

# SABINE RIVER BASIN HIGHLIGHTS

## THE TEXAS CLEAN RIVERS PROGRAM

January 2001

### **Sabine River Watershed Management Program**

The Sabine River Authority (SRA) is using an integrated approach to address water quality issues. This comprehensive program includes the following components:

Public Participation and Basin Steering Committee;

Data Collection, Management and Analysis;

Targeted Monitoring;

Subwatershed Screening;

Subwatershed Inventory;

Quality Assurance Project Plan (QAPP);

Geographic Information System;

And the World Wide Web Project.

This integrated approach to water quality management provides for the best use of limited resources. This is accomplished through the subwatershed inventory, data analysis, and screening studies, which identify areas of water quality concerns or possible concerns, and focuses additional monitoring on problem areas. The coordination of state, regional, and local entities reduces duplication of effort in addressing water quality issues. Encouraging public participation increases the awareness of the impact of human activities on water quality.

### **PUBLIC PARTICIPATION AND BASIN STEERING COMMITTEE**

The Sabine Basin Steering Committee allows stakeholders to have an active role in addressing water quality issues in the Sabine Basin. The Basin Steering Committee Meetings are held in three locations to encourage participation from all of the stakeholders in the Basin. With an emphasis on stakeholder involvement, the SRA invites water supply corporations, permitted dischargers, council of governments, city, and county officials to become Steering Committee members. Private citizens and environmental organizations are also urged to join the Committee. Interested parties should contact the SRA to be added to the contact list. Membership in the Committee has grown from 65 to 138 members since 1991.

The Comprehensive Sabine Watershed Management Study to address water supply as well as water quality in the Sabine Basin was completed in 1999. This plan was performed in conjunction with the Texas Water Development Board. The plan updated the 1985 *Update of the Master Plan for the Sabine River*. Significant changes have taken place since 1985 that necessitated an update of SRA's overall plan for the Basin. This plan takes an overall look at Basin development including such issues as water need, water supply, the environment, conservation, economic development, and natural resources among others.

The goal of this planning is to implement a program to satisfy the water needs of the Sabine Basin in a timely and cost-effective manner. The combination of this study with the Texas Clean Rivers Program (TCRP) represents a holistic approach to water management.

### **TEXAS WATCH CITIZEN MONITORING**

Texas Watch training has continued in the Upper Sabine Basin with continued support for students at Jarvis Christian College with ten sites in the Hawkins area, Kilgore College with a site near their campus, the City of Longview with several sites in the Longview area, and a Hallsville High School teacher with two sites. Texas Watch data from the Longview watershed will be utilized with other professional data collected by the SRA in a special study of Grace Creek and its major tributaries. SRA and four SRA-supported monitoring groups participated in 2000 Texas Watch/Earth Day "A Day in the Life of Texas Waters" coordinated sampling event. SRA made a Texas Watch presentation for Jarvis Christian College career day for 75 10-11 graders visiting the school. In the lower Sabine Basin, training and support has also continued with the help of area schools. Students at Little Cypress-Mauriceville High School monitor two sites near their school, one of which is also monitored by SRA as a part of a special study. Also, a Texas Watch Volunteer Monitor is actively monitoring one site on the South Prong of Big Sandy Creek in Reach 4. Students in the Orange area also learn about monitoring from the West Orange Cove School District Nature Classroom on Adams Bayou. SRA sent two representatives to the 2000 EPA/Texas Watch Meeting of the Monitors in Austin on 4/26/00-4/28/00.

Groups or individuals interested in citizen monitoring should contact SRA for additional details. Additional information on citizen monitoring can be found at the Texas Watch website. The site is hosted by Southwest Texas State University and can be found at [www.texaswatch.geo.swt.edu](http://www.texaswatch.geo.swt.edu).

### **DATA COLLECTION BY OTHER ENTITIES**

Water quality data collected by the City of Kilgore, and Eastman Chemical has been included in the SRA QAPP. Kilgore has been documenting water quality and flow in Bighead and Rabbit Creeks to determine the aquatic life use of the two streams. Eastman collects quarterly samples at six Sabine River sites and at their point of discharge to provide additional metals data for Stream Segment 0505. A water quality monitoring program has been added by the City of Longview and they now monitor two sites on Lake Cherokee under the SRA QAPP. East Texas Saltwater Disposal is expected to be added to the SRA QAPP in the future. This will allow the data to be used by the TNRCC in updating surface water standards and wastewater permit criteria.

### **DATA COLLECTION, MANAGEMENT AND ANALYSIS**

The collection, management, and analysis of water quality data is accomplished through an integrated program that includes a Data Management Plan, a comprehensive monitoring program, and statistical analyses of historical and current data. The Data Management Plan was updated in September 1999 and is reviewed on an annual basis. The data collection program is discussed below. Data analyses are conducted according to guidelines set forth by the Clean Rivers Program.

### **SECTION 303(d) OF THE CLEAN WATER ACT**

The Clean Water Act in Section 303(d) requires that water bodies not meeting established water quality standards be listed as impaired and reported to the Environmental Protection Agency (EPA). The Program Guidance for the Texas Clean Rivers Program requires the Planning Partners to analyze the results of the data screening in conjunction with other factors affecting water quality to identify and describe the reason for the concern. The SRA provided comments to the TNRCC on the Draft 2000 303(d) List ([http://www.tnrcc.state.tx.us/water/quality/00\\_303d.html](http://www.tnrcc.state.tx.us/water/quality/00_303d.html)); however, EPA has not approved the final list at this time. Water bodies of concern are addressed in the Summary of Sabine Basin Water Quality section of this report.

