Sabine River Authority of Texas

Sabine River Basin Highlights 2004

Sabine River Tidal Segment Near Orange

Prepared in Cooperation with the Texas Commission on Environmental Quality *Under the Authorization of the* Texas Clean Rivers Act

May 2005

The Sabine River Authority (SRA) has taken an active role in water quantity and quality matters since initial operational activities began in 1954, and has expanded its services to meet increasing needs throughout the Sabine River Basin. SRA supplies water to municipal, industrial, and agricultural water users from three major water supply reservoirs and a canal system. SRA's water quality management program was initiated in the 1960's through participation in the development of the first stream standards for the State of Texas.

The Texas Clean Rivers Program (TCRP) is a cooperative endeavor between the Texas Commission on Environmental Quality (TCEQ), Texas Parks & Wildlife Department (TPWD), the TCRP Partners, agencies, local entities, and the public. The goal is to maintain and improve the quality of water resources within each river basin in Texas through regional assessments of watersheds. The SRA serves as the clearinghouse for all water quality data in the Sabine Basin and is responsible for analyzing the data to identify and prioritize water quality concerns and the causes of pollution. The SRA is the planning agency for all TCRP activities in the Sabine Basin.

Sabine Basin Issues & Activities

Water quality conditions in the Sabine Basin were excellent in most areas during fiscal year 2004 (September through August). Some sampling sites did not meet Texas Surface Water Quality Standards (Stream Standards) **[1]**, primarily for bacteria and dissolved oxygen. Special investigations were performed in 15 subwatersheds in response to pollution complaints and reports of fish kills. Most pollution complaints involved minor oil spills or oilfield-related discharges that were remediated with no long-term impacts expected.

One of the primary water quality issues in some areas of the Sabine Basin is elevated bacteria levels. Bacteria are a natural part of the environment and occasional elevated levels occur from rainfall runoff events. Water can also become contaminated by untreated sewage due to malfunctioning collection systems and/or wastewater treatment systems. There are hundreds of species of pathogenic bacteria that could be present in contaminated water. The water quality test developed for bacteria uses the nonpathogenic indicator species, *Escherichia coli* and enterococci, to determine the presence of untreated sewage. Since the indicator bacteria can't survive long outside of the digestive tract of warm-blooded animals, their presence indicates conditions are favorable for pathogens. The absence of these bacteria is a good indication that harmful bacteria are not likely present.

Another water quality concern in some areas of the Sabine Basin is occasional low dissolved oxygen. Adequate dissolved oxygen is necessary for a healthy aquatic community and to provide for aerobic life forms that carry on natural stream purification processes. As dissolved oxygen levels in water fall below 5.0 mg/L, aquatic life becomes stressed. Oxygen levels that remain below 1-2 mg/L for a few hours can result in fish kills. Stream Standards for dissolved oxygen are set as the minimum average value for a 24-hour period. The daily average set in the Stream Standards is 4.0 mg/L with a minimum instantaneous value of 3.0 mg/L.

Other water quality concerns include elevated levels of chlorophyll *a* and plant nutrients. Although Stream Standards have not been established for nutrients in Texas surface waters, statewide screening levels have been developed from historical monitoring data. A few areas have shown occasional values above the screening values, but there is no indication at this time of any impaired uses of the water bodies.

Other issues in the Sabine Basin include water supply planning, water conservation, and environmental flows.

Sabine River Watershed Management Program

SRA takes a holistic approach to water management and recognizes that quality and quantity are inherently interdependent. SRA is using an integrated approach to address water needs, water supply, the environment, conservation, and water quality. This comprehensive program includes the components listed below.

- **Water Quality**
  - Public Participation and the Basin Steering Committee
  - Quality Assurance Project Plan (QAPP)
  - Data Collection, Management, and Analysis
  - Geographic Information System (GIS)
  - Subwatershed Inventory
  - World Wide Web Project
- **Water Quantity**
  - Water Supply Planning
  - Water Conservation and Drought Contingency Planning
  - Environmental Flows

Water Quality

The TCRP coordination of state, regional, and local entities reduces duplication of effort in addressing water quality issues. This integrated approach to water quality management provides for the best use of limited resources. The subwatershed inventory, data analysis, and screening studies supplement the routine monitoring and are used to help identify areas of water quality concerns or possible concerns and allow the focus of additional monitoring resources on problem areas. Encouraging public participation increases the awareness of the impact of human activities on water quality, fosters watershed ownership, and provides an additional communication path for the public to provide local insight to the SRA.

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 throughout the Basin to encourage participation from all of the stakeholders. With an emphasis on stakeholder involvement, the SRA invites water supply corporations, permitted dischargers, councils of government, city and county officials, environmental organizations, and the public to become Steering Committee members. Interested parties should contact the SRA to be added to the contact list. Membership in the Committee has grown from 65 to 146 since 1991.

