	4/22/08
	0841	17674	00610	POR	0.19	-0.19	0.02	0.86	-2.42	-0.82	0.44	27	0.10	0.34	0.14	0.09	0.04	0.01	0.10	5/29/02	11/19/08
	0841	17674	00610	Winter	0.51	-0.02	0.01	0.05	-3.40	0.06	-1.8	13	0.08	0.15	0.13	0.08	0.04	0.01	0.09	11/12/02	11/19/08
	0841	17674	00900	Summer	0.28	-8.49	0.08	33.74	-1.99	-0.06	0.15	12	146.00	208.00	169.00	146.00	126.00	84.00	43.00	5/29/02	8/20/08
	0841	17674	00940	POR	0.15	0.10	0.06	0.53	1.95	0.85	2.81	24	26.04	110.00	26.50	22.00	18.50	8.00	8.00	5/29/02	11/19/08
	0841	17674	pH	POR	0.22	-0.01	0.00	0.05	-4.61	-0.04	1.49	79	7.69	9.00	7.90	7.70	7.50	6.70	0.40	12/11/01	11/19/08
	0841	17675	00610	POR	0.24	-0.30	0.01	1.20	-2.68	0.12	-1.5	25	0.07	0.30	0.10	0.04	0.01	0.01	0.09	5/29/02	8/19/08
	0841	17675	00610	Summer	0.58	-0.03	0.00	0.09	-3.90	1.31	1.01	13	0.09	0.30	0.15	0.05	0.04	0.01	0.11	5/29/02	8/19/08
	0841	17675	pH	Summer	0.16	-0.05	0.01	0.24	-2.63	0.01	1.02	38	7.42	8.00	7.60	7.40	7.30	6.90	0.30	5/29/02	10/21/08
	0841	17676	00610	POR	0.38	-0.33	0.00	1.07	-3.92	0.72	-1.3	27	0.04	0.17	0.09	0.01	0.01	0.01	0.08	5/30/02	11/18/08
	0841	17676	00610	Summer	0.52	-0.39	0.00	1.13	-3.63	0.95	-1	14	0.04	0.17	0.09	0.01	0.01	0.01	0.08	5/30/02	8/19/08
	0841	17676	00610	Winter	0.29	-0.01	0.06	0.04	-2.12	1.09	-0.3	13	0.04	0.12	0.06	0.01	0.01	0.01	0.05	11/12/02	11/18/08
	0841	17676	00945	POR	0.15	0.13	0.06	0.66	1.97	0.09	-0.9	24	112.67	314.00	148.00	95.50	53.50	34.00	94.50	5/30/02	11/18/08
	0841	17676	pH	Summer	0.23	-0.09	0.00	0.40	-3.37	-0.06	-0.3	41	7.75	8.60	8.10	7.79	7.50	7.00	0.60	5/30/02	10/22/08
	0841	17677	00610	POR	0.35	-0.29	0.00	0.99	-3.49	0.93	-0.7	25	0.04	0.14	0.04	0.01	0.01	0.01	0.03	5/30/02	11/18/08
	0841	17677	00610	Summer	0.55	-0.02	0.00	0.05	-3.86	1.13	-0.6	14	0.05	0.14	0.10	0.02	0.01	0.01	0.09	5/30/02	8/19/08
	0841	17677	00900	POR	0.16	-22.12	0.05	110.44	-2.06	-0.10	-1.2	24	325.75	484.00	422.00	340.00	222.00	140.00	200	5/30/02	11/18/08
	0841	17677	00900	Winter	0.39	-34.70	0.03	111.77	-2.52	-0.56	-0.8	12	354.50	484.00	465.00	356.00	280.00	156.00	185	11/11/02	11/18/08
	0841	17677	00940	Winter	0.27	-4.31	0.10	16.61	-1.85	-0.84	-0.8	11	44.64	63.00	57.00	51.00	25.00	15.00	32.00	11/11/02	11/18/08
	0841	17677	32211	POR	0.22	-0.38	0.02	1.84	-2.51	0.14	-1.9	25	2.08	8.80	4.60	0.90	0.10	0.10	4.50	12/11/01	11/18/08
	0841	17677	pH	Summer	0.16	-0.06	0.01	0.30	-2.77	-0.55	1.49	41	7.59	8.30	7.70	7.60	7.50	6.70	0.20	5/30/02	10/21/08
	0841	17677	TDS Meas	POR	0.27	-49.79	0.02	203.18	-2.62	-0.29	-0.6	21	642.67	947.00	734.00	670.00	572.00	264.00	162	2/19/02	11/18/08
	0841	17677	TDS Meas	Winter	0.54	-60.48	0.02	190.08	-3.06	-0.44	-0.1	10	661.90	932.00	730.00	692.00	610.00	354.00	120	2/19/02	11/18/08
	0841	17678	00610	POR	0.16	-0.24	0.04	1.17	-2.14	0.60	-1	26	0.06	0.36	0.10	0.02	0.01	0.01	0.09	5/30/02	11/18/08
	0841	17678	00610	Summer	0.48	-0.02	0.01	0.06	-3.19	1.09	-0.1	13	0.06	0.19	0.11	0.03	0.02	0.01	0.09	5/30/02	5/20/08
	0841	17678	32211	POR	0.26	-0.45	0.01	1.86	-2.85	0.28	-1.9	25	2.01	8.00	3.50	0.10	0.10	0.10	3.40	12/11/01	11/18/08
	0841	17678	32211	Winter	0.37	-0.48	0.02	1.80	-2.65	0.68	-1.5	14	1.66	7.30	2.40	0.10	0.10	0.10	2.30	12/11/01	11/18/08
	0841	17678	FecalColi	Winter	0.15	0.41	0.01	2.22	2.56	0.04	1.11	40	1276	30900	380.00	80.00	35.00	0.50	345	12/11/01	11/18/08
	0841	17678	pH	POR	0.15	-0.08	0.00	0.43	-3.57	0.22	1.53	73	7.71	9.00	7.90	7.70	7.50	6.60	0.40	12/11/01	11/18/08
	0841	17678	pH	Summer	0.22	-0.11	0.00	0.46	-3.05	-0.58	1.51	34	7.69	8.70	7.90	7.70	7.50	6.60	0.40	5/30/02	10/21/08

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
Main Stem	0841	17679	00610	Summer	0.40	-0.03	0.02	0.09	-2.73	1.05	0.12	13	0.09	0.27	0.11	0.06	0.01	0.01	0.10	8/29/02	8/19/08
	0841	17679	00665	POR	0.21	0.01	0.02	0.05	2.55	0.44	-1.1	27	0.06	0.17	0.11	0.06	0.01	0.01	0.11	2/19/02	11/18/08
	0841	17679	00665	Winter	0.29	0.02	0.04	0.06	2.28	0.79	-0.8	15	0.06	0.17	0.12	0.04	0.01	0.01	0.12	2/19/02	11/18/08
	0841	17679	00900	POR	0.19	-21.85	0.04	94.92	-2.21	0.37	-1	23	260.17	432.00	332.00	242.00	188.00	124.00	144	8/29/02	11/18/08
	0841	17679	00940	Winter	0.27	-4.12	0.07	15.24	-2.04	-0.33	-1.5	13	36.63	56.00	49.00	43.00	24.00	14.00	25.00	11/11/02	11/18/08
	0841	17679	32211	Summer	0.28	0.35	0.08	1.29	1.97	0.61	2.03	12	30.80	217.00	21.25	9.40	6.85	1.10	14.40	8/29/02	8/19/08
	0841	17679	TDS Meas	POR	0.14	-35.21	0.09	184.10	-1.79	0.43	-0.8	21	512.95	852.00	570.00	482.00	390.00	263.00	180	2/19/02	11/18/08
	0841	17681	00610	Summer	0.49	-0.02	0.01	0.05	-3.24	0.94	-0.4	13	0.05	0.14	0.08	0.01	0.01	0.01	0.07	5/29/02	8/19/08
	0841	17681	FecalColi	POR	0.12	0.34	0.00	1.97	3.33	0.40	0.33	81	252.17	6100	80.00	20.00	5.00	0.50	75.00	12/10/01	11/18/08
	0841	17681	FecalColi	Winter	0.15	0.42	0.01	2.17	2.63	0.51	0.45	40	280.78	6100	80.00	15.00	5.00	0.50	75.00	12/10/01	11/18/08
	0841	17682	00610	POR	0.27	-0.27	0.01	1.05	-2.97	0.77	-1.3	26	0.04	0.15	0.07	0.01	0.01	0.01	0.06	5/30/02	11/19/08
	0841	17682	00610	Summer	0.35	-0.01	0.03	0.05	-2.43	0.99	-0.5	13	0.05	0.15	0.09	0.01	0.01	0.01	0.08	5/30/02	8/20/08
	0841	17682	00900	Winter	0.28	-9.13	0.06	33.56	-2.08	-0.29	0.75	13	195.69	256.00	216.00	192.00	176.00	124.00	40.00	11/13/02	11/19/08
	0841	17682	FecalColi	Summer	0.13	0.38	0.03	2.22	2.33	0.58	-0.2	38	1989	35000	700.00	110.00	30.00	5.00	670	5/30/02	10/22/08
	0841	17683	00665	Summer	0.30	0.02	0.06	0.06	2.09	-0.07	-0.1	12	0.12	0.22	0.16	0.11	0.08	0.01	0.08	5/28/02	8/19/08
	0841	17683	00940	Summer	0.24	6.52	0.09	27.76	1.87	-0.52	-1.2	13	63.77	95.00	88.00	71.00	44.00	18.00	44.00	5/28/02	8/19/08
	0841	18313	00610	POR	0.57	-0.09	0.00	0.07	-5.39	0.68	-0.3	24	0.10	0.24	0.15	0.09	0.04	0.01	0.11	10/1/02	10/19/04
	0841	18313	00610	Summer	0.55	-0.06	0.01	0.05	-3.52	0.29	-1.1	12	0.07	0.15	0.11	0.07	0.03	0.01	0.08	10/1/02	10/19/04
	0841	18313	00610	Winter	0.57	-0.11	0.00	0.08	-3.62	0.23	-1.3	12	0.13	0.24	0.20	0.11	0.07	0.01	0.14	11/6/02	4/19/04
	0841	18313	01040	Summer	0.71	1.18	0.00	0.91	4.91	0.38	-1.4	12	1.33	3.00	2.00	1.25	0.50	0.50	1.50	10/1/02	10/19/04
	0841	18313	FecalColi	POR	0.17	2.07	0.04	3.11	2.14	-0.60	-0.3	25	2641	27200	2700	240.00	70.00	0.50	2630	10/1/02	10/19/04
	0841	18313	FecalColi	Winter	0.31	3.75	0.06	3.68	2.10	0.24	-1	12	2794	27200	1565	65.00	2.75	0.50	1562	11/6/02	4/19/04
	0841	18313	pH	POR	0.25	-0.13	0.01	0.15	-2.68	-0.25	-1.1	24	7.69	7.90	7.80	7.70	7.55	7.40	0.25	11/6/02	10/19/04
	0841	18314	00610	POR	0.62	-0.09	0.00	0.07	-6.10	0.86	0.70	25	0.08	0.27	0.13	0.09	0.01	0.01	0.12	10/14/02	10/20/04
	0841	18314	00610	Summer	0.74	-0.08	0.00	0.06	-5.62	0.20	-1.7	13	0.08	0.16	0.13	0.09	0.01	0.01	0.12	10/14/02	10/20/04
	0841	18314	00610	Winter	0.61	-0.11	0.00	0.08	-3.93	1.23	1.84	12	0.09	0.27	0.13	0.07	0.03	0.01	0.11	11/7/02	4/20/04
	0841	18314	01040	POR	0.42	0.90	0.00	0.86	3.97	0.89	-1.1	24	1.33	4.00	2.00	0.50	0.50	0.50	1.50	10/14/02	10/20/04
	0841	18314	01040	Summer	0.72	1.91	0.00	1.42	5.38	0.69	-1.2	13	1.65	4.00	3.00	0.50	0.50	0.50	2.50	10/14/02	10/20/04
	0841	18314	FecalColi	Summer	0.39	-1.75	0.02	1.78	-2.64	0.18	-1.1	13	9203	43500	8700	1800.00	736.00	240.00	7964	10/14/02	10/20/04
	0841	18314	OP	POR	0.39	0.53	0.00	0.51	3.75	0.93	1.79	24	0.02	0.08	0.02	0.02	0.02	0.01	0.01	10/14/02	10/20/04
	0841	18314	OP	Winter	0.63	0.84	0.00	0.58	3.90	0.75	-0.5	11	0.02	0.05	0.02	0.02	0.01	0.01	0.01	11/7/02	4/20/04
	0841	18314	pH	POR	0.62	-0.58	0.00	0.43	-6.03	0.36	-0.8	24	7.71	8.61	8.05	7.65	7.35	7.00	0.70	11/7/02	10/20/04
	0841	18314	pH	Summer	0.72	-0.73	0.00	0.46	-5.12	0.83	-0.2	12	7.67	8.61	7.95	7.55	7.25	7.20	0.70	5/7/03	10/20/04
	0841	18314	pH	Winter	0.68	-0.64	0.00	0.42	-4.61	-0.15	-0.8	12	7.74	8.40	8.10	7.75	7.40	7.00	0.70	11/7/02	4/20/04
	0841	18315	00010	POR	0.12	4.28	0.09	7.57	1.77	-0.19	-1.5	25	19.49	30.60	25.60	21.00	12.60	7.50	13.00	10/1/02	10/19/04
	0841	18315	00610	POR	0.40	-0.08	0.00	0.08	-3.85	0.99	-0.1	24	0.09	0.27	0.13	0.07	0.01	0.01	0.12	10/1/02	10/19/04
	0841	18315	00610	Summer	0.57	-0.11	0.00	0.09	-3.62	0.99	-0.2	12	0.08	0.27	0.14	0.03	0.01	0.01	0.13	10/1/02	10/19/04
	0841	18315	00610	Winter	0.29	-0.08	0.07	0.08	-2.03	1.24	1.01	12	0.09	0.25	0.10	0.08	0.03	0.01	0.07	11/6/02	4/19/04

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
Main Stem	0841	18315	01040	Summer	0.76	1.24	0.00	0.90	5.82	0.53	-1.3	13	1.27	3.00	2.00	0.50	0.50	0.50	1.50	10/1/02	10/19/04
	0841	18315	pH	POR	0.13	-0.13	0.08	0.21	-1.83	-0.53	-0.1	24	7.77	8.10	7.90	7.80	7.67	7.30	0.24	11/6/02	10/19/04
	0841	18315	pH	Winter	0.41	-0.30	0.03	0.25	-2.62	-1.05	0.56	12	7.82	8.10	8.00	7.85	7.75	7.30	0.25	11/6/02	4/19/04
Mountain Creek	0838	13621	00610	POR	0.29	-0.34	0.00	1.32	-3.16	0.78	-0.5	27	0.09	0.78	0.08	0.03	0.01	0.01	0.07	2/18/02	11/18/08
	0838	13621	00610	Summer	0.35	-0.41	0.03	1.46	-2.52	0.60	-0.7	14	0.12	0.78	0.17	0.04	0.01	0.01	0.16	5/29/02	8/19/08
	0838	13621	00610	Winter	0.27	-0.27	0.07	1.13	-2.01	0.89	-0.8	13	0.05	0.19	0.06	0.01	0.01	0.01	0.05	2/18/02	11/18/08
	0838	13621	32211	Winter	0.35	-0.51	0.03	1.97	-2.54	-0.01	-1.9	14	3.01	16.00	5.00	1.55	0.10	0.10	4.90	12/10/01	11/18/08
	0838	13621	pH	POR	0.25	-0.10	0.00	0.40	-5.38	-0.02	1.01	91	7.35	8.50	7.60	7.37	7.18	6.20	0.42	12/10/01	11/18/08
	0838	13621	pH	Summer	0.21	-0.10	0.00	0.42	-3.35	-0.54	1.95	45	7.36	8.50	7.60	7.40	7.20	6.20	0.40	5/29/02	10/21/08
	0838	13621	pH	Winter	0.31	-0.11	0.00	0.40	-4.43	0.55	0.35	46	7.33	8.40	7.60	7.30	7.10	6.60	0.50	12/10/01	11/18/08
	0838	17680	00665	Winter	0.33	0.01	0.04	0.04	2.33	1.14	-0.5	13	0.03	0.11	0.07	0.01	0.01	0.01	0.07	2/18/02	2/19/08
	0838	17680	00900	POR	0.52	-0.15	0.00	0.41	-4.92	0.77	-0	24	174.83	396.00	191.00	144.00	124.00	88.00	67.00	5/29/02	11/19/08
	0838	17680	00900	Summer	0.50	-0.13	0.01	0.40	-3.01	0.92	1.51	11	155.45	352.00	164.00	148.00	100.00	88.00	64.00	5/29/02	8/19/08
	0838	17680	00900	Winter	0.63	-36.19	0.00	89.22	-4.30	1.28	0.75	13	191.23	396.00	252.00	140.00	124.00	120.00	128	11/11/02	11/19/08
	0838	17680	00940	POR	0.42	-5.55	0.00	17.06	-4.02	0.84	-0.2	24	34.71	70.00	45.50	29.00	22.00	9.00	23.50	5/29/02	11/19/08
	0838	17680	00940	Summer	0.34	-4.95	0.05	17.96	-2.27	0.94	0.37	12	33.92	70.00	41.00	30.00	21.50	9.00	19.50	5/29/02	8/19/08
	0838	17680	00940	Winter	0.56	-6.47	0.01	16.87	-3.57	0.89	-0.4	12	35.50	69.00	48.50	29.00	23.00	17.00	25.50	11/11/02	11/19/08
	0838	17680	00945	POR	0.49	-50.62	0.00	145.93	-4.51	0.68	-0.9	23	260.65	534.00	420.00	204.00	142.00	54.00	278	5/29/02	11/19/08
	0838	17680	00945	Summer	0.37	-41.19	0.04	143.84	-2.41	0.71	-0.5	12	255.25	530.00	382.00	201.00	159.00	54.00	223	5/29/02	8/19/08
	0838	17680	00945	Winter	0.66	-62.34	0.00	154.98	-4.15	0.74	-1	11	266.55	534.00	454.00	217.00	128.00	112.00	326	11/11/02	11/19/08
	0838	17680	32211	Winter	0.45	0.28	0.01	0.96	3.14	-0.21	0.18	14	7.50	27.80	8.50	5.40	3.20	0.80	5.30	12/10/01	11/19/08
	0838	17680	TDS Meas	POR	0.58	-125.8	0.00	341.75	-5.13	0.73	-0.8	21	683.81	1340	812.00	516.00	434.00	200.00	378	2/18/02	11/19/08
	0838	17680	TDS Meas	Summer	0.33	-84.87	0.08	287.53	-1.98	1.28	2.46	10	595.20	1250	750.00	512.00	434.00	200.00	316	5/29/02	8/19/08
	0838	17680	TDS Meas	Winter	0.76	-147.6	0.00	379.73	-5.33	0.35	-1.7	11	764.36	1340	1170	668.00	420.00	304.00	750	2/18/02	11/19/08
	0838	17684	00945	POR	0.16	6.10	0.06	29.64	1.98	0.82	0.42	23	127.70	199.00	142.00	118.00	107.00	77.00	35.00	5/29/02	8/19/08
	0838	17684	00945	Winter	0.32	11.70	0.09	36.92	1.96	-0.19	-0.4	10	142.80	199.00	173.00	139.00	125.00	77.00	48.00	11/11/02	2/19/08
	0838	17684	32211	POR	0.15	0.15	0.05	0.79	2.08	0.84	2.04	26	23.78	170.00	24.20	15.30	9.20	3.60	15.00	12/10/01	8/19/08
	0838	17684	pH	Winter	0.13	-0.01	0.02	0.05	-2.35	0.55	2.34	39	8.08	9.40	8.30	8.00	7.88	7.00	0.42	12/10/01	4/22/08
	0838	17684	TDS Meas	Winter	0.33	21.44	0.08	75.81	1.99	1.19	0.70	10	400.00	554.00	432.00	377.00	355.00	312.00	77.00	2/18/02	2/19/08
Richland Chambers	0815	10979	00945	POR	0.40	2.27	0.00	9.13	4.65	0.38	-0.4	35	42.25	63.00	46.00	43.00	35.00	26.00	11.00	5/19/99	8/21/08
	0815	10979	00945	Summer	0.37	1.69	0.01	7.83	3.07	0.33	-0.2	18	38.86	56.00	45.00	38.06	34.00	26.00	11.00	5/19/99	8/21/08
	0815	10979	00945	Winter	0.53	3.02	0.00	9.25	4.13	0.25	-0.8	17	45.83	63.00	53.00	44.00	37.24	31.09	15.76	3/29/00	1/23/08
	0815	10979	OP	Winter	0.19	0.00	0.08	0.01	1.87	1.07	1.14	17	0.02	0.06	0.03	0.02	0.01	0.01	0.02	3/29/00	1/23/08
	0815	10979	TDS Meas	Winter	0.28	0.03	0.09	0.13	1.88	1.27	2.61	11	251.00	342.00	254.00	248.00	228.00	207.00	26.00	3/29/00	1/23/08
	0816	10980	00945	POR	0.11	0.03	0.10	0.29	1.73	0.38	-0	27	21.48	37.00	24.00	21.00	18.00	12.00	6.00	5/19/99	8/26/08
	0816	10980	TDS Meas	POR	0.12	4.96	0.08	40.88	1.84	-0.25	2.65	27	184.70	286.00	208.00	178.00	164.00	64.00	44.00	5/19/99	8/26/08
	0817	10981	00010	Summer	0.19	0.79	0.08	3.64	1.88	-0.77	-0.4	17	26.37	30.50	29.40	27.80	23.90	19.00	5.50	9/26/00	9/6/06
	0817	10981	00951	Summer	0.64	-0.05	0.01	0.15	-3.81	-1.31	0.45	10	0.29	0.44	0.39	0.36	0.27	0.03	0.12	5/23/01	8/21/08