## **THE SRA WATER QUALITY MONITORING PROGRAM**

The SRA Water Quality Monitoring Program (WQMP) for 2000 included 39 stations on the mainstem and reservoirs. The intensive efforts on Toledo Bend will continue as an in-kind service to the Texas Clean Rivers Program (TCRP). The stations are sampled at least once each month. Active stations for WQMP were selected on the basis of relative position (upstream or downstream) to point source discharges, water supply intakes, proximity to industrialized areas of the Basin, representative coverage of reservoirs, and other land use activities that have the potential to impact water quality.

## **SRA TCRP SUBWATERSHED SCREENING PROGRAM**

The SRA TCRP Subwatershed Screening Program utilizes biological screening studies in combination with routine physical and chemical parameters to provide data on the health of aquatic life and long-range water quality protection. The screening studies provide information on the health of aquatic life and provide toxics information to protect human health. The focus of these tests is in subwatershed areas where this information is lacking. The biological tests include ambient toxicity tests (AT), and rapid bioassessments (RBA) with macroinvertebrate and fish collections. Water quality samples are also collected for physicochemical parameters to aid in determining long-term trends in water quality for the routine water quality parameters. This additional monitoring program complements the existing WQMP by providing information on the many subwatersheds not covered by WQMP. The Subwatershed Screening Program also includes field investigations to provide data on subwatersheds that have never been sampled.

Sampling site locations and monitoring parameters are reviewed each year at coordinated monitoring meetings with all of the entities conducting water quality monitoring in the Sabine Basin. Adjustments are made in the various programs to reduce duplication of effort and ensure that all areas are appropriately monitored. The Subwatershed Screening studies in 2000 focused in Reach 4 with additional monitoring in problem areas identified by screening in previous years. Subwatershed sampling locations were selected using a subwatershed ranking system that included previous bioscreening results, historical data, and the subwatershed inventory of all known factors that could influence water quality.

## **SPECIAL STUDIES**

The herbicide, atrazine has recently come under a lot of scrutiny in the Lake Tawakoni watershed after the reservoir was placed on the 303(d) List as a possible threat to future water use. Although levels found have not exceeded allowable limits, in water supply samples, SRA has begun monthly sampling for atrazine at three sites in Lake Tawakoni beginning April 2000. This is a cooperative effort with the TNRCC in an effort to resolve the atrazine concerns. Sampling is scheduled to continue for at least three years. SRA participates in periodic meetings of the Surface Water Protection Committee, which is composed of state and local parties associated with atrazine monitoring and education.

Lower Basin Special Studies were began in September 1999 in Reach 1 and Reach 4 and will continue until September 2001. Subwatersheds sampled included Little Cypress Bayou, Indian Creek, Flat Fork Creek and Palo Gaucho Bayou.

# Summary of Sabine Basin Water Quality

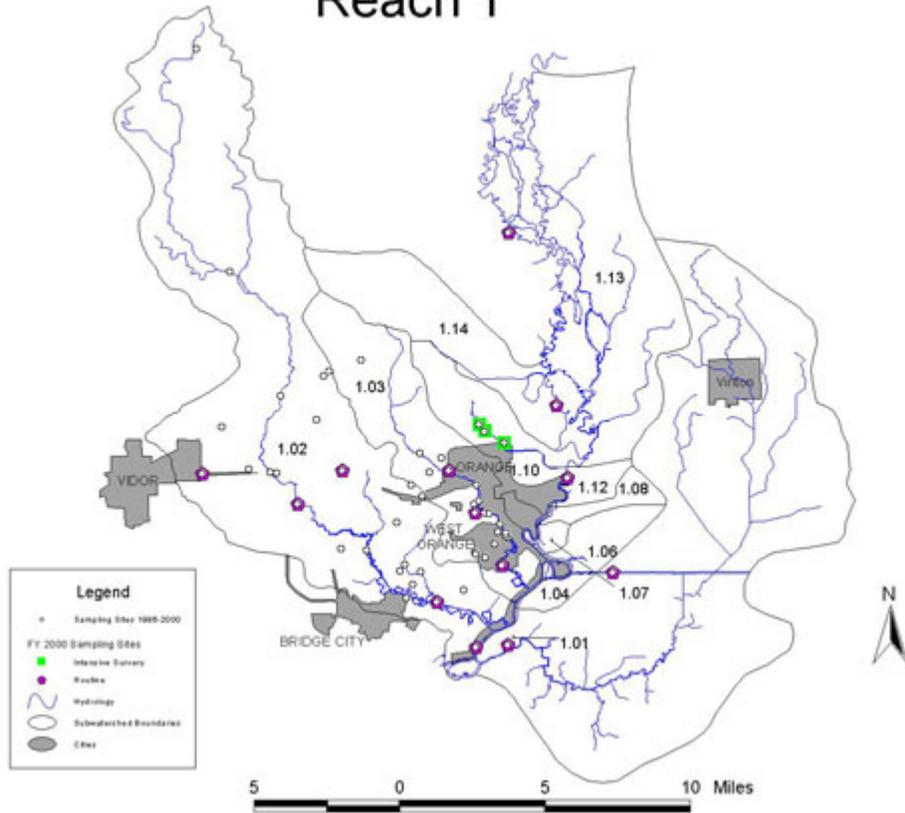
## REACH 1

**Description:** Sabine River and its drainage from Sabine River Confluence into Sabine Lake (river mile 0) to Morgans Bluff (river mile 25.1) in Orange County. This Reach is divided into 14 subwatersheds and covers 348.48 square miles. Eighty-six percent of the reach is in Texas and 14% is in Louisiana. This reach includes Segments 0501 (Sabine River Tidal), 0508 (Adams Bayou Tidal), and 0511 (Cow Bayou Tidal). Although some areas are quite rural, much of this reach is dominated by two cities with populations greater than 5000.