Texas Watch Citizen Monitoring

Texas Watch is a network of over 400 trained volunteers that collect, and make available to the public, water quality data on lakes, rivers, streams, bayous, wetlands, bays, and estuaries in Texas. The SRA continues to

provide Texas Watch program training and support in the Upper and Lower Sabine Basin. Citizen monitors include Kilgore College students monitoring a site near their campus and a citizen in Longview who has recently been trained and is monitoring Grace Creek. Several members of the Tyler Chapter of The Master Naturalists have recently expressed interest in obtaining Texas Watch training. Training and support has continued with the help of area schools. Students at Little Cypress-Mauriceville High School monitor two sites near their school, a volunteer monitor is actively monitoring one site on the South Prong of Big Sandy Creek, and students in the Orange area learn about monitoring from the West Orange Cove Independent School District Nature Classroom on Adams Bayou. Groups or individuals interested in citizen monitoring should contact the SRA for additional details. Information on citizen monitoring can also be found at the Texas Watch website hosted by Texas State University at www.texaswatch.geo.swt.edu.

Data Collection by Other Entities

All entities collecting water quality data in the Sabine Basin are encouraged to coordinate their efforts with SRA and participate under the SRA QAPP. Collection of water quality data under a qualified QAPP ensures that data is collected and analyzed according to TCEQ specifications and only water data collected under a qualified QAPP can be used by the TCEQ in updating wastewater permits and Stream Standards. Water quality data is currently being collected under the SRA QAPP by the City of Longview. Longview personnel monitor two sites on Lake Cherokee under the SRA QAPP as a part of their drinking water supply monitoring program. Information on the SRA QAPP can be found in the Quality Assurance Project Plan section of this document. The City of Dallas also monitors water quality in the Lake Tawakoni Subwatershed under the Trinity River Authority's QAPP. Although not under a TCEQ-approved QAPP, East Texas Saltwater Disposal Company monitors for saltwater discharges from oil-related activities in the East Texas Oilfield. This program provides useful information to proactively minimize impacts to area streams.

Quality Assurance Project Plan

The Quality Assurance Project Plan (QAPP) was updated in August 2003. 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.

Data Collection, Management and Analysis

The collection, management, and analysis of water quality data is accomplished through an integrated program that includes a comprehensive monitoring program, a data management plan, and statistical analyses of historical and current data. The SRA's Data Management Plan was updated in July 2003 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 TCRP. 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.

Texas Water Quality Inventory and 303(d) List 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 impairment. The SRA provided comments to the TCEQ on the Draft 2004 303(d) List **[2]**; 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.

SRA Water Quality Monitoring Program

The SRA Water Quality Monitoring Program (WQMP) for 2004 included 39 stations sampled monthly. 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. Routine tests include the following:

- pH
- Dissolved Oxygen
- Conductivity
- Solids
- Nutrients
- Chlorides
- Sulfates
- Total Hardness
- Alkalinity
- Total Organic Carbon
- Turbidity
- Transparency
- Bacteriology
- Stream Flow
- Metals in Sediment (annually)
- Metals in Water (annually)

SRA TCRP Subwatershed Screening Program

The SRA TCRP Subwatershed Screening Program utilizes biological assessments of macroinvertebrates and fishes to provide data on the health of aquatic life and long-range water quality conditions. The biological assessments along with routine parameters complement the existing WQMP by providing information for many Basin subwatersheds.

Data Analysis

SRA developed a methodology for the 2003 Sabine Basin Summary Report that analyzes five years of WQMP data using descriptive statistics, Stream Standards, and screening criteria. These data summaries are generated quarterly for every station and each reach.

Geographic Information System

The SRA GIS provides analysis and spatial representation of the multiple factors that influence water quality. Datasets are updated and additional datasets added as they become available. Other activities include maintaining and developing relationships with GIS user groups as well as other agencies and universities such as the Stephen F. Austin Forest Research Institute (SFA FRI), Texas Natural Resources Information System (TNRIS), and Texas Department of Information Resources (DIR). TNRIS is currently working on a base mapping initiative that will provide highly accurate base map layers. These base map layers will be a great improvement over current data.

Subwatershed Inventory

Inventories of factors that can impact water quality for the Sabine Basin are incorporated as GIS layers as they become available. Water quality monitoring data from each subwatershed are interpreted using GIS, and new monitoring is prioritized based on the specific factors within the subwatershed. Data sets for these inventories have been contributed by a number of sources including municipalities, government agencies (local, state, and federal), and universities. Data sets that include water quality analyses are reviewed to determine if 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. Current layers, as well as those under development, include the following:

- Water Quality Data
- U.S. Census Data
- On-site Sewage Facilities
- Land Use
- Permitted Discharges
- Storm Water Permits
- USGS Flow Stations
- Superfund Sites
- Oil and Gas Wells

World Wide Web Project

SRA's World Wide Website, www.sra.dst.tx.us, provides TCRP stakeholders, and others, with access to information and data regarding water resource issues within the Sabine River Basin. Information and data services provided include the following:

- The TCRP page, www.sra.dst.tx.us/srwmp/tcrp/, provides information regarding this statewide program, a current events calendar, and links to the TCEQ and other TCRP Planning Partner websites.
- The State of the Basin page, www.sra.dst.tx.us/srwmp/tcrp/state_of_the_basin/, provides access to the latest water quality 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.
- The QAPP is available at www.sra.dst.tx.us/srwmp/tcrp/state_of_the_basin/qapp/.
- The Lake and River Conditions page, www.sra.dst.tx.us/basin/lake_and_river_conditions.asp, provides links to USGS historical and near real-time lake level data for the Sabine River Basin, as well as historical values collected by SRA back to January 1995. Additional links connect to National Weather Service flood statements, flood warnings, and hydrologic readings (river and reservoir levels and precipitation).
- The Orange County Total Maximum Daily Load (TMDL) Project page, www.sra.dst.tx.us/srwmp/octmdl/, provides a project overview, information regarding public meetings, and a link to the TCEQ *Improving Water Quality in Adams and Cow Bayou: A TMDL Project for Bacteria, Dissolved Oxygen and pH* Fact Sheet.

Water Quantity

Water Supply Planning

Management of the Basin's water resources is part of SRA's legislative responsibility to ensure that water is available to meet the needs of the population and the value of the resource is protected. After meeting the long-term needs of the Basin, the SRA is responsible to provide water for broader use by the State of Texas.

The demand for water in the Upper Sabine Basin is expected to exceed the existing Upper Basin water supplies in 15 to 20 years due to projected population growth. The primary surface water supplies include Lake Tawakoni and Lake Fork which are totally committed under long-term water supply contracts.

Texas Senate Bill 1 and Senate Bill 2 (SB 1 and SB 2) water planning requirements have established a regional planning process to address long-term water supply needs in Texas. The Texas Water Development Board (TWDB) is the primary state agency charged with developing the state water plan. The planning process resulted in the formation of sixteen regional water planning areas with members representing eleven interest groups serving on Regional Water Planning Groups (RWPG). The TWDB must approve and incorporate the regional water plans into a comprehensive state water plan.

The Sabine River Basin is located in RWPG Regions I, D, and C. SRA is working with each RWPG to address the water needs in the Sabine Basin and to ensure that the data, information, and recommendations of the studies undertaken by SRA are incorporated into the Regional Planning Process. SRA has completed the *Comprehensive Sabine Watershed Management Plan* **[3]** dated December 1999 and the *Upper Sabine Basin Water Supply Study* **[4]** dated March 2003. These studies have evaluated a number of alternatives for meeting long-term (50 year planning period) projected water demands and were undertaken to assess the growing needs for additional water supply in the Upper Sabine River Basin service area.

Water Conservation and Drought Contingency Planning

SRA views water conservation and drought contingency planning as an integral part of meeting near-term and long-term water supply needs. Water conservation and drought contingency planning is necessary to extend existing supplies, ensuring the wise use of available resources, but cannot be counted on alone to meet the growing demands of an expanding population and the associated economic development.

SRA has updated its *Water Conservation and Drought Contingency Plan* **[5]** (Draft, March 2005) in accordance with new requirements for wholesale water suppliers, as set forth in the Texas Administrative Code **[6]**. The SRA plan was previously revised in 1999 and 2002 and is currently required to be updated every five years with the next update scheduled for May 2009.

The 78th Texas Legislature, by Senate Bill 1094 in 2003, created the "Texas Water Conservation Implementation Task Force" (Task Force) **[7]**. SRA Executive Staff member Jack Tatum was appointed as a member of the Task Force September 17, 2003, by TWDB Chairman Rod Pittman. In November 2004, the Task Force completed the Report to the 79th Legislature, and developed a Water Conservation Best Management Practices Guide.

Environmental Flows

Environmental flows encompass instream flows and estuarine freshwater needs. The SRA has worked to achieve a leadership role in water management planning efforts in Texas through participation in water-related committees, workshops, and development and implementation of water quality monitoring programs within the watersheds of the Sabine River. SRA is confident the balance between man's water supply needs and those of the environment can be achieved and that we have an excellent opportunity for a win/win long term solution in meeting those needs.

In 2001, the 77th Legislature enacted Senate Bill 2 establishing the Texas Instream Flow Program to define "appropriate methodologies for determining flow conditions in the state's rivers and streams necessary to support a sound ecological environment" (Texas Water Code §16.059). In July 2004, the TWDB, TCEQ, and TPWD, tasked with implementation of the Texas Instream Flow Program, contracted with the SRA for assistance in the Lower Sabine River Priority Instream Flow Study (IFS), which will study the instream flow needs of the Sabine River from Toledo Bend to its mouth at Sabine Lake. The Lower Sabine IFS is among the first tier of instream flow studies to be initiated and is due to be completed prior to December 31, 2010.

In 2002, the SRA partnered with the Lower Neches Valley Authority (LNVA) to authorize the development of initial baseline studies to help characterize the long-term environmental flow needs of the Sabine and Neches River Basins and to evaluate how to meet these needs. SRA and LNVA have taken continued steps as active participants to establish freshwater inflow and instream flow targets for the Sabine-Neches Estuary and the Sabine and Neches Rivers. Effective management of the States' natural resources requires a full understanding of baseline conditions and freshwater inflow needs of the Sabine-Neches Estuary based on rigorous scientific research and analyses.