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
Richland Chambers	0817	10981	00951	Winter	0.39	-0.03	0.05	0.07	-2.25	0.23	-0.2	10	0.34	0.48	0.39	0.35	0.27	0.23	0.12	4/10/02	1/23/08
	0836	11068	00078	Summer	0.17	-0.03	0.06	0.17	-1.98	0.74	2.11	21	1.01	1.63	1.10	1.02	0.90	0.71	0.20	6/16/99	9/10/08
	0836	11068	00610	Winter	0.16	0.01	0.06	0.04	2.02	0.74	1.04	23	0.05	0.15	0.07	0.05	0.02	0.01	0.05	12/2/98	3/12/08
	0836	11068	00665	Summer	0.29	0.08	0.01	0.38	3.03	-0.36	1.72	24	0.05	0.12	0.06	0.05	0.04	0.02	0.02	6/16/99	9/10/08
	0836	11068	OP	POR	0.13	0.10	0.01	0.76	2.55	0.37	-0.6	45	0.01	0.05	0.01	0.01	0.01	0.00	0.01	12/2/98	9/10/08
	0836	11068	OP	Winter	0.21	0.13	0.03	0.75	2.32	0.42	-0.7	22	0.01	0.05	0.02	0.01	0.01	0.00	0.01	12/2/98	3/12/08
	0836	11068	TDS Meas	Summer	0.22	1.44	0.02	8.30	2.46	-0.05	-1.2	24	154.51	169.00	161.00	156.50	147.50	141.00	13.50	6/16/99	9/10/08
	0836	15168	00665	Summer	0.35	0.09	0.00	0.43	3.33	0.85	0.81	23	0.04	0.09	0.04	0.03	0.03	0.02	0.02	6/16/99	9/10/08
	0836	15168	OP	Winter	0.21	0.00	0.03	0.01	2.27	0.95	0.05	22	0.01	0.03	0.02	0.01	0.01	0.00	0.01	12/2/98	3/12/08
	0836	15168	TDS Meas	Summer	0.17	1.47	0.05	9.42	2.09	0.81	-0.3	23	162.26	181.00	166.00	159.00	156.00	148.00	10.00	6/16/99	9/10/08
	0836	15169	00610	Winter	0.15	0.00	0.07	0.02	1.94	-0.18	-1.3	23	0.04	0.08	0.06	0.05	0.01	0.01	0.05	12/2/98	3/12/08
	0836	15169	00665	Summer	0.41	0.08	0.00	0.32	3.90	0.70	2.37	24	0.04	0.10	0.05	0.04	0.03	0.02	0.02	6/16/99	9/10/08
	0836	15169	00940	Winter	0.32	0.50	0.02	1.65	2.64	0.00	-0.6	17	10.17	13.02	10.80	10.40	8.80	7.40	2.00	12/5/01	3/12/08
	0836	15169	OP	Winter	0.25	0.00	0.02	0.01	2.55	0.95	0.06	22	0.01	0.03	0.02	0.01	0.01	0.00	0.01	12/2/98	3/12/08
	0836	15169	TDS Meas	POR	0.18	0.01	0.00	0.08	3.13	0.67	0.46	47	162.60	201.00	169.00	161.00	153.00	143.00	16.00	12/2/98	9/10/08
	0836	15169	TDS Meas	Winter	0.40	3.43	0.00	14.32	3.76	0.66	0.05	23	167.26	201.00	181.00	165.00	158.00	144.00	23.00	12/2/98	3/12/08
	0836	15170	00078	Summer	0.12	-0.02	0.08	0.18	-1.82	0.53	0.61	26	0.90	1.37	0.97	0.91	0.81	0.61	0.16	6/16/99	9/10/08
	0836	15170	00300	Summer	0.16	0.28	0.00	1.86	3.07	-0.14	0.71	53	7.67	12.30	8.85	7.55	6.70	2.55	2.15	5/5/99	9/10/08
	0836	15170	00610	Winter	0.21	0.01	0.02	0.03	2.43	0.60	-0.8	24	0.04	0.10	0.06	0.04	0.01	0.01	0.05	12/2/98	3/12/08
	0836	15170	00945	POR	0.14	-0.71	0.02	5.66	-2.35	0.28	-0.8	37	31.33	44.10	34.94	31.60	26.50	22.30	8.44	12/2/98	9/10/08
	0836	15170	00945	Summer	0.21	-0.90	0.04	5.85	-2.19	0.54	-0.2	20	30.73	44.10	34.52	31.05	26.20	22.30	8.32	6/16/99	9/10/08
	0836	15170	OP	Winter	0.16	0.11	0.06	0.75	1.98	0.31	-0.3	23	0.01	0.06	0.02	0.01	0.01	0.00	0.02	12/2/98	3/12/08
	0836	15170	pH	Summer	0.10	0.03	0.02	0.29	2.41	-0.56	0.07	54	8.39	8.97	8.60	8.44	8.16	7.52	0.45	5/5/99	10/22/08
	0836	15170	TDS Calc	Summer	0.19	0.03	0.01	0.17	2.60	0.58	2.29	31	167.97	282.10	180.70	161.42	156.00	115.05	24.70	5/5/99	10/22/08
	0836	15170	TDS Calc	Winter	0.43	3.72	0.00	17.22	4.41	0.16	-0.5	28	182.27	217.75	194.03	182.65	169.54	149.18	24.49	1/6/99	11/12/08
	0836	15170	TDS Meas	Summer	0.14	1.32	0.07	9.59	1.90	0.01	0.40	25	159.47	179.00	163.80	159.00	154.00	137.00	9.80	6/16/99	9/10/08
	0836	15170	TDS Meas	Winter	0.21	0.02	0.03	0.13	2.39	0.91	1.59	24	175.54	254.00	186.50	170.50	160.50	138.00	26.00	12/2/98	3/12/08
	0836	15172	00300	Winter	0.13	0.02	0.09	0.18	1.77	0.70	-0.2	23	10.10	15.05	11.10	9.60	8.70	7.71	2.40	12/2/98	3/12/08
	0836	15172	TDS Calc	Winter	0.17	4.38	0.05	27.92	2.10	-0.61	0.19	23	170.49	221.65	195.00	175.50	150.83	108.16	44.17	12/2/98	3/12/08
	0836	15199	00010	Summer	0.15	0.33	0.05	2.16	2.10	-0.71	0.89	27	27.57	30.65	29.15	27.76	26.22	21.50	2.93	6/17/99	9/10/08
	0836	15199	00300	Winter	0.18	0.30	0.06	1.99	2.02	0.99	1.02	21	10.18	15.45	11.22	9.45	8.90	7.27	2.32	12/2/98	3/12/08
	0836	15199	00665	Winter	0.28	-0.02	0.05	0.08	-2.19	0.08	-0.3	14	0.19	0.34	0.23	0.20	0.13	0.06	0.11	12/16/99	3/12/08
	0836	15199	32211	Winter	0.20	-0.13	0.10	0.71	-1.78	-0.03	-0.9	15	29.31	83.70	41.40	26.70	14.00	8.00	27.40	12/16/99	3/12/08
Trinity Below Livingston	0801	10892	00078	POR	0.16	-0.07	0.00	0.52	-3.25	0.49	-0.8	57	0.33	0.90	0.44	0.25	0.18	0.12	0.26	12/17/98	11/24/08
	0801	10892	00078	Summer	0.48	-0.05	0.00	0.21	-4.94	0.78	-0.1	28	0.39	0.90	0.51	0.37	0.22	0.15	0.29	6/2/99	10/29/08
	0801	10892	00300	Winter	0.12	0.21	0.03	1.56	2.32	0.31	1.04	41	9.95	14.50	10.80	9.80	9.10	6.40	1.70	12/17/98	11/24/08
	0801	10892	00620	Winter	0.13	-0.06	0.09	0.29	-1.77	0.17	-1.6	23	0.33	0.75	0.56	0.29	0.00	0.00	0.56	12/11/02	11/24/08
	0801	10892	31701	POR	0.40	-0.46	0.00	1.11	-3.53	0.95	0.21	21	27.86	223.00	20.00	10.00	5.00	5.00	15.00	6/26/01	6/14/06

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
Trinity Below Livingston	0801	10892	31701	Summer	0.59	-7.46	0.01	16.11	-3.57	1.38	1.06	11	17.09	52.00	20.00	10.00	5.00	5.00	15.00	6/26/01	6/14/06
	0801	10892	31701	Winter	0.37	-0.55	0.06	1.34	-2.15	0.98	-0.1	10	39.70	223.00	52.00	10.00	5.00	5.00	47.00	12/4/01	3/7/06
	0801	10892	32211	Summer	0.28	1.65	0.00	8.23	3.68	0.21	0.78	37	16.44	37.00	21.00	16.00	12.50	0.10	8.50	6/2/99	10/29/08
	0801	10892	TDS Meas	Winter	0.18	8.26	0.07	54.74	1.94	0.13	1.51	19	221.63	336.00	232.00	222.00	191.00	92.00	41.00	12/17/98	1/16/08
	0802	10894	00940	POR	0.14	1.25	0.02	8.54	2.45	0.70	-0.6	40	27.00	45.00	32.00	23.00	20.00	15.00	12.00	2/24/99	12/6/07
	0802	10894	00940	Winter	0.29	2.04	0.01	9.12	2.95	0.94	-0.2	23	26.00	45.00	31.00	23.00	19.00	15.00	12.00	2/24/99	12/6/07
	0802	10894	00945	Winter	0.16	1.68	0.06	10.22	1.98	0.19	0.84	22	34.45	56.00	39.00	33.50	30.00	12.00	9.00	2/24/99	12/6/07
	0802	10894	OP	POR	0.11	0.08	0.04	0.61	2.15	0.16	-1.3	40	0.06	0.16	0.08	0.06	0.03	0.02	0.05	2/24/99	12/6/07
	0802	10894	OP	Summer	0.42	0.01	0.00	0.04	3.29	1.05	0.26	17	0.06	0.16	0.08	0.03	0.03	0.02	0.05	6/2/99	9/11/07
	0802	10894	TDS Meas	POR	0.15	0.03	0.02	0.19	2.55	0.44	-0	38	221.84	342.00	236.00	219.00	193.00	158.00	43.00	2/24/99	12/6/07
	0802	10894	TDS Meas	Winter	0.37	0.04	0.00	0.17	3.44	0.63	0.77	22	209.50	318.00	226.00	204.00	188.00	158.00	38.00	2/24/99	12/6/07
	0802	10896	00940	POR	0.13	1.23	0.02	8.94	2.46	0.67	-0.5	44	27.43	46.00	32.00	25.50	20.00	14.00	12.00	12/17/98	12/6/07
	0802	10896	00940	Winter	0.30	0.08	0.01	0.35	3.04	0.49	-0.6	24	25.71	46.00	31.00	22.00	19.00	14.00	12.00	12/17/98	12/6/07
	0802	10896	00945	Winter	0.27	1.94	0.01	9.66	2.77	0.81	0.41	23	36.04	59.00	40.00	33.00	30.00	21.00	10.00	12/17/98	12/6/07
	0802	10896	OP	POR	0.16	0.09	0.01	0.58	2.83	-0.14	-1.1	43	0.07	0.18	0.09	0.07	0.03	0.02	0.06	12/17/98	12/6/07
	0802	10896	OP	Summer	0.33	0.01	0.01	0.04	2.96	0.97	0.71	20	0.07	0.18	0.10	0.07	0.03	0.03	0.07	6/2/99	9/11/07
	0802	10896	TDS Meas	Summer	0.23	5.12	0.04	28.06	2.23	0.18	1.08	19	229.47	292.00	246.00	226.00	214.00	167.00	32.00	6/2/99	9/11/07
	0802	10897	00610	Winter	0.48	0.00	0.03	0.02	2.74	1.33	2.63	10	0.03	0.06	0.03	0.03	0.01	0.01	0.02	2/24/99	3/27/07
	0802	10897	00900	POR	0.27	2.41	0.01	14.20	3.03	-0.19	-0.7	27	113.52	138.00	126.00	113.00	104.00	87.00	22.00	2/24/99	8/27/08
	0802	10897	00900	Summer	0.57	2.61	0.00	11.47	4.27	-0.01	-1.4	16	116.44	134.00	126.00	116.50	107.00	99.00	19.00	7/27/99	8/27/08
	0802	10897	TDS Meas	POR	0.17	0.02	0.03	0.17	2.24	0.55	0.63	27	211.33	320.00	236.00	202.00	188.00	152.00	48.00	2/24/99	8/27/08
	0802	10897	TDS Meas	Summer	0.26	3.33	0.05	21.69	2.14	0.53	-0.9	15	210.80	250.00	225.00	206.00	192.00	182.00	33.00	7/27/99	8/27/08
Village Creek	0828	10780	00010	Winter	0.20	-1.09	0.08	5.75	-1.89	0.78	1.46	16	16.44	31.00	19.35	16.55	12.15	7.80	7.20	11/14/00	3/5/08
	0828	10780	00300	POR	0.25	0.39	0.01	2.19	2.67	0.89	0.57	23	6.61	12.20	7.70	6.60	4.79	4.00	2.91	5/10/00	6/18/08
	0828	10780	00300	Summer	0.40	0.33	0.03	1.58	2.58	0.15	-2	12	5.74	7.90	7.25	5.63	4.19	4.00	3.06	5/10/00	6/18/08
	0828	10780	00300	Winter	0.30	0.48	0.08	2.43	1.98	0.71	-0.4	11	7.56	12.20	9.10	6.82	5.20	4.79	3.90	11/14/00	3/5/08
	0828	10780	TDS Calc	POR	0.19	0.07	0.01	0.38	2.77	0.34	1.49	34	214.59	545.35	234.00	189.15	169.00	83.85	65.00	5/10/00	8/12/08
	0828	11042	00665	Winter	0.51	0.01	0.00	0.03	3.67	0.65	1.43	15	0.07	0.15	0.09	0.06	0.05	0.01	0.03	11/29/01	11/12/08
	0828	11042	00940	Winter	0.22	0.55	0.08	2.62	1.92	0.58	0.64	15	16.93	23.00	18.60	16.88	14.80	13.00	3.80	11/29/01	11/12/08
	0828	11042	31699	Winter	0.26	18.08	0.06	74.46	2.07	0.99	-0.6	14	68.06	200.00	130.00	40.50	10.00	0.50	120	2/27/02	11/12/08
	0828	11042	32211	POR	0.10	0.07	0.10	0.44	1.73	0.26	0.42	28	35.27	95.40	42.70	31.20	24.55	13.40	18.15	11/29/01	11/12/08
	0828	11042	pH	Winter	0.36	-0.08	0.02	0.31	-2.73	-0.29	-0.4	15	8.13	8.65	8.40	8.20	7.90	7.50	0.50	11/29/01	11/12/08
	0828	13897	00665	Winter	0.48	0.35	0.00	1.13	3.44	-0.75	1.98	15	0.14	0.50	0.17	0.08	0.05	0.01	0.12	11/29/01	11/12/08
	0828	13897	00940	POR	0.10	0.06	0.05	0.54	2.03	0.65	-0.5	38	21.77	62.03	27.22	15.82	13.50	7.92	13.72	1/25/99	11/12/08
	0828	13897	00940	Winter	0.16	0.08	0.07	0.62	1.91	0.48	-0.9	21	23.39	62.03	29.30	16.00	13.50	7.92	15.80	1/25/99	11/12/08
	0828	13897	31699	Winter	0.30	20.25	0.04	77.93	2.27	-0.27	-2	14	129.26	201.00	200.00	165.00	41.00	25.40	159	2/27/02	11/12/08
	0828	13897	OP	POR	0.13	0.12	0.06	0.90	1.93	0.90	1.24	28	0.03	0.21	0.02	0.01	0.01	0.01	0.02	1/25/99	8/15/07
	0828	13897	pH	POR	0.50	-0.12	0.00	0.47	-5.87	0.04	-0.6	37	7.96	8.80	8.30	7.90	7.60	6.95	0.70	1/25/99	11/12/08