**Water Quality:** Data analyses have indicated water quality problems in three subwatersheds. The Adams and Cow Bayou Subwatersheds are impaired due to low dissolved oxygen, high fecal coliforms, and high nutrients. The special studies indicated the impairments were due to both point and non-point sources. The non-point sources include large populated areas using inadequate on-site systems. Preliminary results from the Little Cypress Bayou Subwatershed special study show impairment due to low dissolved oxygen, high fecal coliforms and high nutrients. Little Cypress Bayou's impairments are further compounded due to little or no flow except at periods of high rainfall. Members of the Sabine Basin Steering Committee expressed concerns for zinc and copper requirements in wastewater permits. SRA will continue to collect additional data on zinc and copper to aid in determining appropriate permit limits.

**Monitoring:** The SRA 2001 WQMP includes monthly monitoring at five sites in Reach 1. SRA is monitoring three sites in a special study in Little Cypress Bayou for the TCRP. TCRP monitoring for the also includes three sites in the Adams Bayou Subwatershed and four sites in the Cow Bayou Subwatershed as a follow up to special studies conducted from 1998 to 1999. Measurement of 24-hour dissolved oxygen will be performed three times per year in each of these Subwatersheds.

# Reach 1



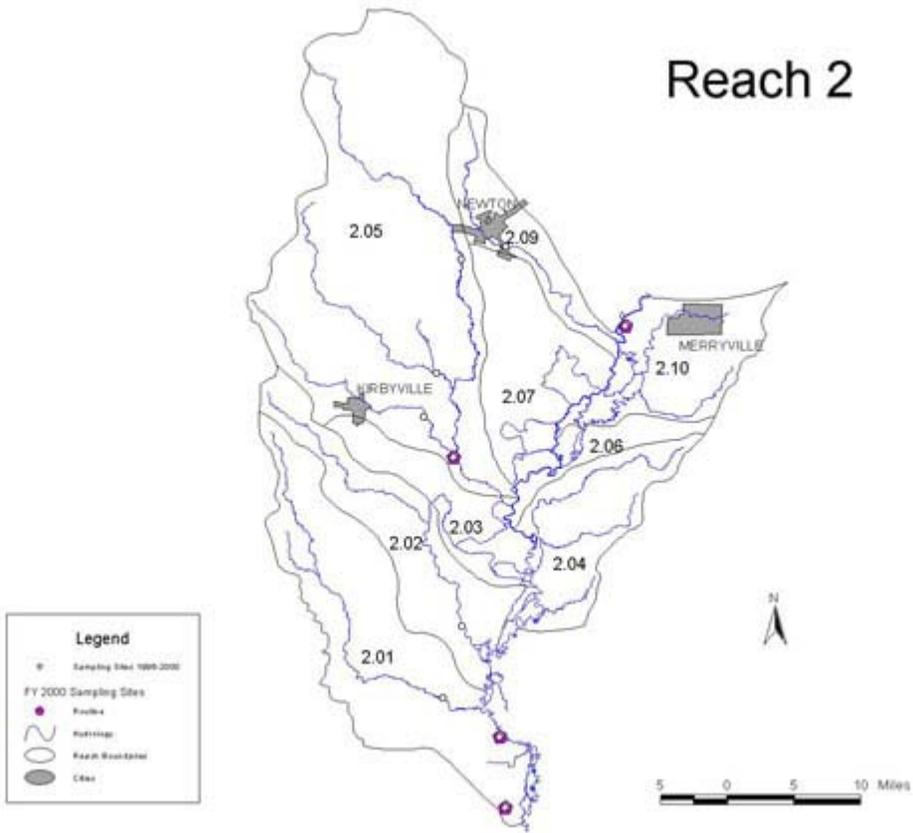
## REACH 2

**Description:** Sabine River and its drainage from Morgans Bluff (river mile 25.1) to a point that includes Caney Creek (river mile 95.24) in Newton County. This Reach is divided into 9 subwatersheds and covers 1103.15 square miles. Three-quarters of the reach is in Texas and 25% is in Louisiana. Reach 2 includes the lower portion of Segment 0503 (the Sabine River below Toledo Bend) and Segment 0513 (Big Cow Creek). This is largely a rural area with no major industries or cities.

**Water Quality:** Data analyses have shown water quality problems in two subwatersheds in Reach 2. The Nichols Creek Subwatershed was added to the draft 303(d) List due to low dissolved oxygen and high fecal coliform bacteria levels. The conditions in Nichols Creek appear to be due to ambient conditions and no biological impairments have been observed. There are no permitted discharges in this sparsely populated Subwatershed. The 303(d) List also included the Big Cow Creek Subwatershed (Segment 0513) due to elevated levels of dissolved aluminum and high levels of fecal coliform bacteria. Recent data indicate the levels of fecal coliform bacteria are within the acceptable limits. This Subwatershed contains only one municipal wastewater discharge and no other densely populated areas. Non-point sources include large areas of pastureland.