Senate Bill 1639 (78th Legislature) established the Study Commission on Water for Environmental Flows charged with balancing the growing demands for the State's water resources with environmental concerns including instream flow and freshwater inflow to bays and estuaries. SRA General Manager Jerry Clark was appointed by Governor Rick Perry to this Commission. In December 2004, the Commission submitted the Interim Report to the 79th Legislature **[8]**.

Environmental Responsibilities in the Sabine River Basin

Summary of Sabine Basin Water Quality

Water quality assessments were developed by analyzing water quality data and all other available information for each subwatershed. The primary water quality issues are elevated bacteria levels and low dissolved oxygen. The problems tend to be in small streams with low elevation gradients. In most cases the problems occur infrequently and do not appear to significantly impact the designated use of the water body. Some of the impacts are due to excessive loading from point sources, but many of the concerns are the result of non-point source pollution or natural conditions.

Waterbodies were assessed for impairments based on water quality and biological data and placed into the following categories:

- **Excellent -** All Designated Uses Fully Supported
- **Adequate -** Most Uses Fully Supported; Some Parameters Exceed Screening Limits
- **Poor -** Designated Uses Not Fully Supported

The level for potential impacts to water quality from land use and other human activities were rated on the following scale:

- **High -** Sources of Potential Impacts Are Numerous
- **Medium -** Some Sources of Potential Impacts Exist
- **Low -** Sources of Potential Impact Are Scarce

The 2003 Sabine Basin Summary Report contains the details of the analytical process used to assess water quality conditions in each subwatershed and is available on the SRA website, www.sra.dst.tx.us.

Sabine River Below Toledo Bend Reservoir

Reach 1

Description

Reach 1 consists of the Sabine River and its drainage from the Sabine River confluence into Sabine Lake (river mile 0) to Morgan Bluff (river mile 25.1) in Orange County. Reach 1 is divided into fourteen subwatersheds and covers 348 square miles. Reach 1 is fairly evenly divided between Texas (48%) and Louisiana (52%). This reach includes Segments 0501 (Sabine River Tidal), 0508 (Adams Bayou Tidal), and 0511 (Cow Bayou Tidal). Although some areas are quite rural, this reach has two cities with populations greater than 5,000 and a variety of industries including petrochemical plants, a pulp and paper mill, and two electric generating plants.

Water Quality

Data analyses have indicated water quality problems in three subwatersheds and in the main-stem.

Orange County TMDL Project

The Orange County TMDL Project was initiated by TCEQ in August 2002 through contracts with SRA and the engineering firm of Parsons, Inc. The project is addressing the water quality impairments in the Adams Bayou Subwatershed and the Cow Bayou Subwatershed identified in previous SRA special studies. The impairments included low dissolved oxygen, elevated bacteria, and high nutrients from point and non-point sources. The non-point sources include large populated areas using on-site sewage treatment systems that have historically functioned poorly in this area. SRA formed the Orange County TMDL Stakeholder Advisory Group to provide advice and comment on the project. Members represent government, permitted facilities, agriculture, business, environmental, and community interests in the watersheds. The SRA also participated in data collection and laboratory analyses. All other aspects such as the historical data review, sampling plans, and model development are being led by Parsons, Inc. Data collection is complete and the modeling phase has begun.