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
Village Creek	0828	13897	pH	Summer	0.46	-0.13	0.01	0.47	-3.34	0.34	-1.3	15	8.02	8.80	8.40	7.90	7.60	7.45	0.80	8/4/99	8/15/07
	0828	13897	pH	Winter	0.53	-0.12	0.00	0.48	-4.74	-0.13	-0.3	22	7.92	8.80	8.30	7.95	7.60	6.95	0.70	1/25/99	11/12/08
	0828	13899	00078	Winter	0.31	-0.06	0.03	0.23	-2.39	-0.73	0.61	15	0.60	0.91	0.79	0.61	0.48	0.08	0.31	11/29/01	11/12/08
	0828	13899	pH	Winter	0.24	-0.06	0.02	0.36	-2.48	-0.18	-1	22	8.25	8.80	8.50	8.30	7.90	7.60	0.60	1/25/99	11/12/08
	0828	13904	00665	POR	0.48	0.01	0.00	0.02	4.82	-0.12	0.62	27	0.06	0.11	0.08	0.06	0.05	0.01	0.03	11/29/01	11/12/08
	0828	13904	00665	Summer	0.23	0.01	0.10	0.02	1.81	0.26	0.02	13	0.07	0.11	0.08	0.07	0.04	0.03	0.03	5/29/02	8/13/08
	0828	13904	00665	Winter	0.71	0.01	0.00	0.02	5.41	-0.32	1.32	14	0.06	0.10	0.07	0.06	0.05	0.01	0.02	11/29/01	11/12/08
	0828	13904	00940	POR	0.33	0.04	0.00	0.22	4.33	0.42	0.53	40	15.91	28.50	17.91	15.54	13.29	10.02	4.63	1/25/99	11/12/08
	0828	13904	00940	Summer	0.23	0.04	0.04	0.23	2.19	0.58	0.78	18	16.80	28.50	18.98	16.30	13.60	10.69	5.38	8/4/99	8/13/08
	0828	13904	00940	Winter	0.41	0.67	0.00	3.08	3.76	0.61	0.54	22	15.18	23.10	17.60	14.49	13.12	10.02	4.48	1/25/99	11/12/08
	0828	13904	00945	POR	0.18	0.03	0.01	0.20	2.86	0.53	0.53	39	31.88	52.60	35.80	31.40	26.60	20.04	9.20	1/25/99	11/12/08
	0828	13904	00945	Summer	0.21	1.40	0.05	8.33	2.09	1.06	1.31	18	33.12	52.60	36.70	32.00	26.90	20.04	9.80	8/4/99	8/13/08
	0828	13904	32211	Winter	0.27	3.57	0.06	15.67	2.11	0.59	-0.7	14	38.88	65.40	46.30	36.35	27.60	16.90	18.70	11/29/01	11/12/08
	0828	13904	pH	Winter	0.14	-0.04	0.09	0.33	-1.77	-0.42	-0.2	22	8.19	8.70	8.50	8.20	7.90	7.40	0.60	1/25/99	11/12/08
West Fork	0807	10942	00665	POR	0.26	0.01	0.00	0.03	3.23	-0.12	0.92	32	0.07	0.12	0.09	0.06	0.05	0.01	0.03	10/14/99	10/15/08
	0807	10942	00665	Summer	0.47	0.01	0.00	0.03	3.79	-0.75	1.63	18	0.08	0.12	0.10	0.08	0.06	0.01	0.04	10/14/99	10/15/08
	0807	10942	00940	POR	0.13	-1.13	0.04	8.04	-2.11	0.38	-0	33	32.64	51.00	37.40	32.10	27.00	19.10	10.40	10/14/99	10/15/08
	0807	10942	00945	POR	0.20	-0.98	0.01	5.45	-2.73	0.06	-0.8	32	28.87	38.80	32.95	28.40	25.30	19.50	7.65	10/14/99	10/15/08
	0807	10942	00945	Summer	0.25	-0.71	0.03	3.86	-2.34	-0.28	-0.4	18	26.29	33.00	28.80	26.83	23.50	19.50	5.30	10/14/99	10/15/08
	0807	10942	00945	Winter	0.35	-1.48	0.03	5.49	-2.56	-0.89	-0.1	14	32.19	38.80	36.30	33.45	30.00	21.60	6.30	3/22/00	1/15/08
	0807	10942	32211	POR	0.13	2.53	0.04	17.88	2.14	0.82	1.58	33	25.58	81.90	34.70	26.70	14.20	0.10	20.50	10/14/99	10/15/08
	0807	10942	32211	Summer	0.31	3.70	0.02	18.19	2.67	0.28	2.54	18	34.86	81.90	40.70	34.70	30.30	0.10	10.40	10/14/99	10/15/08
	0807	10942	OP	POR	0.46	-0.24	0.00	0.90	-4.97	0.17	-1.1	31	0.01	0.03	0.01	0.01	0.00	0.00	0.01	10/14/99	10/15/08
	0807	10942	OP	Summer	0.48	0.00	0.00	0.01	-3.69	1.04	-0.6	17	0.01	0.03	0.01	0.01	0.00	0.00	0.01	10/14/99	10/15/08
	0807	10942	OP	Winter	0.49	-0.26	0.01	0.86	-3.38	0.13	-0.8	14	0.01	0.03	0.01	0.01	0.00	0.00	0.01	3/22/00	4/15/08
	0807	10942	pH	Winter	0.40	-0.07	0.01	0.27	-2.95	-0.97	0.19	15	8.10	8.40	8.30	8.20	7.90	7.55	0.40	3/22/00	4/15/08
	0807	10942	TDS Meas	POR	0.12	-3.18	0.05	23.23	-2.06	0.16	0.52	33	223.95	287.00	235.00	227.00	213.00	184.00	22.00	10/14/99	10/15/08
	0807	10942	TDS Meas	Winter	0.33	-5.54	0.02	22.69	-2.55	0.02	2.03	15	234.55	287.00	245.00	235.00	227.00	192.00	18.00	3/22/00	4/15/08
	0807	15163	OP	POR	0.18	-0.20	0.06	0.75	-2.03	0.23	1.03	21	0.02	0.07	0.02	0.01	0.01	0.00	0.01	10/17/01	1/10/07
	0807	15163	OP	Winter	0.57	0.00	0.01	0.00	-3.24	-0.73	0.71	10	0.01	0.02	0.01	0.01	0.01	0.00	0.01	1/23/02	1/10/07
	0807	15163	pH	POR	0.15	-0.06	0.05	0.32	-2.02	-0.08	0.04	26	7.80	8.45	8.00	7.80	7.60	7.10	0.40	10/17/01	7/16/08
	0807	15163	pH	Winter	0.44	-0.11	0.01	0.33	-2.95	-0.01	-0.3	13	7.89	8.45	8.00	7.90	7.75	7.35	0.25	1/23/02	4/15/08
	0807	15166	00078	Summer	0.20	0.02	0.07	0.14	1.94	0.24	-0.1	17	0.42	0.71	0.50	0.46	0.33	0.20	0.17	10/14/99	10/15/08
	0807	15166	00665	POR	0.13	0.00	0.06	0.03	1.95	-0.67	0.62	28	0.07	0.13	0.09	0.08	0.06	0.01	0.04	10/14/99	1/15/08
	0807	15166	00665	Winter	0.22	0.01	0.09	0.02	1.82	-0.68	0.89	14	0.06	0.10	0.08	0.06	0.05	0.01	0.03	3/22/00	1/15/08
	0807	15166	00940	POR	0.21	-1.93	0.02	9.66	-2.60	0.56	-0.1	28	33.94	56.25	39.13	32.50	27.50	19.00	11.63	10/14/99	1/15/08
	0807	15166	00940	Summer	0.25	-2.02	0.07	9.57	-2.00	0.60	-0.3	14	34.16	52.00	39.35	31.80	27.00	22.20	12.35	10/14/99	10/25/07
	0807	15166	32211	Summer	0.23	2.98	0.08	14.77	1.89	-1.14	1.02	14	30.23	50.70	40.90	32.20	24.95	0.10	15.95	10/14/99	10/25/07

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
West Fork	0807	15166	pH	POR	0.16	-0.05	0.02	0.32	-2.37	-0.41	0.22	32	8.22	8.80	8.43	8.25	8.08	7.51	0.35	10/14/99	7/16/08
	0807	15166	pH	Winter	0.53	-0.08	0.00	0.25	-3.83	-0.79	0.53	15	8.13	8.50	8.30	8.20	8.00	7.55	0.30	3/22/00	4/15/08
	0807	15166	TDS Meas	POR	0.14	-4.04	0.05	24.64	-2.05	0.37	0.02	28	226.46	284.00	242.50	223.50	211.50	185.00	31.00	10/14/99	1/15/08
	0807	15166	TDS Meas	Summer	0.33	-5.55	0.03	22.89	-2.44	0.99	2.37	14	215.43	274.00	224.00	217.50	196.00	185.00	28.00	10/14/99	10/25/07
	0807	15167	00665	Summer	0.36	0.10	0.04	0.33	2.37	1.11	1.13	12	0.11	0.23	0.13	0.10	0.08	0.08	0.05	10/17/01	7/16/08
	0807	15167	OP	POR	0.20	0.00	0.04	0.00	-2.24	0.63	-0.6	22	0.01	0.01	0.01	0.01	0.01	0.00	0.00	10/17/01	1/10/07
	0807	15167	pH	POR	0.30	-0.08	0.00	0.30	-3.20	-0.46	-0.4	26	8.19	8.65	8.50	8.23	8.00	7.50	0.50	10/17/01	7/16/08
	0807	15167	pH	Winter	0.62	-0.10	0.00	0.27	-4.22	0.03	-0.9	13	8.13	8.55	8.30	8.10	8.00	7.70	0.30	1/23/02	4/15/08
	0807	15167	TDS Meas	Winter	0.25	-4.64	0.10	17.70	-1.82	-1.02	-0.1	12	237.25	256.00	250.50	243.50	228.00	203.00	22.50	1/23/02	1/15/08
	0809	10944	00078	Winter	0.11	0.03	0.10	0.30	1.72	0.09	2.27	27	0.97	2.10	1.10	0.91	0.83	0.43	0.27	1/15/99	4/22/08
	0809	10944	00610	Summer	0.19	-0.18	0.02	1.16	-2.43	0.72	-1	28	0.05	0.30	0.08	0.01	0.01	0.01	0.07	7/14/99	10/21/08
	0809	10944	00665	Summer	0.24	0.00	0.01	0.02	2.83	0.18	-0.6	28	0.06	0.09	0.07	0.06	0.05	0.03	0.02	7/14/99	10/21/08
	0809	10944	00940	POR	0.29	-1.67	0.00	8.39	-4.69	0.22	-0.6	56	33.64	51.10	37.95	33.45	28.15	17.54	9.80	1/15/99	10/21/08
	0809	10944	00940	Summer	0.12	-1.04	0.07	8.05	-1.91	0.19	0.29	28	33.44	51.10	35.89	33.45	29.70	17.54	6.19	7/14/99	10/21/08
	0809	10944	00940	Winter	0.50	-2.31	0.00	8.87	-5.13	0.24	-1.2	28	33.83	47.40	42.00	33.35	26.06	21.70	15.94	1/15/99	4/22/08
	0809	10944	00945	POR	0.53	-0.07	0.00	0.27	-6.60	0.40	0.74	40	33.12	64.20	37.90	31.35	27.00	17.10	10.90	1/15/99	10/21/08
	0809	10944	00945	Summer	0.46	-0.07	0.00	0.29	-3.88	0.53	1.01	20	31.38	60.70	34.45	28.40	25.96	17.10	8.49	7/14/99	10/21/08
	0809	10944	00945	Winter	0.64	-0.07	0.00	0.25	-5.69	0.55	1.30	20	34.85	64.20	38.30	33.40	28.60	21.00	9.70	1/15/99	4/22/08
	0809	10944	TDS Meas	POR	0.18	-3.78	0.00	24.16	-3.35	-0.45	1.64	54	218.38	272.00	232.00	219.00	209.00	137.00	23.00	1/15/99	10/21/08
	0809	10944	TDS Meas	Winter	0.27	-4.38	0.00	22.24	-3.08	0.15	0.15	27	226.50	272.00	236.00	225.00	215.00	180.00	21.00	1/15/99	4/22/08
	0809	10952	00078	Winter	0.22	0.03	0.01	0.19	2.65	-0.10	-0.6	27	0.84	1.20	1.00	0.84	0.69	0.43	0.31	1/15/99	4/22/08
	0809	10952	00300	Summer	0.16	0.22	0.04	1.54	2.16	0.12	-0.4	27	8.01	11.05	9.40	7.65	7.05	4.83	2.35	7/14/99	10/21/08
	0809	10952	00665	Summer	0.15	0.00	0.05	0.02	2.10	0.27	-1.2	28	0.07	0.10	0.09	0.07	0.06	0.05	0.04	7/14/99	10/21/08
	0809	10952	00940	POR	0.11	-0.98	0.02	7.12	-2.41	0.22	0.27	49	31.96	49.70	35.60	32.40	28.04	17.16	7.56	10/25/00	10/21/08
	0809	10952	00940	Winter	0.31	-1.77	0.00	7.54	-3.16	0.47	-0.3	24	31.88	48.10	35.95	31.50	25.48	21.90	10.47	11/14/00	4/22/08
	0809	10952	TDS Meas	POR	0.26	-3.89	0.00	20.69	-4.24	0.34	0.02	54	218.95	268.00	232.00	218.50	208.00	182.00	24.00	1/15/99	10/21/08
	0809	10952	TDS Meas	Summer	0.21	-2.89	0.02	17.32	-2.55	0.08	-0.7	27	211.63	243.00	220.00	213.00	197.00	183.00	23.00	7/14/99	10/21/08
	0809	10952	TDS Meas	Winter	0.29	-4.31	0.00	21.47	-3.16	0.21	0.05	27	226.27	268.00	238.00	225.00	212.00	182.00	26.00	1/15/99	4/22/08
	0809	10956	00300	Summer	0.15	0.21	0.05	1.48	2.10	-0.16	0.40	27	7.98	11.05	8.85	8.30	6.80	4.45	2.06	7/14/99	10/21/08
	0809	10956	00610	Summer	0.17	-0.16	0.03	1.04	-2.32	0.65	-1.1	28	0.04	0.19	0.06	0.01	0.01	0.01	0.05	7/14/99	10/21/08
	0809	10956	00610	Winter	0.11	-0.14	0.08	1.16	-1.82	0.67	-0.9	28	0.06	0.38	0.08	0.02	0.01	0.01	0.07	1/15/99	4/22/08
	0809	10956	00665	Summer	0.16	0.00	0.03	0.02	2.23	0.19	0.00	28	0.09	0.13	0.10	0.09	0.08	0.05	0.02	7/14/99	10/21/08
	0809	10960	00610	Summer	0.27	-0.23	0.01	1.17	-3.00	0.96	-0.9	26	0.05	0.20	0.07	0.01	0.01	0.01	0.06	10/6/99	10/21/08
	0809	10960	00665	Summer	0.17	0.00	0.04	0.03	2.23	0.20	-0.8	26	0.12	0.17	0.14	0.11	0.09	0.07	0.05	10/6/99	10/21/08
	0809	10960	31699	Summer	0.55	-0.40	0.01	1.09	-3.47	0.58	0.02	12	3.00	16.00	3.00	2.00	0.50	0.50	2.50	10/23/02	10/21/08
	0809	10960	pH	Winter	0.15	-0.04	0.05	0.30	-2.08	0.11	-0.5	27	8.19	8.80	8.42	8.20	8.00	7.63	0.42	1/15/99	4/22/08
	0809	10960	TDS Meas	Summer	0.12	-0.01	0.10	0.09	-1.74	0.70	0.89	25	211.32	266.00	218.00	208.00	200.00	180.00	18.00	10/6/99	10/21/08
	0809	10964	00078	Winter	0.20	0.02	0.02	0.13	2.42	-0.20	-0.1	25	0.33	0.56	0.43	0.33	0.27	0.03	0.16	1/15/99	4/22/08