**Monitoring:** The SRA is monitoring three sites in Reach 2 for 2001 in the WQMP, including one site located in the SRA main canal.

# Reach 2

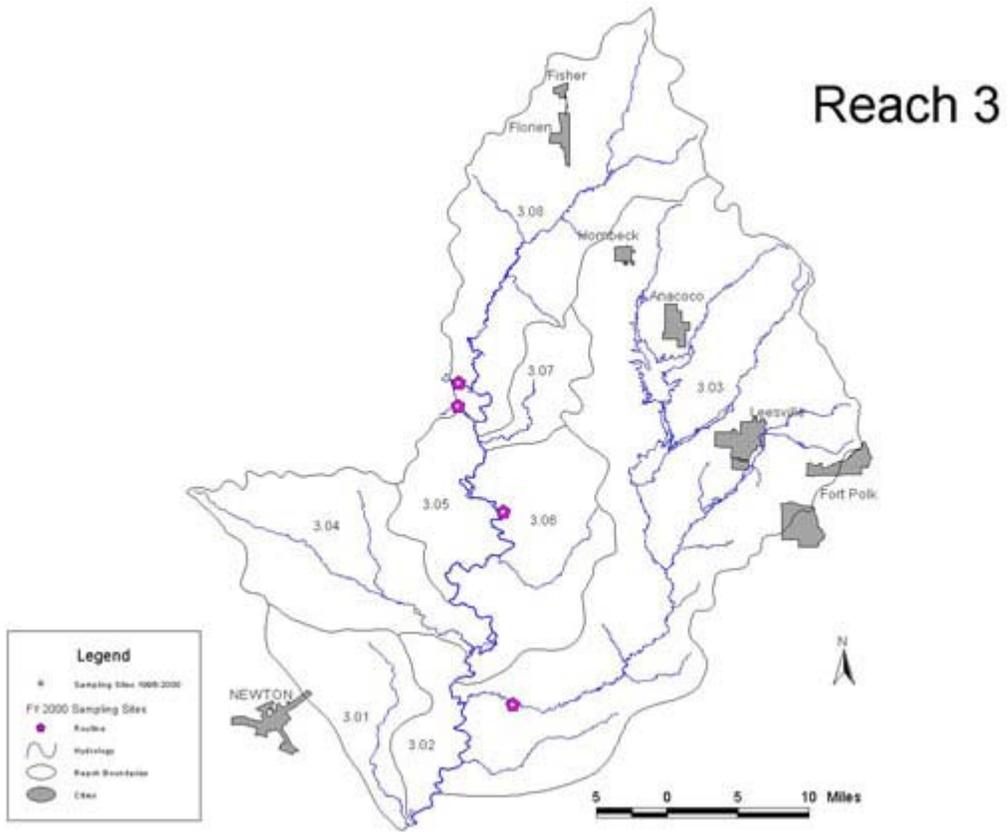


### **REACH 3**

**Description:** Sabine River and its drainage from above the Caney Creek Confluence (river mile 95.24) to Toledo Bend Dam (river mile 156.45). This Reach is divided into 8 subwatersheds and covers 364.28 square miles. Seventy-seven percent of the reach is in Texas 23% is in Louisiana. Reach 3 includes the upper portion of Segment 0503 (the Sabine River below Toledo Bend). This is largely a rural area with no major cities or industries.

**Water Quality:** The data analyses indicate water quality problems in only one subwatershed in Reach 3. The Bayou Anacoco Subwatershed, located in Louisiana, has been shown to have concerns or possible concerns due to fecal coliforms and nutrients. Data collected in the 2000 sampling indicate the levels of fecal coliform bacteria are within the acceptable limits.

**Monitoring:** The SRA WQMP in Reach 3 includes five monitoring sites including one site in the Bayou Anacoco Subwatershed. The flow in the Quicksand Creek Subwatershed is being measured three times per year.