Other Water Quality Issues

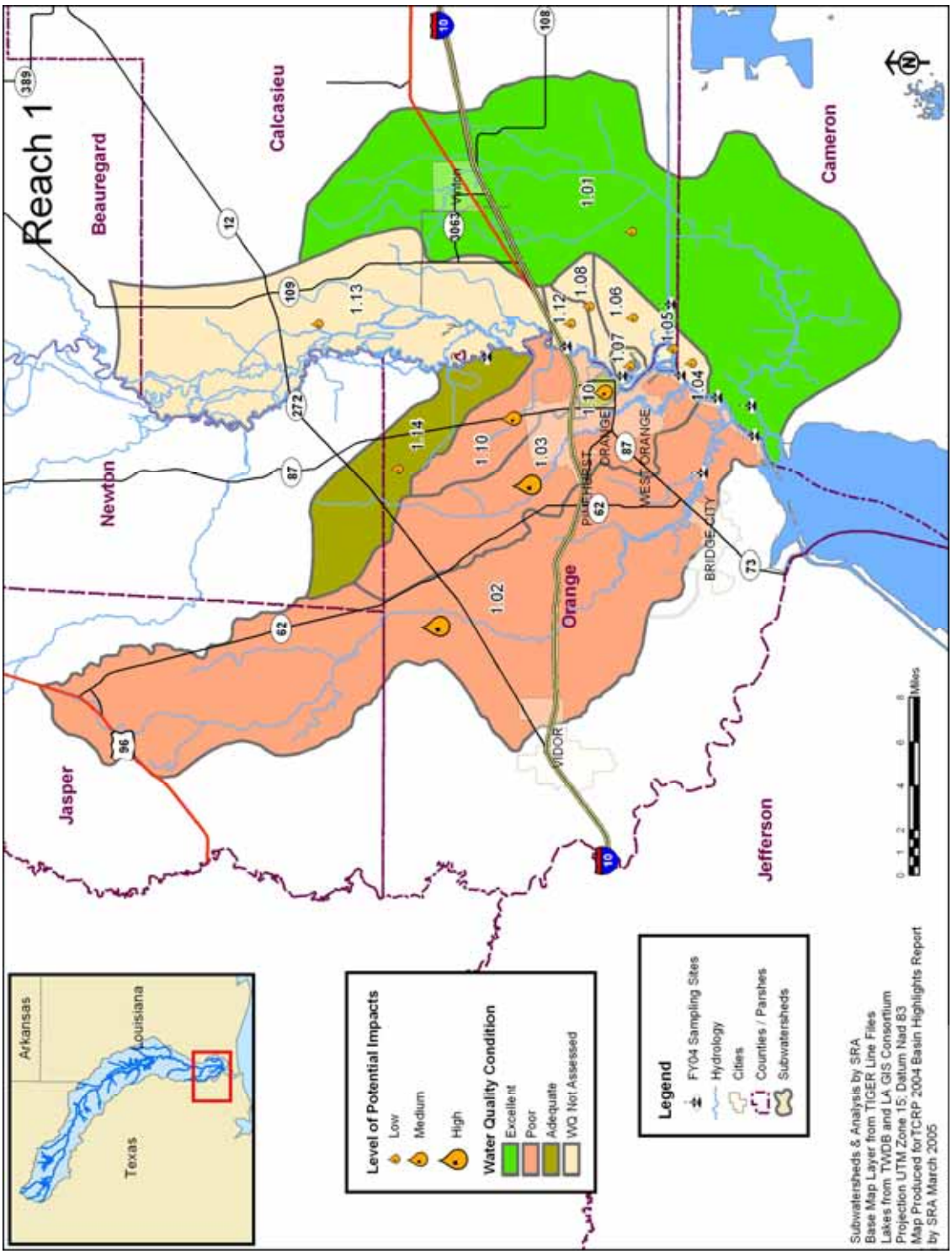
Impairments in the Little Cypress Bayou Subwatershed were identified as low dissolved oxygen, high fecal coliform, and high nutrients. This subwatershed has been included on the Draft 2004 303(d) List for toxicity based on limited ambient toxicity data collected as part of a previous special study. Toxicity appeared to be the result of a high biochemical oxygen demand (BOD) rather than toxic substances.

Elevated bacteria levels have been detected periodically at two main-stem freshwater sites in this tidal reach. Although this is a tidal segment, the salinity levels are usually less than 1 ppt. Samples for enterococci have exceeded the numerical criteria in Stream Standards, but samples for *E. coli* have not exceeded the limits. The use of enterococci as an indicator of human waste does not appear to be as reliable in freshwater as in saltwater. A rookery located in the Blue Elbow Swamp upstream of these locations is the probable source of the enterococci group of bacteria.

Monitoring

The SRA 2005 WQMP includes monthly monitoring at seven sites in Reach 1. Additional sites are being evaluated to provide information for instream flow assessments, tidal stream flow, and nutrient and sediment loading to Sabine Lake.

Water Quality Conditions Map



Reach 2

Description

Reach 2 includes the Sabine River and its drainage from Morgan Bluff (river mile 25.1) to a point that includes Caney Creek (river mile 95.24) in Newton County. Reach 2 is divided into nine subwatersheds and covers 1,103 square miles. Most of Reach 2 is in Texas (82%) and 18% is in Louisiana. Reach 2 includes Segment 0502 (Sabine River Above Tidal) and Segment 0513 (Big Cow Creek). This is largely a rural area with no major industries or cities.