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
West Fork	0809	10964	00300	Summer	0.15	0.24	0.05	1.74	2.06	0.23	2.02	27	7.74	11.90	8.55	7.45	6.90	3.16	1.65	7/14/99	10/21/08
	0809	10964	00610	Summer	0.26	-0.26	0.01	1.31	-2.95	0.80	-1	27	0.07	0.40	0.09	0.01	0.01	0.01	0.08	7/14/99	7/23/08
	0809	10964	OP	Summer	0.14	0.12	0.06	0.79	1.94	-0.86	1.72	25	0.03	0.11	0.03	0.03	0.02	0.00	0.01	7/14/99	10/18/07
	0809	17667	00078	POR	0.15	0.03	0.07	0.18	1.93	0.23	-0.2	23	0.75	1.14	0.88	0.74	0.63	0.43	0.25	10/25/00	9/21/05
	0809	17667	00078	Winter	0.37	0.05	0.04	0.18	2.41	0.34	-0.8	12	0.70	0.99	0.82	0.68	0.57	0.43	0.25	11/14/00	4/20/05
	0809	17667	00300	Summer	0.30	0.42	0.06	1.63	2.09	0.65	0.76	12	8.09	11.30	8.67	7.76	7.15	5.31	1.52	10/25/00	9/21/05
	0809	17667	00940	POR	0.17	-1.56	0.05	7.98	-2.04	0.66	-0.4	23	32.40	48.30	35.90	31.50	25.80	22.20	10.10	10/25/00	9/21/05
	0809	17667	00940	Winter	0.49	-3.20	0.02	9.62	-2.95	1.07	-0.7	11	30.79	47.60	42.90	26.70	23.40	22.60	19.50	11/14/00	4/20/05
	0810	10969	00061	Summer	0.10	14.84	0.08	121.09	1.79	0.68	-0.3	30	142.59	442.00	230.00	133.00	20.00	4.48	210	6/9/99	10/22/08
	0810	10969	00610	POR	0.14	-0.16	0.02	1.24	-2.42	0.70	-1.4	38	0.05	0.21	0.09	0.01	0.01	0.01	0.08	2/24/99	8/13/08
	0810	10969	00610	Winter	0.24	-0.20	0.03	1.22	-2.36	1.07	-0.8	20	0.05	0.21	0.08	0.01	0.01	0.01	0.07	2/24/99	2/13/08
	0810	10969	00951	Winter	0.41	-0.03	0.01	0.11	-2.92	-0.49	-1.8	14	0.17	0.29	0.26	0.21	0.03	0.03	0.24	11/13/01	2/13/08
	0810	15688	31699	Winter	0.22	-0.52	0.04	1.66	-2.20	1.11	1.55	19	2067	24196	580.00	345.00	85.00	42.00	495	4/21/03	4/29/08
	0810	16766	00300	Summer	0.20	-0.83	0.05	2.51	-2.09	-0.15	-1.4	19	5.19	8.80	7.70	5.20	3.00	1.50	4.70	5/22/03	7/24/08
	0810	16766	31699	Summer	0.31	-1.09	0.01	2.69	-2.75	0.45	-0.4	19	1691	24196	821.00	34.00	20.00	1.00	801	5/22/03	7/24/08
	0810	16767	31699	Summer	0.52	-1.18	0.00	2.24	-4.12	-1.03	2.76	18	2728	24196	2000	727.00	130.00	1.00	1870	5/22/03	7/24/08
	0811	10970	00610	Summer	0.15	-0.11	0.09	0.94	-1.80	0.99	-0.3	21	0.03	0.18	0.04	0.01	0.01	0.01	0.03	5/19/99	10/8/08
	0811	10970	00940	POR	0.87	-2.19	0.00	7.56	-17	0.42	-0.9	43	24.96	40.20	29.10	24.40	17.34	14.00	11.76	2/24/99	11/4/08
	0811	10970	00940	Summer	0.89	-2.15	0.00	7.73	-12	0.50	-0.9	21	24.43	39.50	29.10	23.20	17.49	14.00	11.61	5/19/99	10/8/08
	0811	10970	00940	Winter	0.86	-2.22	0.00	7.54	-11	0.39	-0.7	22	25.46	40.20	29.10	24.95	17.34	14.97	11.76	2/24/99	11/4/08
	0811	10970	00945	POR	0.70	-2.86	0.00	10.20	-8.86	0.25	0.72	36	23.23	50.00	29.80	21.45	17.60	1.50	12.20	2/24/99	11/4/08
	0811	10970	00945	Summer	0.80	-3.05	0.00	10.44	-7.84	-0.57	-0	17	21.71	38.80	29.70	21.40	17.00	1.50	12.70	5/19/99	8/6/08
	0811	10970	00945	Winter	0.73	-0.11	0.00	0.39	-6.75	0.16	0.21	19	24.58	50.00	30.80	21.50	17.70	10.10	13.10	2/24/99	11/4/08
	0811	10970	32211	Winter	0.24	0.48	0.02	3.06	2.53	0.94	0.71	22	4.05	11.40	6.00	2.70	2.20	0.10	3.80	2/24/99	11/4/08
	0811	10970	pH	POR	0.17	-0.04	0.00	0.32	-3.02	-0.56	-0.2	47	8.12	8.72	8.38	8.20	7.90	7.30	0.48	2/24/99	11/4/08
	0811	10970	pH	Summer	0.28	-0.06	0.01	0.37	-2.91	-0.74	-0.2	24	8.16	8.72	8.45	8.25	7.95	7.30	0.50	5/19/99	10/8/08
	0811	10970	TDS Meas	POR	0.76	-5.97	0.00	22.12	-11	0.31	-0.8	43	191.91	235.00	209.00	190.00	173.00	150.00	36.00	2/24/99	11/4/08
	0811	10970	TDS Meas	Summer	0.69	-5.30	0.00	21.71	-6.43	0.33	-0.7	21	188.14	227.00	195.00	187.00	170.00	150.00	25.00	5/19/99	10/8/08
	0811	10970	TDS Meas	Winter	0.87	-6.64	0.00	22.40	-11	0.30	-0.9	22	195.50	235.00	209.00	194.00	177.00	161.00	32.00	2/24/99	11/4/08
	0811	15164	00078	Summer	0.13	-0.06	0.08	0.50	-1.81	0.39	-0.7	23	1.34	2.40	1.83	1.32	0.91	0.59	0.92	5/19/99	10/8/08
	0811	15164	00665	Summer	0.19	0.00	0.04	0.03	2.16	0.99	0.17	22	0.04	0.11	0.06	0.04	0.02	0.01	0.04	5/19/99	10/8/08
	0811	15164	00940	POR	0.86	-1.99	0.00	5.09	-13	0.07	-1.5	31	22.34	30.70	27.80	22.42	17.01	14.90	10.79	11/14/01	11/4/08
	0811	15164	00940	Summer	0.89	-1.98	0.00	5.15	-9.95	0.33	-1.4	14	22.20	30.70	27.00	21.95	17.05	16.28	9.95	5/15/02	10/8/08
	0811	15164	00940	Winter	0.83	-1.99	0.00	5.20	-8.55	-0.12	-1.6	17	22.45	29.10	27.80	22.50	17.01	14.90	10.79	11/14/01	11/4/08
	0811	15164	32211	POR	0.14	0.41	0.01	3.53	2.61	0.35	0.51	44	5.85	16.00	8.00	6.70	3.45	0.10	4.55	2/24/99	11/4/08
	0811	15164	32211	Winter	0.33	0.61	0.01	3.34	3.14	0.12	-1.2	22	4.96	10.70	8.00	4.50	2.70	0.10	5.30	2/24/99	11/4/08
	0811	15164	pH	Winter	0.14	-0.04	0.08	0.31	-1.83	-0.41	-1.3	23	7.98	8.41	8.20	8.10	7.70	7.46	0.50	2/24/99	11/4/08
	0811	15164	TDS Meas	POR	0.70	-5.95	0.00	22.74	-9.81	0.28	-0.8	44	189.80	235.00	207.00	185.00	172.50	152.00	34.50	2/24/99	11/4/08

Sub-watershed	Seg	Station	Parameter	Season	R^2	Slope	P	Std Dev	T	Skewness	Kurtosis	N	Mean	Max	Q75	Median	Q25	Min	IQR	Min Date	Max Date
West Fork	0811	15164	TDS Meas	Summer	0.64	-5.44	0.00	22.52	-5.95	0.34	-0.9	22	185.23	228.00	197.00	185.00	165.00	152.00	32.00	5/19/99	10/8/08
	0811	15164	TDS Meas	Winter	0.80	-6.44	0.00	22.54	-9.08	0.28	-0.8	22	194.36	235.00	208.00	189.00	181.00	156.00	27.00	2/24/99	11/4/08
	0811	16762	00665	Summer	0.18	0.08	0.05	0.59	2.12	0.12	-0.5	22	0.04	0.12	0.05	0.04	0.02	0.01	0.03	5/19/99	10/8/08
	0811	16762	00940	POR	0.81	-1.98	0.00	5.19	-12	0.13	-1.5	33	22.01	30.30	27.60	21.80	17.06	13.90	10.54	11/14/01	11/4/08
	0811	16762	00940	Summer	0.83	-2.04	0.00	5.36	-8.34	0.47	-1.1	16	21.42	30.30	25.75	20.85	16.78	13.90	8.97	5/15/02	10/8/08
	0811	16762	00940	Winter	0.79	-1.92	0.00	5.13	-7.43	-0.17	-1.6	17	22.56	28.80	27.60	22.58	17.27	14.85	10.33	11/14/01	11/4/08
	0811	16762	32211	Winter	0.19	0.37	0.05	2.51	2.14	-0.20	-0.9	21	4.69	8.70	6.70	4.70	2.70	0.10	4.00	11/3/99	11/4/08
	0811	16762	pH	POR	0.13	-0.04	0.01	0.34	-2.54	-0.46	1.27	46	8.11	8.98	8.30	8.17	7.90	7.20	0.40	5/19/99	11/4/08
	0811	16762	pH	Summer	0.14	-0.05	0.07	0.39	-1.90	-0.25	0.59	24	8.15	8.98	8.43	8.17	7.86	7.20	0.57	5/19/99	10/8/08
	0811	16762	TDS Meas	POR	0.66	-5.99	0.00	22.96	-8.91	0.07	-0.7	43	191.30	235.00	210.00	188.00	173.00	142.00	37.00	5/19/99	11/4/08
	0811	16762	TDS Meas	Summer	0.62	-5.51	0.00	23.09	-5.77	-0.05	-0.8	22	189.18	227.00	211.00	188.00	173.00	142.00	38.00	5/19/99	10/8/08
	0811	16762	TDS Meas	Winter	0.72	-6.62	0.00	23.18	-7.06	0.20	-0.7	21	193.53	235.00	206.00	188.00	179.00	156.00	27.00	11/3/99	11/4/08

SEGMENT & ASSESSMENT UNIT DICTIONARY

SegID 0801 Trinity River Tidal **From the confluence with Anahuac Channel in Chambers County to a point 3.1 km (1.9 miles) downstream of US 90 in Liberty County**	
0801_01 Lower 25 miles of segment	Station ID(s) 10892
0801_02 Upper 12 miles of segment	Station ID(s)
SegID 0801A Lost River (unclassified water body) **From IH 10 in Chambers County to approximately 6 KM upstream of confluence with John Wiggins Bayou**	
0801A_01 Entire segment	Station ID(s) 17879; 17880; 17881
SegID 0801B Old River (unclassified water body) **From IH 10 in Chambers County to approximately 9 miles upstream of confluence with Cherry Point Gully**	
0801B_01 Entire segment	Station ID(s) 18360
SegID 0801C Cotton Bayou (unclassified water body) **From the confluence of Cotton Lake southeast of Mont Belvieu in Chambers County upstream to a point (NHD RC 12040203000496) approximately 1 mile north of IH 10 in Chambers County**	
0801C_01 Entire segment	Station ID(s) 17628; 17629; 17632; 17633; 18696; 18697; 20003
SegID 0801D Lynchburg Canal (unclassified water body) **Lynchburg Canal from confluence with Trinity River Tidal to confluence with Cedar Point lateral (Reach Code 12030203000425)**	
0801D_01 From confluence with Trinity River Tidal upstream to confluence with Big Caney Creek	Station ID(s) 16148
SegID 0802 Trinity River Below Lake Livingston **From a point 3.1 km (1.9 miles) downstream of US 90 in Liberty County to Livingston Dam in Polk/San Jacinto County**	
0802_01 Lower 17 miles of segment	Station ID(s) 10894
0802_02 Approximately 9 miles upstream to approximately 15 miles downstream of SH 105	Station ID(s) 10895
0802_03 11 miles upstream to approximately 9 miles downstream of FM 787	Station ID(s) 10896
0802_04 5 miles upstream to 11 miles downstream of US 59	Station ID(s) 10897
0802_05 Upper 6 miles of segment	Station ID(s) 16998
SegID 0802A Choates Creek (unclassified water body) **Perennial stream from the confluence with Long King Creek upstream to the confluence with an unnamed tributary approximately 3.0 km upstream of SH 146 near the City of Livingston**	
0802A_01 Entire water body	Station ID(s)
SegID 0802B Long King Creek (unclassified water body) **Perennial stream from the confluence with the Trinity River upstream to the confluence with an unnamed tributary approximately 1.2 km upstream of FM 350 near the City of Livingston**	
0802B_01 From the confluence with segment 0802 of the Trinity River to just upstream of confluence with unknown tributary (NHD RC 12030202001817)	Station ID(s)
0802B_02 From just upstream of the confluence with unnamed tributary (NHD RC 12030202001817) up to the confluence with Mud Creek, in Polk County	Station ID(s) 10689
SegID 0802C Unnamed tributary of Coley Creek (unclassified water body) **Perennial stream from the confluence with Coley Creek upstream to its origin at the culvert leading from Lake Run-Amuck at Wright Road**	
0802C_01 Entire water body	Station ID(s)

SegID 0802D Menard Creek (unclassified water body) **From the confluence with segment 0802 of the Trinity River up to the confluence with Meetinghouse Creek**	
0802D_01 Entire water body	Station ID(s) 10688
SegID 0803 Lake Livingston **From Livingston Dam in Polk/San Jacinto County to a point 1.8 km (1.1 miles) upstream of Boggy Creek in Houston/Leon County, up to normal pool elevation of 131 feet (impounds Trinity River)**	
0803_01 Lowermost portion of reservoir, adjacent to dam	Station ID(s) 10899; 14003; 14004
0803_02 Lower portion of reservoir, East Wolf Creek	Station ID(s) 14005
0803_03 Lower portion of reservoir, East Willow Springs	Station ID(s) 14006
0803_04 Middle portion of reservoir, East Pointblank	Station ID(s) 14007; 14008
0803_05 Middle portion of reservoir, downstream of Kickapoo Creek	Station ID(s) 10909; 14009
0803_06 Middle portion of reservoir, centering on US 190	Station ID(s) 10911; 14010
0803_07 Upper portion of reservoir, west of Carlisle	Station ID(s) 10913; 14013
0803_08 Cove off upper portion of reservoir, East Trinity	Station ID(s) 14014
0803_09 West Carolina Creek cove, off upper portion of reservoir	Station ID(s) 14011
0803_10 Upper portion of reservoir, centering on SH 19	Station ID(s) 10914
0803_11 Riverine portion of reservoir, centering on SH 21	Station ID(s) 10917
0803_12 Remainder of reservoir	Station ID(s)
SegID 0803A Harmon Creek (unclassified water body) **From the confluence with Lake Livingston (normal pool elevation of 131 feet) to the confluence of East Fork Harmon Creek east of Huntsville in Walker County**	
0803A_01 A 16 mile (25.7 KM) stretch of Harmon Creek extending from Lake Livingston (normal pool elevation of 131 feet) upstream to the confluence of East Fork Harmon Creek	Station ID(s) 10698
SegID 0803B White Rock Creek (unclassified water body) **From the confluence of Lake Livingston northeast of Trinity in Trinity County to the upstream perennial portion of the stream east of Lovelady in Houston County**	
0803B_01 lower 25 miles of segment	Station ID(s) 10696
0803B_02 Upper 13 miles of segment	Station ID(s)
SegID 0803C Turkey Creek (unclassified water body) **Perennial stream from Lake Livingston upstream to the confluence with an unnamed tributary 2.55 km downstream of FM 960**	
0803C_01 Entire water body	Station ID(s)
SegID 0803D Parker Creek (unclassified water body) **Perennial stream from the confluence with Harmon Creek upstream to the confluence with Town Branch**	
0803D_01 Entire water body	Station ID(s)
SegID 0803E Nelson Creek (unclassified water body) **From the confluence with segment 0803 Trinity River, to upper end of Nelson Creek NHD RC 12030202005424**	
0803E_01 Entire water body	Station ID(s) 10700; 10701

SegID 0803F Bedias Creek (unclassified water body)	
0803F_01 From the confluence with segment 0803 Trinity River up to confluence with Poole Creek (NHD RC 12030202000572)	Station ID(s) 10702
0803F_02 From the confluence with Poole Creek (NHD RC 12030202000572) to upper end of NHD RC Bedias Creek (NHD RC 12030202000350)	Station ID(s) 10703
SegID 0804 Trinity River Above Lake Livingston **From a point 1.8 km (1.1 miles) upstream of Boggy Creek in Houston/Leon County to a point immediately upstream of the confluence of the Cedar Creek Reservoir discharge canal in Henderson/Navarro County**	
0804_01 From the lower end of the segment up to just above the confluence with Hurricane Bayou in Houston County	Station ID(s) 10918; 13690
0804_02 From just upstream of the confluence with Hurricane Bayou up to just above the confluence with Boons Creek	Station ID(s)
0804_03 From just upstream of the confluence with Boons Creek up to just above the confluence with Caney Creek	Station ID(s)
0804_04 From the confluence with Caney Creek up to just above the confluence with Indian Creek in Anderson County	Station ID(s) 10919
0804_05 From just above the confluence with Indian Creek in Anderson County up to just above the confluence with Tehuacana Creek	Station ID(s)
0804_06 From just above the confluence with Tehuacana Creek to just above the confluence with Richland Creek	Station ID(s)
0804_07 From just above the confluence with Richland Creek in Henderson County, up to the upper end of the segment	Station ID(s) 10920; 10921; 10922
SegID 0804A Box Creek (unclassified water body) **Perennial stream from the confluence of Elkhart Creek upstream to the Elkhart Lake dam northeast of the City of Elkhart**	
0804A_01 Entire water body	Station ID(s)
SegID 0804B Keechi Creek (unclassified water body) **Perennial stream from the confluence with the Trinity River to a point 0.05 km upstream of FM 645**	
0804B_01 Entire water body	Station ID(s)
SegID 0804C Mims Creek (unclassified water body) **Perennial stream from the confluence with Upper Keechi Creek upstream to the confluence of an unnamed tributary approximately 2.1 km upstream of FM 1580 near the City of Fairfield**	
0804C_01 Entire water body	Station ID(s)
SegID 0804D Toms Creek (unclassified water body) **Perennial stream from the confluence with the Trinity River to the Missouri Pacific Railroad crossing near Oakwood**	
0804D_01 Entire water body	Station ID(s)
SegID 0804E Northwest Branch (unclassified water body) **Perennial stream from the confluence with Toms Creek to a point 0.3 km upstream of FM 831**	
0804E_01 Entire water body	Station ID(s)

SegID 0804F Tehuacana Creek (unclassified water body)	
0804F_01 A 27 mile stretch of Tehuacana Creek extending from the confluence with 0804 of the Trinity River up to the confluence with Caney Creek (NHD RC 120302010000226)	Station ID(s) 10705
0804F_02 A 28.4 mile (45.7 KM) stretch of Tehuacana Creek extending from the confluence with Caney Creek to the upper end (NHD RC 120302010000225) of Tehuacana Creek	Station ID(s) 18572
SegID 0804G Catfish Creek (unclassified water body) **Twenty mile stretch of Catfish Creek running upstream from US 287 in Anderson County, to Catfish Creek Ranch Lake just upstream of SH 19 in Henderson County**	
0804G_01 Entire segment	Station ID(s) 10717; 18596; 18597
SegID Upper Keechi Creek (unclassified water body) **From confluence with segment 0804 Trinity River to the upper end of NHD stream Upper Keechi Creek (NHD RC 12030201001075)**	
0804H_01 From the confluence with segment 0804 Trinity River up to confluence with Twin Branch (NHD RC 12030201027099)	Station ID(s) 18401
0804H_02 From the confluence with Twin Branch (NHD RC 12030201027099) to the upper end (NHD RC 12030201001075) of NHD RC stream Upper Keechi Creek	Station ID(s) 18520
SegID 0804I Big Brown Creek (unclassified water body) **From the confluence with segment 0804 of the Trinity River upstream to the end of segment (NHD RC Reach Code 112030201000928)**	
0804I_01 From the confluence with the Trinity River (0804) upstream to the Fairfield Lake Dam in Freestone County	Station ID(s)
0804I_02 From the upper end of Fairfield Lake upstream to headwaters (NHD RC 112030201000928)	Station ID(s)
SegID 0804J Fairfield Lake (unclassified water body) **Impounded Big Brown Creek in Freestone County**	
0804J_01 Entire segment	Station ID(s) 17951
SegID 0805 Upper Trinity River **From a point immediately upstream of the confluence of the Cedar Creek Reservoir discharge canal in Henderson/Navarro County to a point immediately upstream of the confluence of Elm Fork Trinity River in Dallas County**	
0805_01 From confluence of the Cedar Creek Reservoir discharge canal upstream to confluence of Smith Creek	Station ID(s) 10924
0805_02 From confluence of Smith Creek upstream to confluence of Tenmile Creek	Station ID(s) 10925; 10926; 10927; 10928; 16121
0805_03 From the confluence of Fivemile Creek upstream to the confluence of Cedar Creek	Station ID(s) 10934; 10935; 13614; 17161; 20444; 20567
0805_04 From confluence of Cedar Creek upstream to confluence of Elm Fork Trinity River	Station ID(s) 10936; 10937; 16088
0805_06 From confluence of Tenmile Creek upstream to confluence of Fivemile Creek	Station ID(s) 10929; 10930; 10931; 10932; 20566
SegID 0805A Red Oak Creek (unclassified water body) **From confluence with segment 0805 Trinity River 12 miles upstream to I 45**	
0805A_01 Entire segment	Station ID(s) 17506; 18569
SegID 0805B Parsons Slough (unclassified water body) **From confluence with segment 0805 Trinity River in Kaufman County, 11 miles upstream to Malloy Bridge Road in Dallas County**	
0805B_01 Entire segment	Station ID(s) 10839