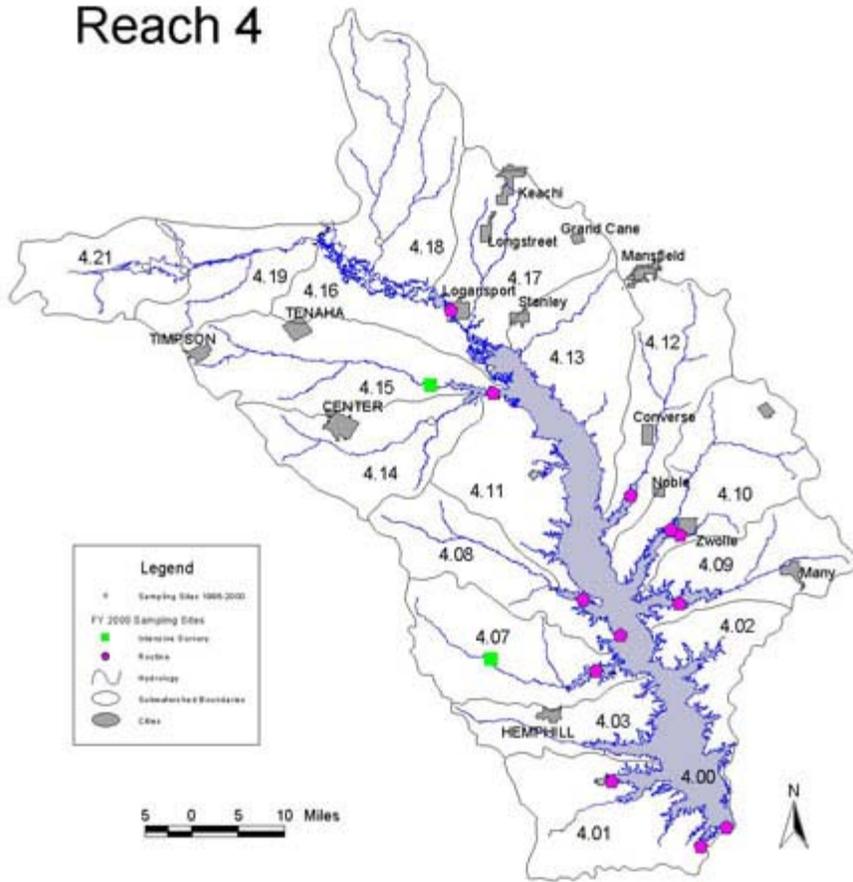
## **REACH 4**

**Description:** Sabine River from Toledo Bend Dam (river mile 156.45) in Newton County to a point which includes Murvaul Creek Confluence (river mile 291.2) in Panola County. This Reach is divided into 21 subwatersheds and covers 2932.82 square miles. Sixty-eight percent of the reach is in Texas with 32% in Louisiana. Reach 4 includes Segment 0504 (Toledo Bend Reservoir) and Segment 0509 (Lake Murvaul) both of which are classified for water supply. This reach is dominated by Toledo Bend Reservoir and has no major cities or industries.

**Water Quality:** Concerns have been identified in Toledo Bend Reservoir associated with two Subwatersheds in this Reach. Water quality problems in the San Miguel Bayou Subwatershed, located in Louisiana, include low dissolved oxygen, high fecal coliform levels and high levels of nutrients. In the Tenaha Creek Arm of the reservoir, low dissolved oxygen levels were observed in the summer months, but the low values appear to be due to ambient conditions and no biological impairments were observed. The Toledo Bend reservoir was included on the 303(d) List for pH, dissolved oxygen, and mercury in fish tissue. The pH in some areas of the Toledo Bend Reservoir was occasionally outside the range established in stream standards, however the exceedances were observed in less than 10% of the samples. The Texas Department of Health fish consumption advisory is still in effect for largemouth bass at Toledo Bend Reservoir due to elevated levels of mercury (<http://www.tdh.state.tx.us/bfds/ssd/images/etexas-fish.jpg>).

**Monitoring:** The SRA WQMP includes 11 sites in Reach 4. Three sites are being monitored through the SRA TCRP Screening Program.

# Reach 4



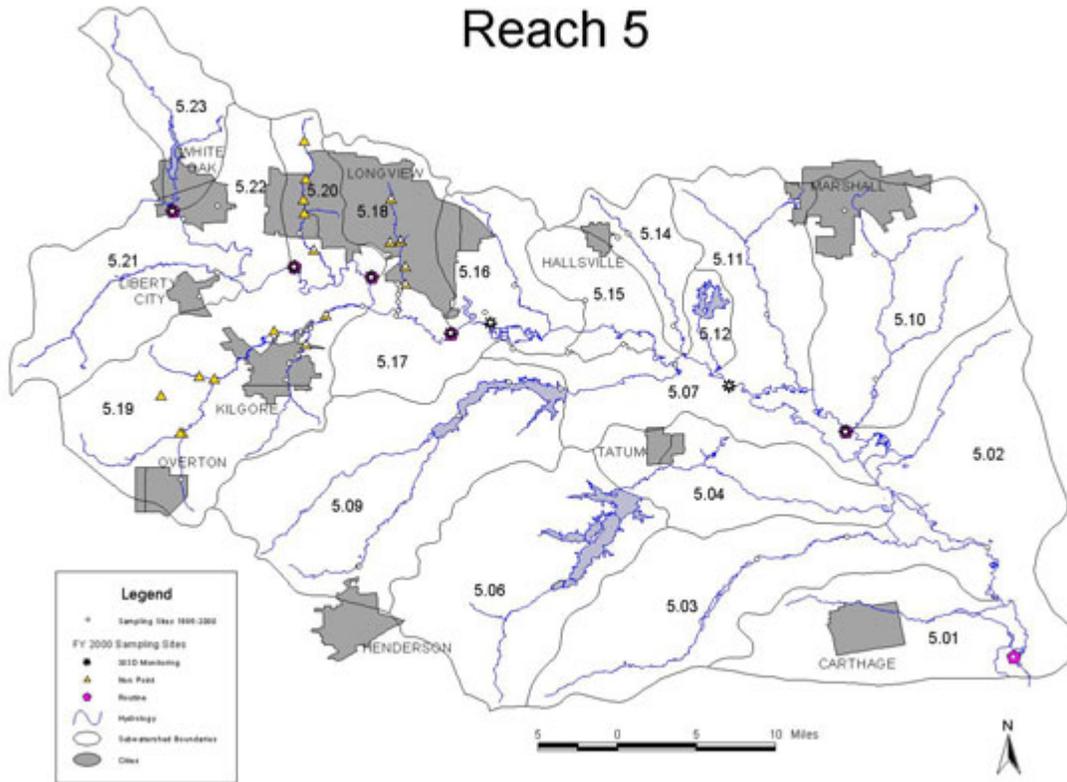
## REACH 5

**Description:** Sabine River and its drainage from above Murvaul Creek Confluence (river mile 291.2) in Panola County to a point which includes Glade Creek Confluence (river mile 397.95) in Gregg County. This Reach is divided into 24 subwatersheds and covers 1629.18 square miles. Segment 0510 (Lake Cherokee, a water supply reservoir) is included in Reach 5. Also included is Segment 0505 (Main-stem of the Sabine River), which is used extensively for water supply. Reach 5 has the highest concentration of population in the Sabine Basin. There are numerous industries in this reach as well as six cities with populations above 5000.