Water Quality

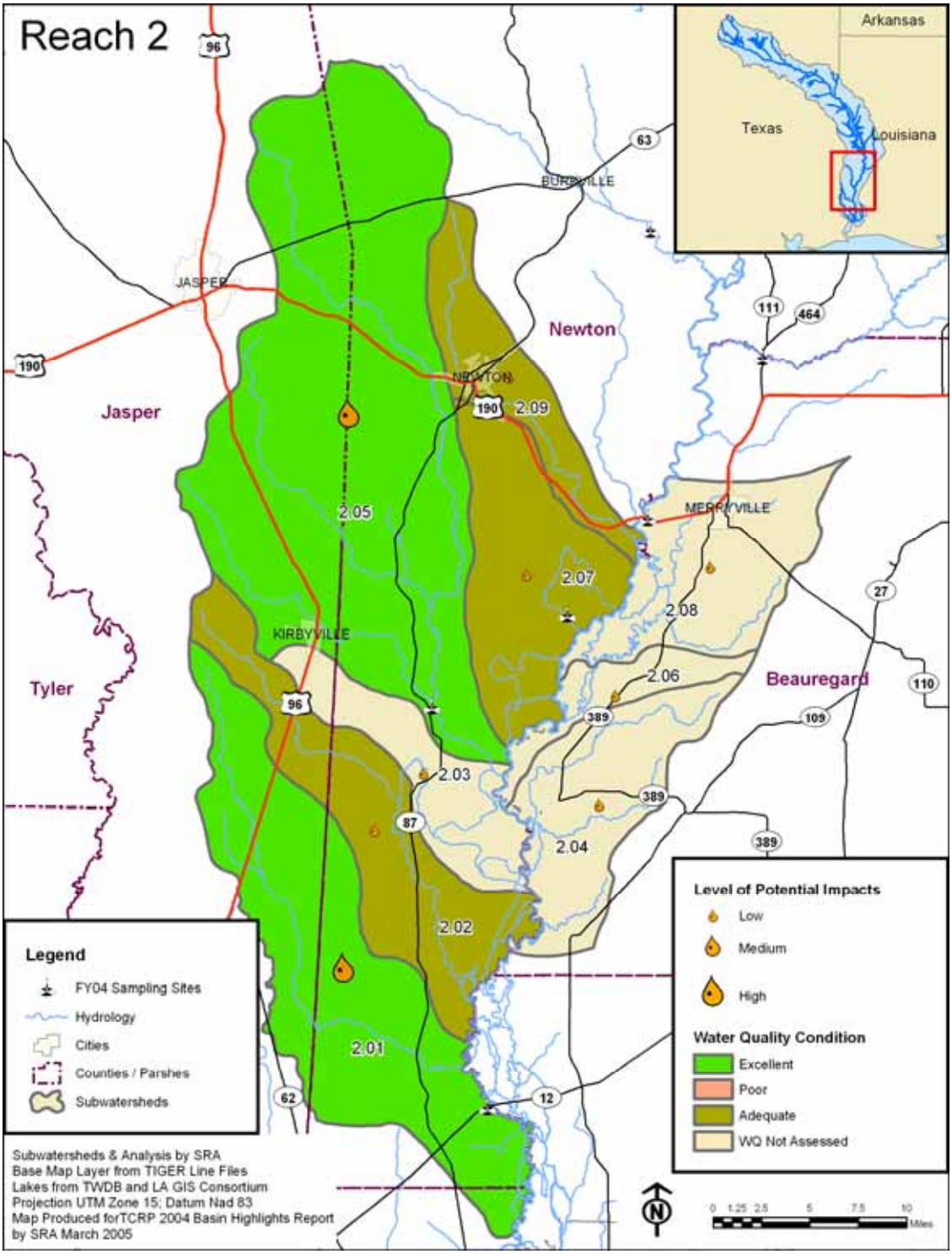
Data analyses have shown water quality problems in one subwatershed in Reach 2. The Nichols Creek Subwatershed is included on the 303(d) List due to low dissolved oxygen and elevated bacteria levels. Nichols Creek is characterized by sluggish flow and the water quality conditions appear to be due to natural conditions. No biological impairments have been observed and there are no permitted discharges in this sparsely populated subwatershed. A listing for toxicity has been added to the Draft 2004 303(d) List. The listing is based on a very small dataset and no toxic materials have ever been detected. The results of the ambient toxicity tests are more likely due to low dissolved oxygen levels rather than any toxic component.

Monitoring

The SRA is monitoring two sites in Reach 2 for 2005 in the WQMP. Big Cypress Creek and Nichols Creek are being monitored by the USGS as part of a TCEQ-initiated study to examine dissolved oxygen in small East Texas streams.

Sabine River Near Deweyville

Water Quality Conditions Map



Reach 3

Description

Reach 3 consists of the 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 eight subwatersheds and covers 364 square miles. Most of Reach 3 is in Louisiana (75%) and 25% is in Texas. Reach 3 is largely a rural area with no major cities and few industries. Reach 3 includes Segment 0503 (Sabine River Above Caney Creek) and is influenced by two major tributaries (Bayou Anacoco and Bayou Toro) from Louisiana.