SegID 0805C White Rock Creek below White Rock Lake (unclassified water body)	
0805C_01 Entire water body	Station ID(s) 18458
SegID 0805D Fivemile Creek (unclassified water body) **A 17 mile stretch of Fivemile Creek extending from confluence with segment 0805 Trinity River upstream to upper end of NHD stream Fivemile Creek (NHD RC 12030105000066)**	
0805D_01 Entire water body	Station ID(s) 18575
SegID 0806 West Fork Trinity River Below Lake Worth **From a point immediately upstream of the confluence of Village Creek in Tarrant County to Lake Worth Dam in Tarrant County**	
0806_01 From confluence of Village Creek upstream to confluence of Clear Fork Trinity River	Station ID(s) 10938; 10939; 10940; 11085; 16120; 17368; 17662; 17863; 18459; 20292; 20336; 20422
0806_02 From confluence of Clear Fork Trinity River upstream to Lake Worth Dam	Station ID(s) 10941; 18460; 20424; 20425
SegID 0806A Fosdic Lake (unclassified water body) **From Fosdic Lake Dam to the reservoir headwaters in Oakland Lake Park in Tarrant County**	
0806A_01 Entire lake	Station ID(s) 16818
SegID 0806B Echo Lake (unclassified water body) **From Echo Lake Dam to the reservoirs headwaters in Tarrant County**	
0806B_01 Entire lake	Station ID(s) 16813
SegID 0806C Big Fossil Creek (unclassified water body) **From confluence with Little Fossil Creek in Haltom City, to HWY 183 in Tarrant County**	
0806C_01 Entire segment	Station ID(s) 10814; 17133
SegID 0806D Marine Creek (unclassified water body) **Two mile stretch of Marine Creek running upstream from confluence with the West Fork of Trinity River to Tenmile Bridge Road in Fort Worth**	
0806D_01 Marine Creek from the confluence with West Fork Trinity River 2 miles upstream to Ten-mile Bridge Road in Fort Worth	Station ID(s) 17370
SegID 0806E Sycamore Creek (unclassified water body) **Five mile stretch of Sycamore Creek running upstream from confluence with the West Fork of Trinity River to confluence with Echo Lake tributary in Fort Worth**	
0806E_01 Five mile stretch of Sycamore Creek running upstream from confluence with the West Fork of Trinity River to confluence with Echo Lake Tributary in Fort Worth	Station ID(s) 17131; 17369
SegID 0806F Little Fossil Creek (unclassified water body) **A 13.7 mile stretch of Little Fossil Creek running upstream from confluence with segment 0806 West Fork Trinity River upstream to upper end (NHD RC Reach Code of NHD RC stream Little Fossil Creek**	
0806F_01 Entire water body	Station ID(s) 17129
SegID 0807 Lake Worth **From Lake Worth Dam in Tarrant County to a point 4.0 km (2.5 miles) downstream of Eagle Mountain Dam in Tarrant County, up to normal pool elevation of 594.3 feet (impounds West Fork Trinity River)**	
0807_01 Entire reservoir	Station ID(s) 10942; 15163; 15166; 15167
SegID 0808 West Fork Trinity River Below Eagle Mountain Reservoir **From a point 4.0 km (2.5 miles) downstream of Eagle Mountain Dam in Tarrant County to Eagle Mountain Dam in Tarrant County**	
0808_01 Entire segment	Station ID(s)

SegID 0809 Eagle Mountain Reservoir **From Eagle Mountain Dam in Tarrant County to a point 0.6 km (0.4 miles) downstream of the confluence of Oates Branch in Wise County up to normal pool elevation of 649.1 feet (impounds West Fork Trinity River)**	
0809_01 Lowermost portion of reservoir near east end of dam	Station ID(s) 10944
0809_02 Dosier Slough cove	Station ID(s) 10947
0809_03 Ash Creek cove	Station ID(s) 10949; 10950; 10951
0809_04 Lowermost portion of reservoir near west end of dam	Station ID(s) 10945
0809_05 Lower portion of reservoir east of Walnut Creek cove	Station ID(s) 10952
0809_06 Walnut Creek cove	Station ID(s) 10954
0809_07 Old Ranch cove	Station ID(s) 10958; 10959
0809_08 Middle portion of reservoir near Cole subdivision	Station ID(s) 10956
0809_09 Indian Creek cove	Station ID(s) 10961; 10962
0809_10 Upper portion of reservoir near Indian Creek cove	Station ID(s) 10960
0809_11 Darrett Creek cove	Station ID(s) 10965
0809_12 Upper portion of reservoir near Newark Beach	Station ID(s) 10964
0809_13 Remainder of reservoir	Station ID(s)
0809_14 Mid-Lake, from just above Walnut Cr. Cove to Oakwood Road peninsula	Station ID(s) 17667
SegID 0810 West Fork Trinity River Below Bridgeport Reservoir **From a point 0.6 km (0.4 miles) downstream of the confluence of Oates Branch in Wise County to Bridgeport Dam in Wise County**	
0810_01 Lower 25 miles of segment	Station ID(s) 10967; 10968; 10969; 14246; 17844
0810_02 Upper 11 miles of segment	Station ID(s) 14904
SegID 0810A Big Sandy Creek (unclassified water body) **Fifteen mile stretch of Sycamore Creek running upstream from confluence with Waggoner Creek to FM 1810, west of Alvord, Wise County**	
0810A_01 Fifteen mile stretch of Big Sandy Creek running from confluence with Waggoner Creek to FM 1810 West of Alvord, Wise County	Station ID(s) 15688
SegID 0810B Garrett Creek (unclassified water body) **Eighteen mile stretch of Garrett Creek running upstream from confluence with Salt Creek to Wise County Road approximately 14 miles upstream of SH114, Wise County**	
0810B_01 Eighteen mile stretch of Garrett Creek running upstream from confluence with Salt Creek to Wise County Road approximately 14 miles upstream of SH114, Wise County	Station ID(s) 16767
SegID 0810C Martin Branch (unclassified water body) **The eight mile stretch of Martin Branch running upstream from confluence with Center Creek to FM 730 south of Decatur, Wise County**	
0810C_01 Eight mile stretch of Martin Branch running upstream from confluence with Center Creek to FM 730 south of Decatur, Wise County	Station ID(s) 17848
SegID 0810D Salt Creek (unclassified water body) **Eleven mile stretch of Salt Creek running upstream from confluence with Garrett Creek, Wise County**	
0810D_01 Eleven mile stretch of Salt Creek running upstream from confluence with Garrett Creek, Wise County	Station ID(s) 16766

SegID 0811 Bridgeport Reservoir **From Bridgeport Dam in Wise County to a point immediately upstream of the confluence of Bear Hollow in Jack County, up to normal pool elevation of 836 feet (impounds West Fork Trinity River)**	
0811_01 Southeast portion of main body of reservoir	Station ID(s) 16762; 16764
0811_02 Southwest portion of main body of reservoir	Station ID(s) 15165; 16763
0811_03 Central portion of main body of reservoir	Station ID(s) 10970
0811_04 Northern portion of main body of reservoir	Station ID(s) 15164; 16761
0811_05 Remainder of reservoir	Station ID(s) 16736; 16759; 16760; 16765
SegID 0812 West Fork Trinity River Above Bridgeport Reservoir **From a point immediately upstream of the confluence of Bear Hollow in Jack County to SH 79 in Archer County**	
0812_01 Lower 25 miles of segment	Station ID(s) 10972; 18058; 18059
0812_02 Upper 60 miles of segment	Station ID(s)
SegID 0813 Houston County Lake **From Houston County Dam in Houston County up to the normal pool elevation of 260 feet (impounds Little Elkhart Creek)**	
0813_01 Entire reservoir	Station ID(s) 10973
SegID 0814 Chambers Creek Above Richland-Chambers Reservoir **From a point 4.0 km (2.5 miles) downstream of Tupelo Branch in Navarro County to the confluence of North Fork Chambers Creek and South Fork Chambers Creek**	
0814_01 From the lower end of the segment up to just above the confluence with Cummins Creek	Station ID(s) 10975
0814_02 From just above the confluence with Cummins Creek up to just above the confluence with Waxahachie Creek	Station ID(s) 10977; 20000
0814_03 From just above the confluence with Waxahachie Creek up to just above the confluence with Mill Branch	Station ID(s)
0814_04 From just above the confluence with Mill Branch to the upper end of the segment	Station ID(s) 10978
SegID 0814A Mill Creek (unclassified water body) **Twenty-five mile stretch of Mill Creek running upstream from confluence with Chambers Creek in Navarro County, to Union Pacific RR in Milford, Ellis County**	
0814A_01 Twenty-five mile stretch of Mill Creek running upstream from confluence with Chambers Creek in Navarro County to Union Pacific RR in Milford, Ellis County	Station ID(s) 18566
SegID 0814B South Fork Chambers Creek (unclassified water body) **A Twenty-nine mile stretch of the South Fork of Chambers creek stretching from the confluence with Chambers Creek (Segment 0814) to the upper end of South Fork Chambers Creek (NHD RC Reach Code 12030109000299)**	
0814B_01 Entire water body	Station ID(s) 18570
SegID 0815 Bardwell Reservoir **From Bardwell Dam in Ellis County up to the normal pool elevation of 421 feet (impounds Waxahachie Creek)**	
0815_01 Entire reservoir	Station ID(s) 10979; 16700; 17582; 18437; 18549; 18550
SegID 0815A Waxahachie Creek (unclassified water body) **Perennial stream from the confluence with Bardwell Reservoir (normal pool elevation 421 feet) to the headwaters west of Waxahachie in Ellis County**	
0815A_01 Entire creek	Station ID(s) 13686; 18519

SegID 0816 Lake Waxahachie **From South Prong Dam in Ellis County up to normal pool elevation of 531.5 feet (impounds South Prong Creek)**	
0816_01 Entire reservoir	Station ID(s) 10980
SegID 0816A South Prong Creek (unclassified water body) **A 12.2 mile stretch of South Prong Creek running upstream from the confluence with Segment 0816 (Lake Waxahachie) to the upper end of the creek (NHD RC 12030109000044), in Midlothian, Ellis County, TX**	
0816A_01 Entire water body	Station ID(s) 18571
SegID 0817 Navarro Mills Lake **From Navarro Mills Dam in Navarro County up to normal pool elevation of 424.5 feet (impounds Richland Creek)**	
0817_01 Entire reservoir	Station ID(s) 10981; 17442; 18545; 18546; 18547; 18548; 20633
SegID 0817A Richland Creek (unclassified water body) **Ten mile stretch of Richland Creek running upstream from 0.5 miles downstream of FM 744 in Navarro County, to FM 308 south of Mertens, Hill County**	
0817A_01 Ten mile stretch of Richland Creek running upstream from 0.5 miles downstream of FM 744 in Navarro County, to FM 308 South of Mertens, Hill County	Station ID(s) 18518
SegID 0818 Cedar Creek Reservoir **From Joe B. Hoggsett Dam in Henderson County up to normal pool elevation of 322 feet (impounds Cedar Creek)**	
0818_01 Lowermost portion of the reservoir, adjacent to the dam	Station ID(s) 13845; 16745; 16748
0818_02 Caney Creek cove	Station ID(s) 16744
0818_03 Clear Creek cove	Station ID(s) 16743
0818_04 Lower portion of reservoir east of Key Ranch Estates	Station ID(s) 13848; 16749
0818_05 Cove off lower portion of reservoir adjacent to Clearview Estates	Station ID(s) 16746
0818_06 Middle portion of reservoir downstream of Twin Creeks cove	Station ID(s) 15812; 16741; 16747; 16750; 17090; 18472; 18473
0818_07 Twin Creeks cove	Station ID(s) 16739
0818_08 Prairie Creek cove	Station ID(s) 16751; 16752
0818_09 Upper portion of reservoir adjacent to Lacy Fork cove	Station ID(s) 13854; 16753; 18471
0818_10 Lacy Fork cove	Station ID(s) 16771
0818_11 Upper portion of reservoir east of Tolosa	Station ID(s) 16772
0818_12 Uppermost portion of reservoir downstream of Kings Creek	Station ID(s) 16774; 18469; 18470
0818_13 Cedar Creek cove	Station ID(s) 16773
0818_14 Remainder of reservoir	Station ID(s)
SegID 0818A One Mile Creek (unclassified water body) **Perennial stream from the confluence with Valley View Reservoir upstream to the confluence with an unnamed tributary 0.8 km upstream of SH 19**	
0818A_01 Entire water body	Station ID(s)
SegID 0819 East Fork Trinity River **From the confluence with the Trinity River in Kaufman County to Rockwall-Forney Dam in Kaufman County**	
0819_01 Entire segment	Station ID(s) 10987; 10990; 10991; 10992; 10996; 13612

SegID 0819A Duck Creek (unclassified water body) **Perennial stream from the confluence with the East Fork Trinity River in Kaufman county to the confluence of an unnamed tributary 0.6 km upstream of Jupiter**	
0819A_01 Entire water body	Station ID(s) 18558
SegID 0819B Buffalo Creek (unclassified water body) **Perennial stream from the confluence with the East Fork Trinity River up to 0.6 km above the confluence of Little Buffalo Creek**	
0819B_01 Entire water body	Station ID(s) 10824; 18576
SegID 0820 Lake Ray Hubbard **From Rockwall-Forney Dam in Kaufman County to Lavon Dam in Collin County, up to normal pool elevation of 435.5 feet (impounds East Fork Trinity River)**	
0820_01 Lower portion of East Fork arm, centering on IH 30	Station ID(s) 16809
0820_02 Middle portion of East Fork arm, centering on SH 66	Station ID(s) 16829
0820_03 Remainder of segment	Station ID(s)
0820_04 Lower portion of main body of reservoir extending up from dam to Yankee Creek arm.	Station ID(s) 10998; 20194
0820_05 Mid-reservoir, I30 crossing Rowlett Creek arm to Yankee Creek arm	Station ID(s) 17829
0820_06 Outfall canal from Lake Lavon Dam	Station ID(s) 17846
SegID 0820A Cottonwood Creek (unclassified water body) **Perennial stream from the confluence with Rowlett Creek up to SH 5 (near Greenville Road)**	
0820A_01 Entire water body	Station ID(s)
SegID 0820B Rowlett Creek (unclassified water body) **Perennial stream from the normal pool elevation of 435.5 feet of Lake Ray Hubbard to the Parker Road crossing**	
0820B_01 Entire water body	Station ID(s) 10753; 17845
SegID 0820C Muddy Creek (unclassified water body) **From the confluence with Lake Ray Hubbard, in Dallas County, to the headwaters east of Allen, in Collin County**	
0820C_01 Entire creek	Station ID(s) 16828; 20110
SegID 0821 Lake Lavon **From Lavon Dam in Collin County, up to normal pool elevation of 492 feet (impounds East Fork Trinity River)**	
0821_01 Lowermost portion of reservoir	Station ID(s) 15684; 15685
0821_02 East Fork arm	Station ID(s) 15686
0821_03 Middle portion of Sister Grove Creek arm	Station ID(s) 15687
0821_04 Remainder of segment	Station ID(s)
SegID 0821A Pilot Grove Creek (unclassified water body) **Perennial stream from confluence of Desert Creek up to FM 121 near Blue Ridge**	
0821A_01 From confluence of Desert Creek up to FM 121 near Blue Ridge	Station ID(s)
SegID 0821B Sister Grove Creek (unclassified water body) **From the confluence with Lake Lavon in Collin County to the confluence of West Prong Sister Grove Creek/East Prong Sister Grove Creek, east of Van Alstyne in Grayson County**	
0821B_01 Entire creek	Station ID(s) 13613
SegID 0821C Wilson Creek (unclassified water body) **From the confluence with Lake Lavon in Collin County up to West FM 455 (NHD RC 12030106000086), just east of Celina, Collin County, TX**	
0821C_01 Entire water body	Station ID(s) 10777, 15041

SegID 0821D East Fork Trinity River above Lake Lavon **A portion of the East Fork Trinity River extending from the confluence with Lake Lavon (segment 0821) to the upper end of the water body (NHD RC 12030106000074) in Collin County, Texas**	
0821D_01 Entire water body	Station ID(s) 13740
SegID 0822 Elm Fork Trinity River Below Lewisville Lake **From the confluence with the West Fork Trinity River in Dallas County to Lewisville Dam in Denton County**	
From the confluence with the West Fork Trinity River in Dallas County to Lewisville Dam in Denton County	0822_01 Lower 11 miles of segment
0822_01 Lower 11 miles of segment	Station ID(s) 16436; 17163; 17164; 18310; 18648; 20287
0822_02 4.5 miles upstream to 7.5 miles downstream DWU intake	Station ID(s) 11024; 16438; 17162
0822_03 1.0 mi upstream to 4.5 miles downstream SH 121	Station ID(s) 13615; 18358
0822_04 Upper 1.5 miles of segment	Station ID(s) 15252; 16437
SegID 0822A Cottonwood Branch (unclassified water body) **A 6 mile stretch of Cottonwood Branch running upstream from confluence with Hackberry Creek, to Valley View Road in Dallas County**	
0822A_01 A 2.5 mile stretch of Cottonwood Branch running upstream from confluence with Hack-berry Creek to approximately 0.5 miles downstream of North Story Road, Dallas County	Station ID(s) 17167; 17168; 18359
0822A_02 A 3. 5 mile stretch of Cottonwood Branch running upstream from approximately 0.5 miles downstream of N. Story Road to Valley View Road, Dallas, County	Station ID(s) 17165; 17166
0822B Grapevine Creek SegID (unclassified water body) **A 5.5 mile stretch of Grapevine Creek running upstream from Coppell Road in Coppell, Dallas County, to approximately 1. 5 miles upstream of SH 21, Tarrant County**	
0822B_01 A 5.5 mile stretch of Grapevine Creek running upstream from Coppell Road in Coppell, Dallas County, to approximately 1. 5 miles upstream of SH 21, Tarrant County	Station ID(s) 17169; 17531; 17939
SegID 0822C Hackberry Creek (unclassified water body) **A 5.5 mile stretch of Hackberry Creek running upstream from confluence with Cottonwood Branch, to approximately 2.4 miles upstream of SH 114, in Irving, Dallas County**	
0822C_01 A 5.5 mile stretch of Hackberry Creek running upstream from confluence with South Fork Hackberry Creek to approximately 2.4 miles upstream of SH 114 in Irving, Dallas County	Station ID(s) 17170; 17171; 17172; 17532; 17938
SegID 0822D Ski Lake (unclassified water body) **A 65 acre reservoir locate just south of the intersection of US 35E and Spur 482 in Irving**	
0822D_01 Entire segment	Station ID(s) 17849
SegID 0823 Lewisville Lake **From Lewisville Dam in Denton County to a point 100 meters (110 yards) upstream of US 380 in Denton County, up to normal pool elevation of 515 feet (impounds Elm Fork Trinity River)**	
0823_01 Lowermost portion of reservoir	Station ID(s) 11025; 13995; 13996
0823_02 Stewart Creek arm	Station ID(s) 13997; 16808
0823_03 Hickory Creek arm	Station ID(s) 11027; 13998; 18476; 18477; 18478; 18479
0823_04 Little Elm Creek arm	Station ID(s) 11026; 17830
0823_05 Middle portion of reservoir east of Lake Dallas	Station ID(s) 13999; 14001
0823_06 Remainder of reservoir	Station ID(s) 18481