**Water Quality:** Water quality concerns have been identified in five Subwatersheds in this Reach. The concerns and possible concerns in Reach 5 include biological impairments, low dissolved oxygen, and high fecal coliform bacteria. Low dissolved oxygen levels were occasionally observed in Hatley Creek. Ambient toxicity tests in the Mason Creek Subwatershed showed lethality in about 18% of the samples, but the rapid bioassessments showed no impairments. High nutrients were observed in both the Grace Creek and Rabbit Creek Subwatersheds. High levels of fecal coliform bacteria were also found in Grace Creek. In the Hawkins Creek Subwatershed low dissolved oxygen levels and elevated levels of dissolved solids were detected.

**Monitoring:** The SRA WQMP includes six main-stem river sites in Reach 5. A non-point study is being conducted in the Grace Creek Subwatershed to delineate concerns identified in the 1999 assessment. SRA assisted the TPWD conduct a biological and habitat assessment on one site on Grace Creek for an urban streams impact study during 2000. Grace Creek was one of many urban sites in Texas assessed during the TPWD study. The Rabbit Creek subwatershed is scheduled for a special study by the SRA in 2001 and the Hawkins Creek subwatershed is scheduled for 2002. Eastman Chemical personnel are monitoring six sites in Reach 5. SRA has trained Eastman Chemical field personnel in the TNRCC metals sampling protocol and Eastman has been collecting additional samples for several metals under the umbrella of the SRA QAPP since 1998. Personnel from TNRCC and the City of Longview are sampling two sites in Lake Cherokee. The Longview sampling program is also under the SRA QAPP.

# Reach 5

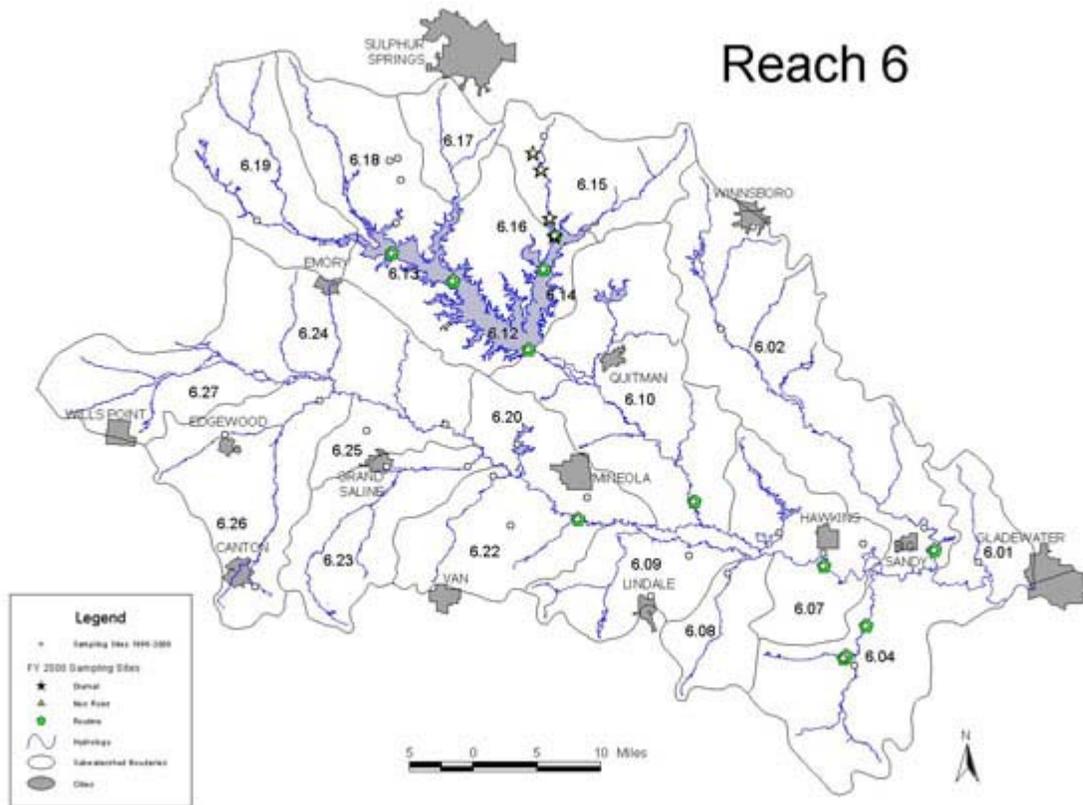


## **REACH 6**

**Description:** Sabine River below Lake Tawakoni, From above Glade Creek Confluence (river mile 397.95) in Gregg County to Iron Bridge Dam (river mile 514.5). This reach is divided into 27 subwatersheds and covers 1977.13 square miles. This reach includes Lake Fork Reservoir (Segment 0512), which is a public water supply reservoir. This reach also includes Segments 0506, 0514, and 0515. This is largely a rural area, but has numerous dairies primarily on Segment 0512.