Water Quality

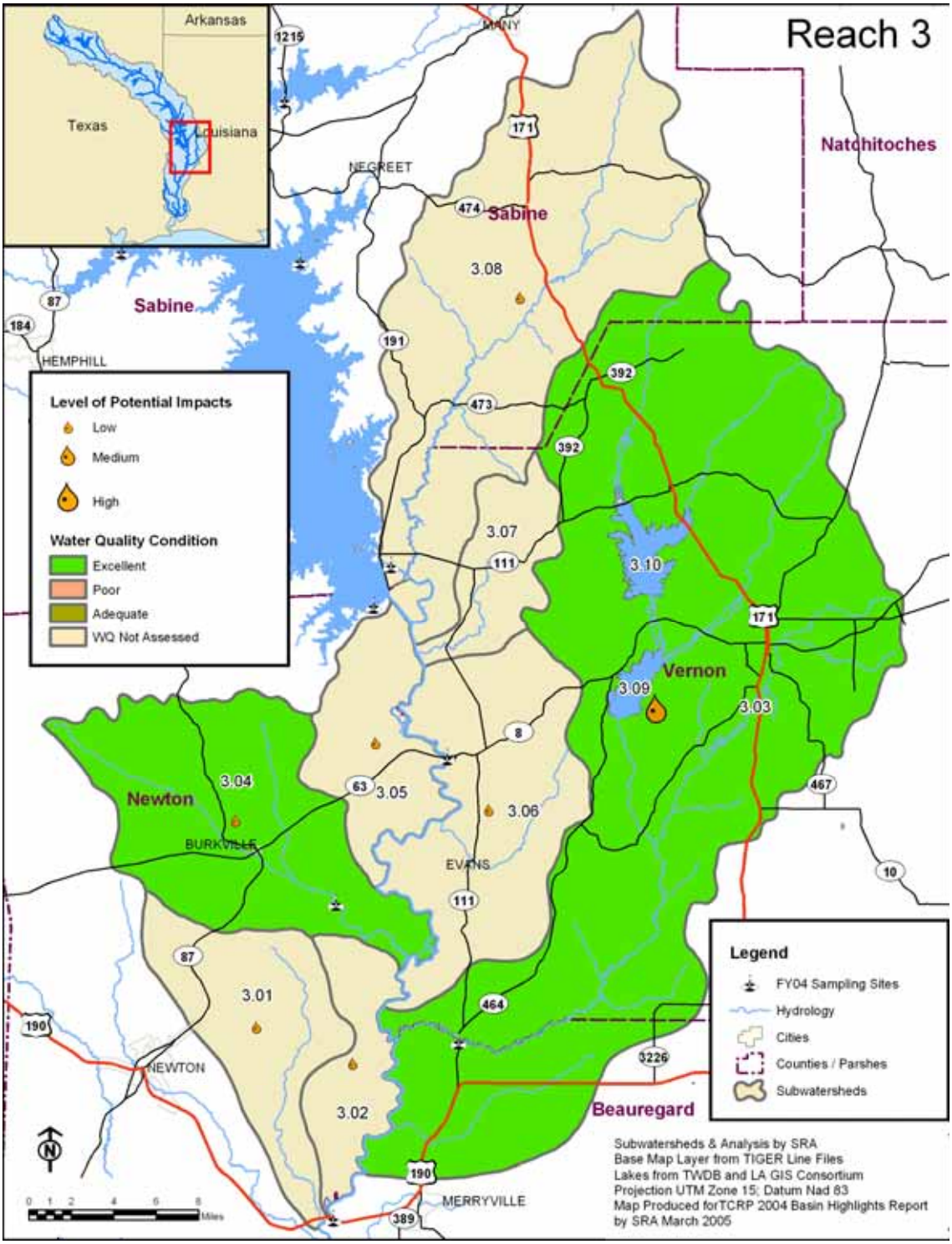
The data analyses indicate no water quality problems in any subwatershed in Reach 3.

Monitoring

The SRA WQMP in Reach 3 consists of four routine monitoring sites including one site in the Bayou Anacoco (Louisiana) Subwatershed. An intensive survey is being conducted in the Little Cow Creek Subwatershed (3.04). Flows are being measured at two sites in support of TCEQ permitting requirements.

Sabine River Downstream of Toledo Bend Reservoir

Water Quality Conditions Map



Reach 4

Description

Reach 4 includes the Sabine River from Toledo Bend Dam (river mile 156.45) in Newton County to a point that includes the Murvaul Creek confluence (river mile 291.2) in Panola County. This Reach is divided into 21 subwatersheds and covers 2,933 square miles. Reach 4 includes Segment 0504 (Toledo Bend Reservoir) and Segment 0509 (Murvaul Lake). This reach is dominated by Toledo Bend Reservoir and has no major cities or industries.