SegID 0823A Little Elm Creek (unclassified water body) **From confluence with Lake Lewisville in Denton County, up to 1.4 km above FM 453 in Collin County**	
0823A_01 From the confluence with Lake Lewisville in Denton County, up to FM 455 in Collin County (Lower 12 miles of segment)	Station ID(s) 13617; 16826
0823A_02 From FM 455 in Collin County, up to 1.4 km above FM 121 in Grayson, County near Guenther (Upper 15 miles of segment)	Station ID(s)
SegID 0823B Stewart Creek (unclassified water body) **From the confluence with Lake Lewisville in Denton County to the headwaters near Frisco in Collin County**	
0823B_01 Entire segment	Station ID(s) 10860
SegID 0823C Clear Creek (unclassified water body) **From the confluence with Lake Lewisville in Denton County to the headwaters west of Montague in Montague County**	
0823C_01 Lower 25 miles of segment	Station ID(s) 16827
0823C_02 Upper 40 miles of segment	Station ID(s)
SegID 0823D Doe Branch (unclassified water body) **From the confluence (NHD RC 12030103023518) with Lake Lewisville/Elm Fork Trinity in Denton County to the headwaters (NHD RC 12030103005935) northeast of Celina, Collin County, TX**	
0823D_01 From the confluence (NHD RC 12030103023518) with Lake Lewisville/Elm Fork Trinity in Denton County to the headwaters (NHD RC 12030103005935) northeast of Celina, Collin County, TX.	Station ID(s) 18560
SegID 0824 Elm Fork Trinity River Above Ray Roberts Lake **From a point 9.5 km (5.9 miles) downstream of the confluence of Pecan Creek in Cooke County to US 82 in Montague County**	
0824_01 Lower 7.5 miles of segment	Station ID(s) 11029; 11031
0824_02 2 mile reach near unmarked county road, 1.4 km downstream Gainesville WWTP	Station ID(s) 11033
0824_03 3.5 mile reach near SH 51	Station ID(s) 15635; 17670
0824_04 25 mile reach near FM 3108	Station ID(s) 16432
0824_05 Upper 48 miles of segment	Station ID(s)
SegID 0825 Denton Creek **From the confluence with the Elm Fork Trinity River in Dallas County to Grapevine Dam in Tarrant County**	
0825_01 Entire segment	Station ID(s) 11034; 14244
SegID 0826 Grapevine Lake **From Grapevine Dam in Tarrant County up to normal pool elevation of 535 feet (impounds Denton Creek)**	
0826_01 Lowermost portion of reservoir	Station ID(s) 13873; 13874; 16113; 17827
0826_02 Morehead Creek cove	Station ID(s) 11036; 11037; 16118
0826_03 Lower portion of reservoir north of Oak Grove Park	Station ID(s) 16114
0826_04 North Main Slough cove	Station ID(s) 16116; 16117
0826_05 Middle portion of reservoir east of Meadowmere Park	Station ID(s) 13875; 16115
0826_06 Middle portion of reservoir southeast of Walnut Grove Park	Station ID(s) 13876; 16112; 17828
0826_07 Upper portion of reservoir east of Marshall Creek Park	Station ID(s) 13877; 13878; 16111
0826_08 Remainder of reservoir	Station ID(s)

SegID 0826A Denton Creek (unclassified water body) **Perennial stream from the confluence with Grapevine Lake in Denton County to the headwaters northeast of Bowie in Montague County**	
0826A_01 Lower 7.9 miles of creek	Station ID(s) 14485
0826A_02 15.7 miles upstream to 7.4 miles down stream of FM 156	Station ID(s) 14483
0826A_03 9.3 miles upstream to 15.7 miles downstream of Greenwood Road	Station ID(s)
0826A_04 Upper 20.8 miles of creek	Station ID(s)
SegID 0826B Trail Creek (unclassified water body) **Perennial stream from the confluence with Denton Creek up to 2.1 km upstream of SH 156 in Justin**	
0826B_01 Entire segment	Station ID(s)
SegID 0826C Henrietta Creek (unclassified water body) **A 3 mile stretch of Henrietta Creek, running upstream from the confluence with Denton Creek to confluence with Elizabeth Creek**	
0826C_01 Entire segment	Station ID(s) 16825
SegID 0827 White Rock Lake **From White Rock Dam in Dallas County up to the normal pool elevation of 458 feet (impounds White Rock Creek)**	
0827_01 Entire segment	Station ID(s) 11038
SegID 0827A White Rock Creek above White Rock Lake (unclassified water body) **Perennial stream from the headwaters of White Rock Lake upstream to the confluence with McKamy Branch east of the City of Addison**	
0827A_01 From the headwaters of White Rock Lake upstream to the upper end of the water body at NHD RC 12030105001118	Station ID(s) 15280; 18517; 20289
SegID 0827B Cottonwood Creek (unclassified water body) **Perennial stream from the confluence with White Rock Creek upstream to the confluence with an unnamed tributary approximately 0.25 km upstream of Campbell road in the City of Richardson**	
0827B_01 Entire segment	Station ID(s)
SegID 0828 Lake Arlington **From Arlington Dam in Tarrant County up to the normal pool elevation of 550 feet (impounds Village Creek)**	
0828_01 Lowermost portion of lake along western half of dam	Station ID(s) 11040; 13905
0828_02 Lowermost portion of lake along eastern half of dam	Station ID(s) 13904
0828_03 Western half of lower portion of lake	Station ID(s) 13903
0828_04 Eastern half of lower portion of lake	Station ID(s) 13901
0828_05 Western half of upper portion of lake	Station ID(s) 13899
0828_06 Eastern half of upper portion of lake	Station ID(s) 11042; 13898
0828_07 Uppermost portion of lake	Station ID(s) 13897
0828_08 Remainder of lake	Station ID(s)
SegID 0828A Village Creek (unclassified water body) **From the confluence with Lake Arlington in Tarrant County to the headwaters east of Joshua in Johnson County**	
0828A_01 From Lake Arlington to the headwaters	Station ID(s) 10780; 10786

SegID 0829 Clear Fork Trinity River Below Benbrook Lake **From the confluence with the West Fork Trinity River in Tarrant County to Benbrook Dam in Tarrant County**	
0829_01 From the confluence with West Fork Trinity River to 1 mile upstream	Station ID(s) 16119
0829_02 From 1 mile upstream of the confluence with West Fork Trinity River up to the confluence with Mary's Creek	Station ID(s) 11044; 11045; 18456
0829_03 From the confluence with Mary's Creek up to Benbrook Dam in Tarrant County, TX	Station ID(s) 13623
SegID 0829A Lake Como (unclassified water body) **From Lake Como Dam to the reservoir headwaters in Lake Como Park in Tarrant County**	
0829A_01 Entire lake	Station ID(s) 16814
SegID 0830 Benbrook Lake **From Benbrook Dam in Tarrant County to a point 200 meters (220 yards) downstream of US 377 in Tarrant County, up to normal pool elevation of 694 feet (impounds Clear Fork Trinity River)**	
0830_01 Lower portion of reservoir	Station ID(s) 13830; 15151; 15161
0830_02 Middle portion of reservoir	Station ID(s) 13831; 15156
0830_03 Upper portion of reservoir	Station ID(s) 15158
0830_04 Remainder of reservoir	Station ID(s)
0830_05 Rock/Mustang Creek arm of Benbrook Lake	Station ID(s) 13832
SegID 0831 Clear Fork Trinity River Below Lake Weatherford **From a point 200 meters (220 yards) downstream of US 377 in Tarrant County to Weatherford Dam in Parker County**	
0831_01 Lower 12.75 miles, downstream from South Fork Trinity River confluence	Station ID(s) 13691; 17444; 17447
0831_03 From the confluence with South Fork of Trinity River to a point 2 miles upstream	Station ID(s) 17445
0831_04 2 mi upstream of South Fork Trinity River confluence to Squaw Creek Confluence	Station ID(s) 11060
0831_05 From the confluence of Squaw Creek to Lake Weatherford Dam	Station ID(s) 17446; 17637
SegID 0831A South Fork Trinity River (unclassified water body) **Eleven mile stretch of South Fork Trinity River running upstream from confluence with Clear Fork Trinity River to confluence with Willow Creek, Parker County**	
0831A_01 Eleven mile stretch of South Fork Trinity River running upstream from confluence with Clear Fork Trinity River to confluence with Willow Creek, Parker County	Station ID(s) 17454; 17455
SegID 0831B Unnamed tributary of South Fork Trinity River (unclassified water body) **A 4.4 mile (7.1 km) stretch of unnamed tributary to South Fork Trinity River stretching from the confluence to the upper end of the creek (NHD RC 12030102000351)**	
0831B_01 Entire segment	Station ID(s) 17456
SegID 0831C Town Creek (unclassified water body) **A 19.5 mile (31.4 km) stretch of Town Creek extending from the confluence with the South Fork of the Trinity River up to the upper end of the creek (NHD RC 12030102000062)**	
0831C_01 A 12.3 mile (19.8 km) stretch of Town Creek extending from the confluence with the South Fork Trinity River up to the confluence with Pogue Branch in Weatherford, Parker County, TX	Station ID(s) 17457
SegID 0832 Lake Weatherford **From Weatherford Dam in Parker County to a point 3.1 km (1.9 miles) upstream of FM 1707 in Parker County, up to the normal pool elevation of 896 feet (impounds Clear Fork Trinity River)**	
0832_01 Entire reservoir	Station ID(s) 11061

SegID 0833 Clear Fork Trinity River Above Lake Weatherford **From a point 3.1 km (1.9 miles) upstream of FM 1707 in Parker County, to FM 3107 in Parker County**	
0833_02 Upper 11 miles of segment	Station ID(s) 16415; 17459; 17460; 17463
0833_03 From the confluence of McKnight Branch to the confluence of Cottonwood Creek	Station ID(s) 11062
0833_04 From the confluence with Dobbs Branch to confluence with McKnight Branch	Station ID(s) 17461
0833_05 From the confluence of Dobbs Creek to the lower end of segment	Station ID(s) 17462
SegID 0834 Lake Amon G. Carter **From Amon G. Carter Dam in Montague County up to the normal pool elevation of 920 feet (impounds Big Sandy Creek)**	
0834_01 Entire reservoir	Station ID(s) 11063
SegID 0835 Richland Creek Below Richland-Chambers Reservoir **From the confluence with the Trinity River in Freestone County to Richland-Chambers Dam in Freestone County**	
0835_01 Entire segment	Station ID(s) 11064
SegID 0836 Richland-Chambers Reservoir **From Richland-Chambers Dam in Freestone County to a point immediately upstream of the confluence of Pin Oak Creek on the Richland Creek Arm in Navarro County and to a point 4.0 kilometers (2.5 miles) downstream of Tupelo Branch on the Chambers Creek Arm in Navarro County, up to the normal pool elevation of 315 feet (impounds Richland and Chambers Creeks)**	
0836_01 Lowermost portion of reservoir, adjacent to dam	Station ID(s) 11065; 15168
0836_02 Confluence of Richland and Chambers Creek arms	Station ID(s) 15169
0836_03 Lower portion of Chambers Creek arm	Station ID(s) 15170
0836_04 Upper portion of Chambers Creek arm	Station ID(s) 15199
0836_05 Lower portion of Richland Creek arm	Station ID(s) 11068
0836_06 Upper portion of Richland Creek arm	Station ID(s) 15172; 18727
0836_07 Remainder of reservoir	Station ID(s)
0836_08 Post Oak Creek arm off of Chambers Creek Arm of Richland Chambers Reservoir	Station ID(s) 18723
SegID 0836A Pin Oak Creek (unclassified water body) **Perennial stream from the confluence with the North Fork of Pin Oak Creek in Limestone County upstream to the confluence with Pin Oak Creek and an unnamed tributary approximately 8.0 km upstream of SH 171**	
0836A_01 Entire segment	Station ID(s)
SegID 0836B Cedar Creek (unclassified water body) **From the confluence with Richland Chambers Reservoir to the upper end of the creek (NHD RC 12030109012807)**	
0836B_01 Entire segment	Station ID(s) 18716; 18718; 18719
SegID 0836C Grape Creek (unclassified water body) **From the confluence with Richland Chambers Reservoir to the upper end of the creek (NHD RC 12030108000107) southwest of Corsicana, Navarro County, TX**	
0836C_01 Entire segment	Station ID(s) 18721
SegID 0836D Post Oak Creek (unclassified water body) **From the confluence with Richland Chambers Reservoir to the upper end of the creek (NHD RC 12030109012706)**	
0836D_01 Entire segment	Station ID(s) 18722
SegID 0837 Richland Creek Above Richland-Chambers Reservoir **From the confluence of Pin Oak Creek in Navarro County to Navarro Mills Dam in Navarro County**	
0837_01 Entire segment	Station ID(s) 18344

SegID 0838 Joe Pool Lake **From Joe Pool Dam in Dallas County up to the normal pool elevation of 522 feet (impounds Mountain Creek)**	
0838_01 Lowermost portion of reservoir adjacent to the dam	Station ID(s) 11073; 13890; 13891; 13893; 13894
0838_02 Mountain Creek arm	Station ID(s) 11071; 13896; 17684
0838_03 Walnut Creek arm	Station ID(s) 11072; 13892
SegID 0838A Mountain Creek (unclassified water body) **Ten mile stretch of Mountain Creek running upstream from US 287 in Ellis County, to confluence with Fish Spring Branch in Johnson County**	
0838A_01 Entire segment	Station ID(s) 13622
SegID 0838B Sugar Creek (unclassified water body) **A 1.6 mile stretch of Sugar Creek running upstream from Tarrant/Dallas County line, to just upstream of Britton Road in Mansfield, Tarrant County**	
0838B_01 Entire segment	Station ID(s) 17680
SegID 0838C Walnut Creek (unclassified water body) **A 7 mile stretch of Walnut Creek running upstream from Holland Road, to confluence with Willow Branch, NW Mansfield, Tarrant County**	
0838C_01 Entire segment	Station ID(s) 13621
SegID 0839 Elm Fork Trinity River Below Ray Roberts Lake **From a point 100 meters (110 yards) upstream of US 380 in Denton County to Ray Roberts Dam in Denton County**	
0839_01 Entire segment	Station ID(s) 13619
SegID 0839A Clear Creek (unclassified water body) **A 25 mile stretch of Clear Creek running upstream from confluence with Elm Fork Trinity, to FM 455 just west of Bolivar, Denton County**	
0839A_01 Entire segment	Station ID(s) 10859; 13618
SegID 0840 Ray Roberts Lake **From Ray Roberts Dam in Denton County to a point 9.5 km (5.9 miles) upstream of the confluence of Pecan Creek in Cooke County, up to the normal pool elevation of 632.5 feet (impounds Elm Fork Trinity River)**	
0840_01 Lowermost portion of reservoir adjacent to dam	Station ID(s) 14039; 17834
0840_02 Lower portion of Jordan Creek arm west of Pilot Point	Station ID(s) 11076
0840_03 Upper portion of Jordan Creek arm	Station ID(s) 16823
0840_04 Buck Creek cove	Station ID(s) 16822
0840_05 Lower portion of Elm Fork arm	Station ID(s)
0840_06 Middle portion of Elm Fork arm	Station ID(s)
0840_07 Upper portion of Elm Fork arm	Station ID(s) 16824
0840_08 Remainder of reservoir	Station ID(s)
SegID 0840A Unnamed tributary of Jordan Creek (unclassified water body) **From the confluence with Jordan Creek south of CR 226 to the headwaters near South Neathery Street in Collinsville in Grayson County**	
0840A_01 Entire segment	Station ID(s)
SegID 0841 Lower West Fork Trinity River **From a point immediately upstream of the confluence of the Elm Fork Trinity River in Dallas County to a point immediately upstream of the confluence of Village Creek in Tarrant County**	
0841_01 From confluence of the Elm Fork Trinity River to the Tarrant/Dallas county line	Station ID(s) 11079; 11080; 11081; 11082; 11089; 17669
0841_02 From the Tarrant/Dallas county line upstream to the confluence of Village Creek	Station ID(s) 11083; 11084; 11086; 11087; 11088; 17160

SegID 0841A Mountain Creek Lake (unclassified water body) **From Mountain Creek Lake Dam to the reservoir headwater at the confluence of Mountain and Fish Creeks, in Dallas County (impounds Mountain Creek)**	
0841A_01 Entire reservoir	Station ID(s)
SegID 0841B Bear Creek (unclassified water body) **A 12 mile stretch of Bear Creek running upstream from confluence with West Fork Trinity River, to the confluence with Little Bear Creek just upstream of HWY 183 in Euless, Tarrant County, TX**	
0841B_01 Entire segment	Station ID(s) 10864; 10865; 10866; 10867; 10868; 10869; 17663; 18313; 18315
SegID 0841C Arbor Creek (unclassified water body)	
0841C_01 Entire segment	Station ID(s) 17666
SegID 0841D Big Bear Creek (unclassified water body) **An 8 mile stretch of Big Bear Creek running upstream from confluence with Little Bear Creek to SH 26, Tarrant County**	
0841D_01 Entire segment	Station ID(s) 17089
SegID 0841E Copart Branch Mountain Creek (unclassified water body) **A 2.8 mile stretch of Copart Branch running upstream from confluence with Mountain Creek to approximately 0.3 miles upstream of Camden Road on Dallas Naval Academy, Dallas County**	
0841E_01 Entire segment	Station ID(s) 17672
SegID 0841F Cottonwood Creek (unclassified water body) **A 6.5 mile stretch of Cottonwood Creek running upstream from approximately 0.1 miles upstream of Mountain Creek Reservoir in Dallas County, to SH 360 in Tarrant County**	
0841F_01 Entire segment	Station ID(s) 10723; 17674; 17676
SegID 0841G Dalworth Creek (unclassified water body) **A 2.2 mile stretch of Dalworth Creek running upstream from confluence with Lower West Fork Trinity to County Line Road in Grand Prairie, Dallas County**	
0841G_01 Entire segment	Station ID(s) 17671
SegID 0841H Delaware Creek (unclassified water body) **An 8.5 mile stretch of Delaware Creek running upstream from confluence with Lower West Fork Trinity to Finley Road in Irving**	
0841H_01 Entire segment	Station ID(s) 10871; 17175; 17176; 17177; 17178; 18314
SegID 0841I Dry Branch Creek (unclassified water body) **An 1.5 mile stretch of Dry Branch Creek running upstream from confluence with Lower West Fork Trinity to Rock Island Road in Irving, Dallas County**	
0841I_01 Entire segment	Station ID(s) 17173
SegID 0841J Estelle Creek (unclassified water body) **A 4 mile stretch of Estelle Creek running upstream from confluence with Bear Creek to Valley View Lane in Irving, Dallas County**	
0841J_01 Entire segment	Station ID(s) 17174
SegID 0841K Fish Creek (unclassified water body) **A 15 mile stretch of Fish Creek running upstream from the confluence with Mountain Creek Reservoir in Grand Prairie, Dallas County, to the upper end of the creek (NHD RC 12030102000107) in Arlington, Tarrant County**	
0841K_01 Entire segment	Station ID(s) 10724; 10725; 17677; 17679; 20342