**Water Quality:** Water quality concerns and possible concerns have been identified in five Subwatersheds in Reach 6. Ambient toxicity tests in the Little White Oak Creek Subwatershed showed lethality in about 20% of the samples, but no impairments were seen in the rapid bioassessment. Low dissolved oxygen levels and high levels of nutrients were observed in the Harris Creek Subwatershed. High sulfate levels were recorded at a single site located in a tributary to Lake Fork Reservoir, but no elevated levels were observed in the main body of the reservoir. In the Running Creek Subwatershed, elevated levels of fecal coliform bacteria and nutrients were detected. Elevated levels of nutrients and were also observed in the Elm Creek Subwatershed as well as elevated levels of chlorides and sulfates.

**Monitoring:** The SRA WQMP includes seven sites in Reach 6, including three sites in Lake Fork Reservoir. An additional four sites are being sampled through the TCRP. TNRCC personnel are monitoring three additional sites in Lake Fork Reservoir.



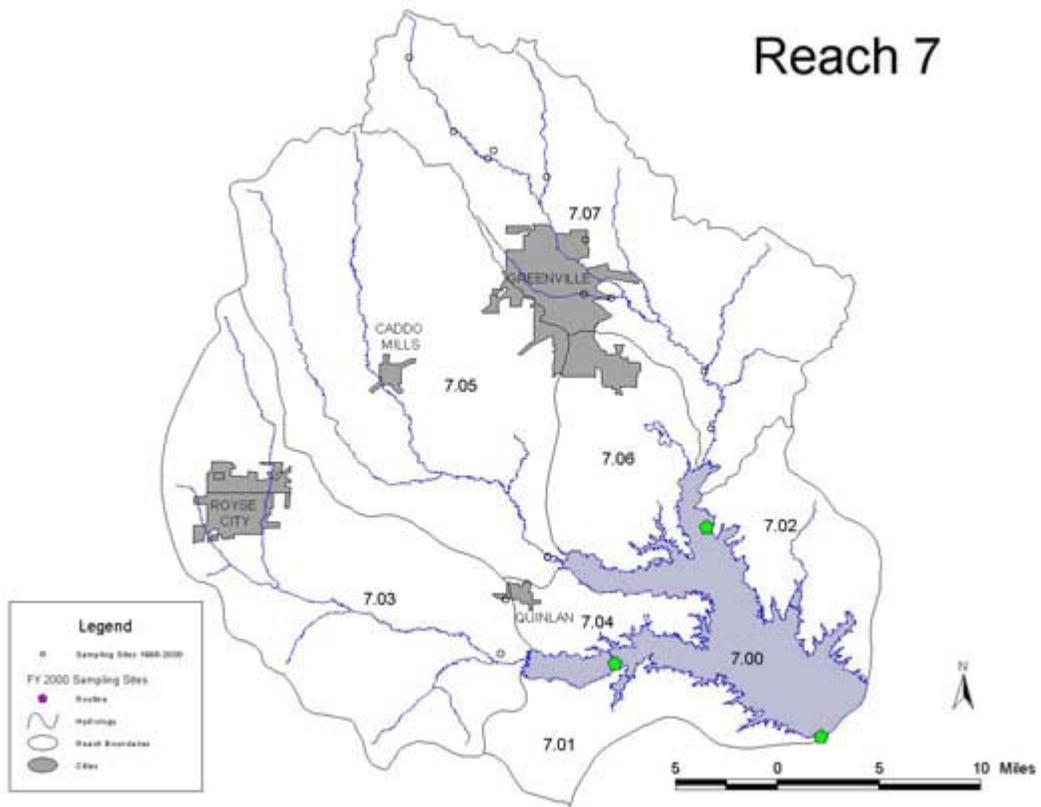
## REACH 7

**Description:** From Iron Bridge Dam (Lake Tawakoni, river mile 514.5) to Sabine River (Cowleech Fork, river mile 579.4) Watershed Divide Near Celeste (headwaters of the Sabine River). This reach is divided into seven Subwatersheds and covers 774.72 square miles. All of the Subwatersheds drain into Lake Tawakoni (Segment 0507) that is a public water supply reservoir. Although much of this reach is rural, it contains one of the four largest cities in the Sabine Basin.

**Water Quality:** In Subwatershed 7.07, elevated levels of fecal coliform and nutrients were detected. A study performed during 1998-99, indicated impairments were not as severe as was first thought and appear to come from non-point sources in the mostly-rural watershed. SRA has recommended the development of a source water protection plan for Lake Tawakoni and its watershed. The 1998 draft 303(d) list of waterbodies not meeting the designated use has included Lake Tawakoni as threatened due to atrazine (an herbicide) contamination in finished water supplies. Lake Tawakoni has also been included on the 303(d) list for high pH levels and low dissolved oxygen. The pH levels have been shown to be due to ambient conditions and the proposed revisions to the standards include a change to the pH range for Lake Tawakoni. The low dissolved oxygen levels were observed at one location in the summer months and appear to be due to ambient conditions.

On March 9, 2000, a 28-inch gasoline pipeline owned and operated by Explorer Pipeline Company ruptured several miles northwest of Greenville, Texas and released an estimated 600,000 gallons of reformulated gasoline into a pasture. The spill drained into a tributary of East Caddo Creek approximately 28 creek miles upstream from Lake Tawakoni. The reformulated gasoline contained methyl tertiary-butyl ether (MtBE), which is difficult to remove from natural waters due to its chemical properties. Rainfall the next day flushed a significant amount of the spilled gasoline down the creek into Lake Tawakoni. The spill has been cleaned up and the area is under remediation. SRA continues periodic visits to the remediation site and will continue monitoring of Lake Tawakoni and East Caddo Creek until soil, and sediment remediation is complete. Respondents to the spill included the USEPA, TNRCC, TPWD, National Transportation Safety Board, U.S. Department of Transportation Office of Pipeline Safety, and Dallas Water Utilities. More information on the status can be found at: [http://www.sra.dst.tx.us/srwmp/special\\_reports/lake\\_tawakoni\\_gasoline\\_spill/default.asp](http://www.sra.dst.tx.us/srwmp/special_reports/lake_tawakoni_gasoline_spill/default.asp).

**Monitoring:** The SRA 2001 WQMP includes three sites monitored monthly in Reach 7. SRA is conducting a joint study with the TNRCC to examine atrazine levels on a monthly basis at three sites in Lake Tawakoni.



## **SUBWATERSHED INVENTORY**

Inventories are being maintained by SRA of all factors that can impact water quality for the Sabine Basin and placed into the GIS as layers. Subwatersheds can then be analyzed based on the specific factors within the subwatershed. Data sets for the inventories have been received from a number of sources including municipalities, government agencies (local, state, and federal), and universities. Data sets that include water quality analyses must first be reviewed to determine the quality assurance associated with the data meets the criteria stated in the SRA QAPP. Other data sets are also reviewed in accordance with the SRA Data Management Plan. In addition to layers for hydrology and highways the data sets include:

Water Quality Data

Population

Septic Tanks

Solid Waste Sites

Land Use

Permitted Discharges

Storm Water Permits

USGS Flow Stations

Superfund Sites

As other data sets become available to SRA they will be assimilated into the Subwatershed Inventory.

## **QUALITY ASSURANCE PROJECT PLAN**

The Quality Assurance Project Plan (QAPP) was updated in September 1999. This document includes all of the details about the SRA monitoring programs, the project definition and background, and all of the quality assurance requirements to ensure the data collected are accurate. The QAPP also ensures that the data collected are representative of the water body being sampled.

## **GEOGRAPHIC INFORMATION SYSTEM**

The SRA Geographic Information System (GIS) is a tool used to examine all of the factors that influence water quality. The SRA GIS provides analysis and spatial representation of this data. This allows the relationships of several data sets to be analyzed or viewed in this format. Many layers of information are available through the Internet for use by stakeholders and other interested entities. The following summarizes the recent developments in the SRA GIS:

- Existing datasets in the SRA library are continually updated. Many additional datasets are being downloaded from the Internet. Some of the datasets downloaded include: National Wetland Inventories, USGS Quads 100K and 250K, 1999 TIGER Line Files, Census Data, Louisiana DOQs, and Louisiana Base Map Data.
- SRA has received Certificate of Convince and Necessity (CCN) data as GIS coverage from TNRCC. These are areas that can be served by various water and wastewater service providers. SRA received this information for all counties that intersect the Sabine Basin. While this is work in progress it promises to be important in future analyses.
- SRA has recently applied to the Railroad Commission to receive important datasets from their GIS department. This is invaluable data that can help SRA analyze subwatersheds. This data should include wells and pipelines with database information.

- Other activities include maintaining and developing relationships with User Groups as well as other agencies and Universities such as SFA FRI, TNRIS and DIR. TNRIS is currently working on a base mapping initiative which will provide Texas with highly accurate and attributed base maps layers. These will be a great improvement over current data.
- SRA received SSURGO Soil data for several counties and contour data is pending.

## **WORLD WIDE WEB PROJECT**

SRA's World Wide Web site, <http://www.sra.dst.tx.us/>, provides TCRP stakeholders with on-demand access to information and data regarding water resource issues within the Sabine River Basin.

Information and data services provided include the following:

- The TCRP home page, <http://www.sra.dst.tx.us/srwmp/terp/>, provides information regarding Senate Bill 818, a current events calendar, and links to the TNRCC and other TCRP Planning Partner Web sites.
- The State of the Basin, [http://www.sra.dst.tx.us/srwmp/terp/state\\_of\\_the\\_basin/](http://www.sra.dst.tx.us/srwmp/terp/state_of_the_basin/), provides access to the latest water quality and supply information for the Sabine River Basin, Texas. Contents include: Reach and Subwatershed Inventories, Monthly Water Quality Monitoring Program Reports, Basin Highlights Reports, and Summary Reports.
- Water Quality Information Clearinghouse, <http://www.sra.dst.tx.us/data/wq/>, provides access to the entire Sabine Basin portion of the TNRCC Surface Water Quality Monitoring Program (SWQM) database (which includes the SRA WQMP data) and the Subwatershed Inventory
- The Sabine Basin GIS Clearinghouse, <http://www.sra.dst.tx.us/data/gis/>, allows users to view and download water-related GIS data sets. SRA is a node on the National Geospatial Data Clearinghouse, <http://fgdclearhs.er.usgs.gov/>, which makes these data available through the searching capabilities provided by the Clearinghouse.
- The Lake and River Conditions page, [http://www.sra.dst.tx.us/basin/lake\\_and\\_river\\_conditions.asp](http://www.sra.dst.tx.us/basin/lake_and_river_conditions.asp), provides links to near-real-time lake level data for the Sabine River Basin at the U.S. Geological Survey, as well as historical values back to January 1995. Additional links include National Weather service flood statements, flood warnings, and hydrologic readings (river and reservoir levels and precipitation).