SegID 0841L Johnson Creek (unclassified water body) **Four mile stretch of Johnson Creek running upstream from confluence with the Arbor Creek to just upstream of I30 in Grand Prairie, Tarrant County**	
0841L_01 Entire segment	Station ID(s) 10719; 10721; 17664; 17665; 18311
SegID 0841M Kee Branch (unclassified water body) **Six mile stretch of Kee Branch running upstream from confluence with Rush Creek to upper end of the creek (NHD RC 12030102000165)**	
0841M_01 Three mile stretch of Kee Branch running upstream from confluence with Rush Creek to approximately 300 meters upstream of Polly-Webb Road in Arlington, Tarrant County	Station ID(s) 10792; 15103; 16896
SegID 0841N Kirby Creek (unclassified water body) **Four mile stretch of Kirby Creek running upstream from confluence with Fish Creek in Grand Prairie, Dallas County, to just upstream of Great Southwest Parkway in Arlington, Tarrant County**	
0841N_01 Entire segment	Station ID(s) 17675
SegID 0841O Mountain Creek (unclassified water body) **Four mile stretch of Mountain Creek running upstream from confluence with West Fork Trinity, to approximately 0.3 mile downstream of Mountain Creek Lake in Grand Prairie, Dallas County**	
0841O_01 Entire segment	Station ID(s) 10815; 13672; 17681; 17682
SegID 0841P North Fork Cottonwood Creek (unclassified water body) **A 4.4 mile stretch of North Fork Cottonwood Creek running upstream from confluence with the S. Fork Cottonwood Creek in Grand Prairie, Dallas County, to approximately 0.3 miles upstream of Carter Street in Arlington, Tarrant County**	
0841P_01 Entire segment	Station ID(s) 10722; 17673
SegID 0841Q North Fork Fish Creek (unclassified water body) **A 5 mile stretch of North Fork Fish Creek running upstream from confluence with Fish Creek in Dallas County, to SH 360 in, Tarrant County**	
0841Q_01 Entire segment	Station ID(s) 17678
SegID 0841R Rush Creek (unclassified water body) **A 5 mile stretch of Rush Creek running upstream from confluence with Village Creek to confluence with Kee Branch in Arlington, Tarrant County**	
0841R_01 Entire segment	Station ID(s) 10788; 10790; 10791; 17190; 17191
SegID 0841S Vilbig Lakes (unclassified water body) **A 5 acre area in NW corner of Vilbig Lakes, near confluence with unnamed creek, approximately 100 meters south of intersection of Rusdell Road/Marvel Drive in Irving, Dallas County**	
0841S_01 A 5 acre area in NW corner of Vilbig Lakes, near confluence with unnamed creek, approximately 100 meters south of intersection of Rusdell Road/Marvel Drive in Irving, Dallas County	Station ID(s) 15624
SegID 0841T Village Creek (unclassified water body) **A 7 mile stretch of Village Creek running upstream from confluence with West Fork Trinity River to SH 303 approximately 0.75 mi. downstream of Lake Arlington**	
0841T_01 A 7 mile stretch of Village Creek running upstream from confluence with West Fork Trinity River to SH 303 approximately 0.75 miles downstream of Lake Arlington	Station ID(s) 10778; 17189
SegID 0841U West Irving Creek (unclassified water body) **A 4 mile stretch of West Irving Branch running upstream from approximately 0.4 miles downstream of Oakdale Road to just south of Sowers Road in Irving, Dallas County**	
0841U_01 A 4 mile stretch of West Irving Branch running upstream from approximately 0.4 miles	Station ID(s) 17179

SegID 0841V Crockett Branch (unclassified water body) **A 1 mile (1.5 KM) stretch of Crockett Branch extending upstream from the confluence with Cottonwood Creek to the upper end of the creek (NHD RC**	
0841V_01 Entire segment	Station ID(s) 17683

RESULTS OF 5-YEAR ANALYSIS-AQUATIC LIFE USE

Segment			AU	Sites in Assessment Unit	5-Year Analysis	Parameter		Result
Cedar Creek	0818	Cedar Creek Reservoir	1	13845; 16745; 16748	13845	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
					13845	00300	DO instantaneous (mg/L)	NA Limited Data
			6	15812; 16741; 16747; 16750; 17090; 18472; 18473	16747	00300	DO vs 24 hr criteria (mg/L)	Concern
Clear Fork	0830	Benbrook Lake	1	13830; 15151; 15161	13830	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
					13830	00300	DO instantaneous (mg/L)	Concern Limited Data
					15151	00300	DO vs 24 hr criteria (mg/L)	Concern
			2	13831; 15156	13831	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
East Fork	0821	Lake Lavon	1	15684; 15685	10777	00300	DO vs 24 hr criteria (mg/L)	Concern
			2	15686	13740	00300	DO instantaneous (mg/L)	Concern Limited Data
			3	15687	13740	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
			4	10998; 20194	20194	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
	0820C	Muddy Creek	1	16828; 20110	16828	00300	DO vs 24 hr criteria (mg/L)	Concern
Elm Fork	0840	Ray Roberts Lake	1	14039; 17834	14039	00300	DO instantaneous (mg/L)	NA Limited Data
					14039	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
	0823	Lewisville Lake	1	11025; 13995; 13996	13996	00300	DO instantaneous (mg/L)	NA Limited Data
					13996	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
	0823A	Little Elm Creek	1	13617; 16826	16826	00300	DO vs 24 hr criteria (mg/L)	Concern
	0823B	Stewart Creek	1	10860	10860	01040	Copper, Dissolved (ug/L)	Not Supporting
	0822	Elm Fork Trinity River Below Lewisville Lake	1	16436; 17163; 17164; 18310; 18648; 20287	17162	00300	DO vs 24 hr criteria (mg/L)	Concern
			2	11024; 16438; 17162	18310	00300	DO vs 24 hr criteria (mg/L)	Concern
	0822C	Hackberry Creek	1	17170; 17171; 17172; 17532; 17938	17170	00300	DO vs 24 hr criteria (mg/L)	Concern
	0826	Grapevine Lake	1	13873; 13874; 16113; 17827	13874	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
Main Stem	0806	West Fork Trinity River Below Lake Worth	1	10938; 10939; 10940; 11085; 16120; 17368; 17662; 17863; 18459; 20292; 20336; 20422	20292	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
	0841B	Bear Creek	1	10864; 10865; 10866; 10867; 10868; 10869; 17663; 18313;	10869	00300	DO vs 24 hr criteria (mg/L)	Concern
					10868	01040	Copper, Dissolved (ug/L)	Fully Supporting
	0841C	Arbor Creek	1	17666	17666	00300	DO vs 24 hr criteria (mg/L)	Concern
	0841F	Cottonwood Creek	1	10723; 17674; 17676	10723	00300	DO instantaneous (mg/L)	Concern Limited Data
					10723	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
					17674	00300	DO vs 24 hr criteria (mg/L)	Concern
					17676	00300	DO vs 24 hr criteria (mg/L)	Concern

RESULTS OF 5-YEAR ANALYSIS-AQUATIC LIFE USE

Segment			AU	Sites in Assessment Unit	5-Year Analysis	Parameter		Result
Main Stem	0841G	Dalworth Creek	1	17671	17671	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
					17671	00300	DO instantaneous (mg/L)	Concern Limited Data
	0841H	Delaware Creek	1	10871; 17175; 17176; 17177; 17178; 18314	17175	01040	Copper, Dissolved (ug/L)	Not Supporting
	0841J	Estelle Creek	1	17174	17174	01040	Copper, Dissolved (ug/L)	Concern Limited Data
	0841K	Fish Creek	1	10724; 10725; 17677; 17679; 20342	17677	00300	DO vs 24 hr criteria (mg/L)	Concern
					17679	00300	DO vs 24 hr criteria (mg/L)	Concern
					17679	00300	DO instantaneous (mg/L)	Concern
	0841L	Johnson Creek	1	10719; 10721; 17664; 17665; 18311	10721	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
					17664	00300	DO vs 24 hr criteria (mg/L)	Concern
	0841N	Kirby Creek	1	17675	17675	00300	DO vs 24 hr criteria (mg/L)	Concern
					17675	00300	DO instantaneous (mg/L)	Concern
	0841O	Mountain Creek	1	10815; 13672; 17681; 17682	10815	00300	DO vs 24 hr criteria (mg/L)	Concern
					10815	01049	Lead, Dissolved (ug/L)	Concern Limited Data
					17681	00300	DO vs 24 hr criteria (mg/L)	Concern
	0841P	North Fork Cottonwood Creek	1	10722; 17673	17673	00300	DO vs 24 hr criteria (mg/L)	Concern
	0841Q	North Fork Fish Creek	1	17678	17678	00300	DO vs 24 hr criteria (mg/L)	Concern
	0841V	Crockett Branch	1	17683	17683	00300	DO vs 24 hr criteria (mg/L)	Concern
	0804	Trinity River Above Lake Livingston	1	10918; 13690	13690	01090	Zinc, Dissolved (ug/L)	Fully Supporting
	0804F	Tehuacana Creek	1	10705	10705	01040	Copper, Dissolved (ug/L)	Fully Supporting
	0804G	Catfish Creek	1	10717; 18596; 18597	10717	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
					10717	89855	DO, 24 Hour Minimum (mg/L)	Concern
					10717	89857	DO 24 hr avg (mg/L)	Not Supporting
	0803	Lake Livingston	3	14006	14006	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
			8	14014	14014	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
			9	14011	14011	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
			11	10917	10917	01090	Zinc, Dissolved (ug/L)	Fully Supporting
	0803E	Nelson Creek	1	10700; 10701	10701	01040	Copper, Dissolved (ug/L)	NA Limited Data
	0803F	Bedias Creek	2	10703	10703	01090	Zinc, Dissolved (ug/L)	NA Limited Data
	0813	Houston County Lake	1	10973	10973	00300	DO vs 24 hr criteria (mg/L)	Concern

RESULTS OF 5-YEAR ANALYSIS-AQUATIC LIFE USE

Segment			AU	Sites in Assessment Unit	5-Year Analysis	Parameter		Result
Mountain Creek	0838B	Sugar Creek	1	17680	17680	00300	DO vs 24 hr criteria (mg/L)	Concern
Richland-Chambers	0815	Bardwell Reservoir	1	10979; 16700; 17582; 18437; 18549; 18550	10979	00300	DO vs 24 hr criteria (mg/L)	Concern
					18549	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
	0814	Chambers Creek Above Richland-Chambers Reservoir	1	10975	10975	00300	DO vs 24 hr criteria (mg/L)	Concern
					10975	89855	DO, 24 Hour Minimum (mg/L)	Concern Limited Data
					10975	89857	DO 24 hr avg (mg/L)	Concern Limited Data
	0817	Navarro Mills Lake	1	10981; 17442; 18545; 18546; 18547; 18548; 20633	10981	00300	DO vs 24 hr criteria (mg/L)	Concern
	0836	Richland-Chambers Reservoir	1	11065; 15168	15168	00300	DO vs 24 hr criteria (mg/L)	Concern
Trinity Below Livingston	0801D	Lynchburg Canal	1	16148	16148	01090	Zinc, Dissolved (ug/L)	Concern Limited Data
Village Creek	0828	Lake Arlington	4	13901	13901	00300	DO vs 24 hr criteria (mg/L)	NA Limited Data
West Fork	0810	West Fork Trinity River Below Bridgeport Reservoir	1	10967; 10968; 10969; 14246; 17844	10967	00300	DO vs 24 hr criteria (mg/L)	Concern
	0810D	Salt Creek	1	16766	16766	00300	DO instantaneous (mg/L)	Fully Supporting
					16766	00300	DO vs 24 hr criteria (mg/L)	Concern

RESULTS OF 5-YEAR ANALYSIS-CONTACT RECREATION USE

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Clear Fork	0831	Clear Fork Trinity River Below Lake Weatherford	1	13691; 17444; 17447	11060	31699	E. coli (cfu/100mL)	Fully Supporting
			3	17445	17444	31699	E. coli (cfu/100mL)	Not Supporting Single
			4	11060	17445	31699	E. coli (cfu/100mL)	Fully Supporting
	0829	Clear Fork Trinity River Below Benbrook Lake	2	11044; 11045; 18456	11045	31699	E. coli (cfu/100mL)	Not Supporting Single
					18456	31699	E. coli (cfu/100mL)	Not Supporting Geomean
East Fork	0821C	Wilson Creek	1	10777; 15041	10777	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0821D	East Fork Trinity River Above Lake Lavon	1	13740	13740	31699	E. coli (cfu/100mL)	Concern Limited Data Geomean
	0820B	Rowlett Creek	1	10753; 17845	10753	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0820C	Muddy Creek	1	16828; 20110	20110	31699	E. coli (cfu/100mL)	NA Limited Data
	0819	East Fork Trinity River	1	10987; 10990; 10991; 10992; 10996; 13612	10990	31699	E. coli (cfu/100mL)	Not Supporting Geomean
					10991	31699	E. coli (cfu/100mL)	Not Supporting Single
					10996	31699	E. coli (cfu/100mL)	Not Supporting Geomean
Elm Fork	0824	Elm Fork Trinity River Above Ray Roberts Lake	1	11029; 11031	11031	31699	E. coli (cfu/100mL)	Fully Supporting
			3	15635; 17670	15635	31699	E. coli (cfu/100mL)	Not Supporting Single
	0839	Elm Fork Trinity River Below Ray Roberts Lake	1	13619	10859	31699	E. coli (cfu/100mL)	NA Limited Data
	0823B	Stewart Creek	1	10860	10860	31699	E. coli (cfu/100mL)	Not Supporting Single
	0822	Elm Fork Trinity River Below Lewisville Lake	1	16436; 17163; 17164; 18310; 18648; 20287	17163	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17163	31699	E. coli (cfu/100mL)	Fully Supporting
					18310	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					18310	31699	E. coli (cfu/100mL)	Fully Supporting
					18648	31699	E. coli (cfu/100mL)	Not Supporting Single
					20287	31699	E. coli (cfu/100mL)	Not Supporting Single
			2	11024; 16438; 17162	17162	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17162	31699	E. coli (cfu/100mL)	Fully Supporting
	0822A	Cottonwood Branch	1	17167; 17168; 18359	17168	31616	Fecal Coliform (cfu/100mL)	Fully Supporting
					18359	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single

RESULTS OF 5-YEAR ANALYSIS-CONTACT RECREATION USE

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Elm Fork	0822A	Cottonwood Branch	2	17165; 17166	17165	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
					17165	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					17166	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
					17166	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0822B	Grapevine Creek	1	17169; 17531; 17939	17531	31699	E. coli (cfu/100mL)	NA Limited Data
					17939	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
					17939	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0822C	Hackberry Creek	1	17170; 17171; 17172; 17532; 17938	17170	31616	Fecal Coliform (cfu/100mL)	Fully Supporting
					17170	31699	E. coli (cfu/100mL)	Fully Supporting
					17172	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17172	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					17532	31699	E. coli (cfu/100mL)	Fully Supporting
					17938	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17938	31699	E. coli (cfu/100mL)	Not Supporting Geomean
Main Stem	0806	West Fork Trinity River Below Lake Worth	1	10938; 10939; 10940; 11085; 16120; 17368; 17662; 17863; 18459; 20292; 20336; 20422	10938	31699	E. coli (cfu/100mL)	Not Supporting Single
					16120	31699	E. coli (cfu/100mL)	Not Supporting Single
					17368	31699	E. coli (cfu/100mL)	Not Supporting Single
					17863	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					20292	31699	E. coli (cfu/100mL)	Concern Limited Data Geomean
	0806C	Big Fossil Creek	1	10814; 17133	17133	31699	E. coli (cfu/100mL)	Fully Supporting
	0806D	Marine Creek	1	17370	17370	31699	E. coli (cfu/100mL)	Concern Single
	0806E	Sycamore Creek	1	17131; 17369	17369	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0841	Lower West Fork Trinity River	1	11079; 11080; 11081; 11082; 11089; 17669	11080	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single

RESULTS OF 5-YEAR ANALYSIS-CONTACT RECREATION USE

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Main Stem	0841	Lower West Fork Trinity River	1	11079; 11080; 11081; 11082; 11089; 17669	11080	31699	E. coli (cfu/100mL)	Not Supporting Geomean
					11081	31699	E. coli (cfu/100mL)	Not Supporting Single
					17669	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
					17669	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0841B	Bear Creek	1	10864; 10865; 10866; 10867; 10868; 10869; 17663; 18313; 18315	10869	31699	E. coli (cfu/100mL)	Fully Supporting
					10865	31699	E. coli (cfu/100mL)	Not Supporting Single
					10866	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					10866	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					10867	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					10867	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					10868	31699	E. coli (cfu/100mL)	Fully Supporting
					18313	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					18313	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					18315	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					18315	31699	E. coli (cfu/100mL)	Not Supporting Single
					17663	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17663	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0841C	Arbor Creek	1	17666	17666	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17666	31699	E. coli (cfu/100mL)	Not Supporting Single
	0841D	Big Bear Creek	1	17089	17089	31699	E. coli (cfu/100mL)	Fully Supporting
	0841E	Copart Branch Mountain Creek	1	17672	17672	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17672	31699	E. coli (cfu/100mL)	Not Supporting Single
	0841F	Cottonwood Creek	1	10723; 17674; 17676	10723	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single

RESULTS OF 5-YEAR ANALYSIS-CONTACT RECREATION USE

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Main Stem	0841F	Cottonwood Creek	1	10723; 17674; 17676	17674	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
					17674	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					17676	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17676	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0841G	Dalworth Creek	1	17671	17671	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
					17671	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0841H	Delaware Creek	1	10871; 17175; 17176; 17177; 17178; 18314	17175	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
					17175	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					17176	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
					17176	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					17177	31616	Fecal Coliform (cfu/100mL)	Fully Supporting
					17177	31699	E. coli (cfu/100mL)	Not Supporting Single
					17178	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17178	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					18314	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					18314	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0841I	Dry Branch Creek	1	17173	17173	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17173	31699	E. coli (cfu/100mL)	Not Supporting Geomean
	0841J	Estelle Creek	1	17174	17174	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
					17174	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single

RESULTS OF 5-YEAR ANALYSIS-CONTACT RECREATION USE

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Main Stem	0841K	Fish Creek	1	10724; 10725; 17677; 17679; 20342	10724	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					10725	31699	E. coli (cfu/100mL)	Not Supporting Geomean
					17677	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
					17677	31699	E. coli (cfu/100mL)	Not Supporting Geomean
					17679	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17679	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					20342	31699	E. coli (cfu/100mL)	Concern Limited Data Geomean & Single
	0841L	Johnson Creek	1	10719; 10721; 17664; 17665; 18311	10719	31699	E. coli (cfu/100mL)	Not Supporting Geomean
					10721	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					17664	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17664	31699	E. coli (cfu/100mL)	Not Supporting Geomean
					18311	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					18311	31699	E. coli (cfu/100mL)	Not Supporting Single
	0841M	Kee Branch	1	10792; 15103; 16896	10792	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					15103	31699	E. coli (cfu/100mL)	Concern Limited Data Geomean
					16896	31699	E. coli (cfu/100mL)	Concern Limited Data Geomean
	0841N	Kirby Creek	1	17675	17675	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
					17675	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0841O	Mountain Creek	1	10815; 13672; 17681; 17682	10815	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					10815	31699	E. coli (cfu/100mL)	Not Supporting Single
					17681	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17681	31699	E. coli (cfu/100mL)	Fully Supporting

RESULTS OF 5-YEAR ANALYSIS-CONTACT RECREATION USE

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Main Stem	0841O	Mountain Creek	1	10815; 13672; 17681; 17682	17682	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17682	31699	E. coli (cfu/100mL)	Not Supporting Single
	0841P	North Fork Cottonwood Creek	1	10722; 17673	10722	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					17673	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17673	31699	E. coli (cfu/100mL)	Not Supporting Single
	0841Q	North Fork Fish Creek	1	17678	17678	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
					17678	31699	E. coli (cfu/100mL)	Not Supporting Single
	0841R	Rush Creek	1	10788; 10790; 10791; 17190; 17191	10791	31699	E. coli (cfu/100mL)	Not Supporting Single
					17190	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					17191	31699	E. coli (cfu/100mL)	Not Supporting Geomean
	0841S	Vilbig Lakes	1	15624	15624	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
					15624	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0841T	Village Creek	1	10778; 17189	17189	31699	E. coli (cfu/100mL)	Not Supporting Geomean
	0841U	West Irving Creek	1	17179	17179	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
					17179	31699	E. coli (cfu/100mL)	Not Supporting Geomean
	0841V	Crockett Branch	1	17683	17683	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
					17683	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0805	Upper Trinity River	2	10925; 10926; 10927; 10928; 16121	10925	31699	E. coli (cfu/100mL)	Not Supporting Single
			3	10934; 10935; 13614; 17161; 20444; 20567	10934	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
			4	10936; 10937; 16088	10937	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
			6	10929; 10930; 10931; 10932; 20566	10930	31699	E. coli (cfu/100mL)	Fully Supporting
	0805B	Parsons Slough	1	10839	10839	31699	E. coli (cfu/100mL)	Fully Supporting

RESULTS OF 5-YEAR ANALYSIS-CONTACT RECREATION USE

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Main Stem	0804	Trinity River Above Lake Livingston	1	10918; 13690	13690	31699	E. coli (cfu/100mL)	Not Supporting Single
			4	10919	10919	31699	E. coli (cfu/100mL)	Not Supporting Single
			7	10920; 10921; 10922	10922	31699	E. coli (cfu/100mL)	Not Supporting Single
	0804G	Catfish Creek	1	10717; 18596; 18597	10717	31699	E. coli (cfu/100mL)	Concern Limited Data Geomean & Single
					18596	31699	E. coli (cfu/100mL)	NA Limited Data
					18597	31699	E. coli (cfu/100mL)	NA Limited Data
	0803	Lake Livingston	6	10911; 14010	10911	31699	E. coli (cfu/100mL)	Not Supporting Single
			7	10913; 14013	10913	31699	E. coli (cfu/100mL)	Not Supporting Single
			10	10914	10914	31699	E. coli (cfu/100mL)	Not Supporting Single
			11	10917	10917	31699	E. coli (cfu/100mL)	Not Supporting Single
	0803A	Harmon Creek	1	10698	10698	31699	E. coli (cfu/100mL)	NA Limited Data
	0803B	White Rock Creek	1	10696	10696	31699	E. coli (cfu/100mL)	NA Limited Data
	0803E	Nelson Creek	1	10700; 10701	10700	31699	E. coli (cfu/100mL)	Concern Limited Data Geomean
	0803F	Bedias Creek	1	10702	10702	31699	E. coli (cfu/100mL)	NA Limited Data
			2	10703	10703	31699	E. coli (cfu/100mL)	NA Limited Data
	0827A	White Rock Creek	1	15280; 18517; 20289	18517	31699	E. coli (cfu/100mL)	NA Limited Data
					20289	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
Mountain Creek	0838	Joe Pool Lake	1	11073; 13890; 13891; 13893; 13894	17684	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
			2	11071; 13896; 17684	17684	31699	E. coli (cfu/100mL)	Not Supporting Single
			3	11072; 13892	17680	31616	Fecal Coliform (cfu/100mL)	Not Supporting Single
	0838A	Mountain Creek	1	13622	17680	31699	E. coli (cfu/100mL)	Not Supporting Single
	0838B	Sugar Creek	1	17680	13621	31616	Fecal Coliform (cfu/100mL)	Not Supporting Geomean & Single
	0838C	Walunt Creek	1	13621	13621	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single

RESULTS OF 5-YEAR ANALYSIS-CONTACT RECREATION USE

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Richland-Chambers	0814	Chambers Creek Above Richland-Chambers Reservoir	1	10975	10975	31699	E. coli (cfu/100mL)	Fully Supporting
Trinity Below Livingston	0802	Trinity River Below Lake Livingston	1	10894	10894	31699	E. coli (cfu/100mL)	NA Limited Data
			3	10896	10896	31699	E. coli (cfu/100mL)	NA Limited Data
			4	10897	10897	31699	E. coli (cfu/100mL)	Fully Supporting
	0802B	Long King Creek	2	10689	10689	31699	E. coli (cfu/100mL)	NA Limited Data
	0802D	Menard Creek	1	10688	10688	31699	E. coli (cfu/100mL)	Concern Limited Data Geomean
Village Creek	0828	Lake Arlington	7	13897	13897	31699	E. coli (cfu/100mL)	Fully Supporting
	0828A	Village Creek	1	10780; 10786	10780	31699	E. coli (cfu/100mL)	Not Supporting Geomean
West Fork	0812	West Fork Trinity River Above Bridgeport Reservoir	1	10972; 18058; 18059	10972	31699	E. coli (cfu/100mL)	NA Limited Data
	0810	West Fork Trinity River Below Bridgeport Reservoir	1	10967; 10968; 10969; 14246; 17844	10967	31699	E. coli (cfu/100mL)	Not Supporting Geomean
					10968	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					10969	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					14246	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
					17844	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
			2	14904	14904	31699	E. coli (cfu/100mL)	Not Supporting Single
	0810A	Big Sandy Creek	1	15688	15688	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0810B	Garrett Creek	1	16767	16767	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0810C	Martin Branch	1	17848	17848	31699	E. coli (cfu/100mL)	Not Supporting Geomean & Single
	0810D	Salt Creek	1	16766	16766	31699	E. coli (cfu/100mL)	Not Supporting Single

RESULTS OF 5-YEAR ANALYSIS-GENERAL USE

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Cedar Creek	0818	Cedar Creek Reservoir	1	13845; 16745; 16748	16748	00400	pH (SU)	Concern
			4	13848; 16749	16749	00400	pH (SU)	Not Supporting
			6	15812; 16741; 16747; 16750; 17090; 18472; 18473	16747	00400	pH (SU)	Not Supporting
					16750	00400	pH (SU)	Concern
			9	13854; 16753; 18471	16753	00400	pH (SU)	Not Supporting
			11	16772	16772	00400	pH (SU)	Not Supporting
East Fork	0819B	Buffalo Creek	1	10824; 18576		00940	Cloride (mg/L)	Not Supporting
						00945	Sulfate (mg/L)	Not Supporting
						70300	TDS (mg/L)	Not Supporting
					10824	00400	pH (SU)	Concern Limited Data
Elm Fork	0823B	Stewart Creek	1	10860		00940	Cloride (mg/L)	Not Supporting
						00945	Sulfate (mg/L)	Not Supporting
						70300	TDS (mg/L)	Not Supporting
Main Stem	0841H	Delaware Creek	1	10871; 17175; 17176; 17177; 17178; 18314	17175	00400	pH (SU)	Concern
					17177	00400	pH (SU)	Concern
	0841K	Fish Creek	1	10724; 10725; 17677; 17679; 20342		00945	Sulfate (mg/L)	Not Supporting
					10724	00400	pH (SU)	No Concern
	0841L	Johnson Creek	1	10719; 10721; 17664; 17665; 18311	17665	00400	pH (SU)	NA Limited Data
	0804G	Catfish Creek	1	10717; 18596; 18597	10717	00400	pH (SU)	Concern Limited Data
	0803	Lake Livingston	1	10899; 14003; 14004	10899	00400	pH (SU)	Concern
					14003	00400	pH (SU)	NA Limited Data
					14004	00400	pH (SU)	NA Limited Data
			7	10913; 14013	10913	00400	pH (SU)	Concern
				Entire reservoir		00945	Sulfate (mg/L)	Not Supporting
Trinity Below Livingston	0802B	Long King Creek	2	10689	10689	00400	pH (SU)	NA Limited Data
	0802D	Menard Creek	1	10688	10688	00400	pH (SU)	Concern Limited Data
	0801D	Lynchburg Canal	1	16148	16148	00400	pH (SU)	Concern Limited Data

RESULTS OF 5-YEAR ANALYSIS-WATER QUALITY CONCERNS

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Cedar Creek	0818	Cedar Creek Reservoir	4	13848; 16749	16748	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
					16749	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			6	15812; 16741; 16747; 16750; 17090; 18472; 18473	16747	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
					16750	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			9	13854; 16753; 18471	16753	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			11	16772	16772	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	NA Limited Data
					16772	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	NA Limited Data
Clear Fork	0831	Clear Fork Trinity River Below Lake Weatherford	1	13691; 17444; 17447	17444	00610	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	NA Limited Data
					17444	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	NA Limited Data
					17444	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	NA Limited Data
	0830	Benbrook Lake	1	13830; 15151; 15161	13830	00610	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	NA Limited Data
					15151	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
					15161	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	NA Limited Data
			2	13831; 15156	13831	00610	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	NA Limited Data
					15156	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			3	15158	15158	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			5	13832	13832	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern

RESULTS OF 5-YEAR ANALYSIS-WATER QUALITY CONCERNS

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
East Fork	0819	East Fork Trinity River	1	10987; 10990; 10991; 10992; 10996; 13612	10990	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10990	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
					10990	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
					10991	00610	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	Concern
					10991	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10991	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
					10996	00610	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	Concern
					10996	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10996	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
	0819A	Duck Creek	1	18558	18558	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	NA Limited Data
					18558	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	NA Limited Data
	0819B	Buffalo Creek	1	10824; 18576	10824	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10824	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
					18576	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	NA Limited Data
					18576	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	NA Limited Data

RESULTS OF 5-YEAR ANALYSIS-WATER QUALITY CONCERNS

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Elm Fork	0824	Elm Fork Trinity River Above Ray Roberts Lake	3	15635; 17670	15635	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	NA Limited Data
	0823B	Stewart Creek	1	10860	10860	00610	NITROGEN, AMMONIA, TOTAL (MG/L AS N)	No Concern
					10860	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10860	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLD FILT<15MIN	Concern
					10860	01003	Arsenic (mg/kg)	NA Limited Data
					10860	01028	Cadmium (mg/kg)	NA Limited Data
					10860	01029	Chromium (mg/kg)	NA Limited Data
					10860	01043	Copper (mg/kg)	NA Limited Data
					10860	01052	Lead (mg/kg)	NA Limited Data
					10860	01068	Nickel (mg/kg)	NA Limited Data
					10860	01093	Zinc (mg/kg)	NA Limited Data
	0822	Elm Fork Trinity River Below Lewisville Lake	1	16436; 17163; 17164; 18310; 18648; 20287	17163	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	NA Limited Data
					18310	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
					18648	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
					20287	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	No Concern
			2	11024; 16438; 17162	17162	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	No Concern
	0822A	Cottonwood Branch	1	17167; 17168; 18359	17168	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
					18359	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	NA Limited Data
	0822C	Hackberry Creek	1	17170; 17171; 17172; 17532; 17938	17170	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern

RESULTS OF 5-YEAR ANALYSIS-WATER QUALITY CONCERNS

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Main Stem	0806	West Fork Trinity River Below Lake Worth	1	10938; 10939; 10940; 11085; 16120; 17368; 17662; 17863; 18459; 20292; 20336; 20422	17863	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
					20292	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	NA Limited Data
	0841	Lower West Fork Trinity River	1	11079; 11080; 11081; 11082; 11089; 17669	11080	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					11080	00671	ORTHOPHOSPHATE PHOSPHORUS,DISS,MG/L,FLD FILT<15MIN	Concern
					11080	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
					11081	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					11081	00671	ORTHOPHOSPHATE PHOSPHORUS,DISS,MG/L,FLD FILT<15MIN	Concern
					11081	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
					17669	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					17669	00671	ORTHOPHOSPHATE PHOSPHORUS,DISS,MG/L,FLD FILT<15MIN	Concern
					17669	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
	0841B	Bear Creek	1	10864; 10865; 10866; 10867; 10868; 10869; 17663; 18313; 18315	10868	01078	Silver (mg/kg)	NA Limited Data
	0841H	Delaware Creek	1	10871; 17175; 17176; 17177; 17178; 18314	17177	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
					18314	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
	0841K	Fish Creek	1	10724; 10725; 17677; 17679; 20342	17679	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
	0841O	Mountain Creek	1	10815; 13672; 17681; 17682	17682	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
	0841R	Rush Creek	1	10788; 10790; 10791; 17190; 17191	17191	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern

RESULTS OF 5-YEAR ANALYSIS-WATER QUALITY CONCERNS

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Main Stem	0841U	West Irving Creek	1	17179	17179	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	No Concern
	0805	Upper Trinity River	2	10925; 10926; 10927; 10928; 16121	10925	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10925	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
					10925	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			3	10934; 10935; 13614; 17161; 20444; 20567	10934	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10934	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
					10934	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			4	10936; 10937; 16088	10937	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10937	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
					10937	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
	0804	Trinity River Above Lake Livingston	1	10918; 13690	13690	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					13690	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
					13690	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			4	10919	10919	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10919	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
					10919	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern

RESULTS OF 5-YEAR ANALYSIS-WATER QUALITY CONCERNS

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
	0804	Trinity River Above Lake Livingston	7	10920; 10921; 10922	10922	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10922	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
					10922	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
	0804G	Catfish Creek	1	10717; 18596; 18597	18596	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	NA Limited Data
	0803	Lake Livingston	1	10899; 14003; 14004	10899	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
					14003	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	NA Limited Data
			4	14007; 14008	14008	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	NA Limited Data
			5	10909; 14009	10909	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
					14009	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	NA Limited Data
			6	10911; 14010	10911	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10911	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
					10911	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			7	10913; 14013	10913	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10913	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
					10913	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern

RESULTS OF 5-YEAR ANALYSIS-WATER QUALITY CONCERNS

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Main Stem	0803	Lake Livingston	10	10914	10914	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10914	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
					10914	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	No Concern
			11	10917	10917	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10917	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
	0803A	Harmon Creek	1	10698	10698	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	NA Limited Data
					10698	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	NA Limited Data
	0803B	White Rock Creek	1	10696	10696	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	NA Limited Data
	0803F	Bedias Creek	1	10702	10702	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	NA Limited Data
			2	10703	10703	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	NA Limited Data
Mountain Creek	0838	Joe Pool Lake	2	11071; 13896; 17684	17684	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
	0838B	Sugar Creek	1	17680	17680	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
Richland-Chambers	0815	Bardwell Reservoir	1	10979; 16700; 17582; 18437; 18549; 18550	10979	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
	0814	Chambers Creek Above Richland-Chambers Reservoir	1	10975	10975	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					10975	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLDFILT<15MIN	Concern
			2	10977; 20000	10977	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	No Concern

RESULTS OF 5-YEAR ANALYSIS-WATER QUALITY CONCERNS

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
Richland-Chambers	0817	Navarro Mills Lake	1	10981; 17442; 18545; 18546; 18547; 18548; 20633	10981	00671	ORTHPHOSPHATE PHOSPHORUS,DISS,MG/L,FLD FILT<15MIN	Concern
	0836	Richland-Chambers Reservoir	4	15199	15199	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
					15199	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			6	15172; 18727	15172	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
Trinity Below Livingston	0802	Trinity River Below Lake Livingston	1	10894	10894	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	NA Limited Data
			3	10896	10896	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			4	10897	10897	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			5	16998	16998	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
Village Creek	0828	Lake Arlington	2	13904	13904	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			5	13899	13899	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	No Concern
					13899	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			6	11042; 13898	11042	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			7	13897	13897	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	Concern
West Fork	0811	Bridgeport Reservoir	5	16736; 16759; 16760; 16765	16736	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	NA Limited Data
					16759	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	No Concern
	0809	Eagle Mountain Reservoir	1	10944	10944	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			3	10949; 10950; 10951	10950	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	NA Limited Data
			5	10952	10952	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern

RESULTS OF 5-YEAR ANALYSIS-WATER QUALITY CONCERNS

Segment			AU	Sites in Assessment Unit	5-Year Analysis Site	Parameter		Result
West Fork	0809	Eagle Mountain Reservoir	6	10954	10954	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	NA Limited Data
			8	10956	10956	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			10	10960	10960	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
			12	10964	10964	00665	PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	No Concern
					10964	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	No Concern
			14	17667	17667	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
	0807	Lake Worth	1	10942; 15163; 15166; 15167	10942	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern
					15166	32211	CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	Concern

RESULTS OF 5-YEAR ANALYSIS-THREATENED WATERBODIES

Segment			AU	Sites in Assessment Unit	5-Year Analysis	Parameter		Result
East Fork	0820B	Rowlett Creek	1	10753; 17845	10753	00630	Nitrate+Nitrite (mg/L)	Threatened
Main Stem	0803	Lake Livingston	11	10917	10917	00620	Nitrate (mg/L)	Threatened
					10917	00630	Nitrate+Nitrite (mg/L)	Threatened
Richland-Chambers	0817	Navarro Mills Lake	1	10981; 17442; 18545; 18546; 18547; 18548; 20633	10981	39630	Atrazine (ug/L)	No Concern
					17442	39630	Atrazine (ug/L)	No Concern