Water Quality

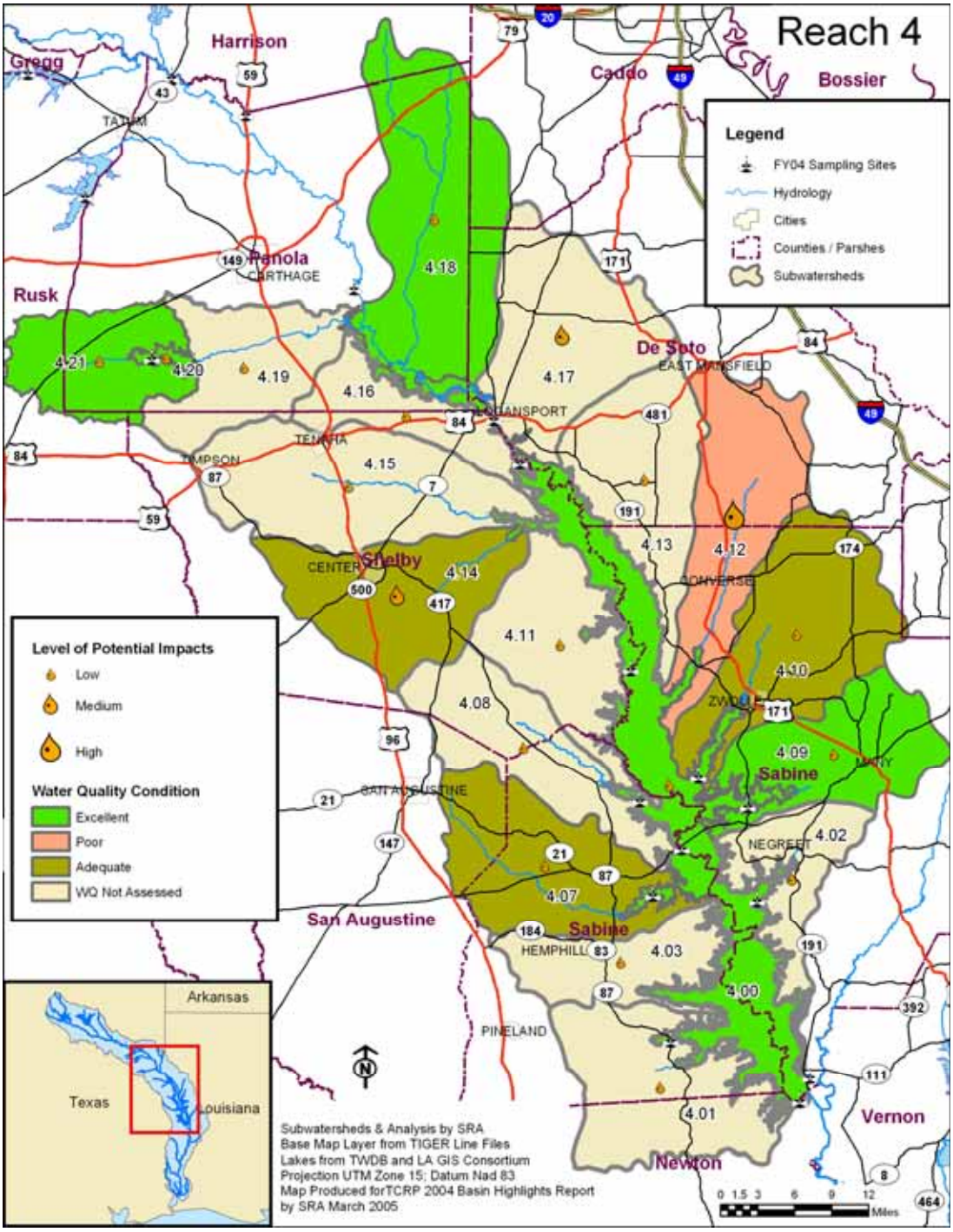
Concerns have been identified in Toledo Bend Reservoir associated with two subwatersheds in this Reach. Possible concerns for low dissolved oxygen were identified in the San Miguel Bayou Subwatershed, located in Louisiana. In the Tenaha Creek Arm of the reservoir, low dissolved oxygen levels were observed in the summer months, but the low values appear to be due to ambient conditions and no biological impairments were observed. Toledo Bend Reservoir was included on the 303(d) List for dissolved oxygen and mercury in fish tissue. The Texas Department of State Health Services (DSHS), formerly the Texas Department of Health, fish consumption advisory is still in effect for largemouth bass and freshwater drum in Toledo Bend Reservoir due to elevated levels of mercury in fish tissue **[9]**. Palo Gaucho Bayou was added to the Draft 2004 303(d) List. Ambient toxicity tests indicated possible water quality problems, but biological assessments showed no impairments. The toxicity was not persistent and not likely the result of toxic substances.

Monitoring

The SRA WQMP includes eleven sites in Reach 4, including three sites on the Louisiana side of Toledo Bend.

Pendleton Bridge on Toledo Bend Reservoir

Water Quality Conditions Map



Reach 5

Description

Reach 5 includes the Sabine River and its drainage from above the Murvaul Creek confluence (river mile 291.2) in Panola County to a point that includes the Glade Creek confluence (river mile 397.95) in Gregg County. This reach is divided into 24 subwatersheds and covers 1,629 square miles. Segment 0510 (Lake Cherokee, a water supply reservoir) is included in Reach 5. Also included is Segment 0505 (Sabine River Above Toledo Bend Reservoir), which is used extensively for water supply. Reach 5 has the highest concentration of population in the Sabine Basin and contains a large section of the East Texas Oilfield. There are numerous industries in this reach as well as six cities with populations above 5,000.

Water Quality

Water quality concerns were identified in one subwatershed in this reach. Elevated levels of bacteria were found in Grace Creek. Biological assessments performed in the Grace Creek Subwatershed in 2000 indicated non-impaired or slight impairment in twelve assessments at six sites. Fish samples indicated intermediate or high aquatic life use in ten assessments at six sites and limited/intermediate life use in two assessments. Grace Creek is included on the Draft 2004 303(d) List for low dissolved oxygen and elevated bacteria levels.

One main-stem site has been included on the Draft 2004 303(d) List for low dissolved oxygen and elevated bacteria levels. The site is located at Highway 149 near Longview and the causes have not been identified.

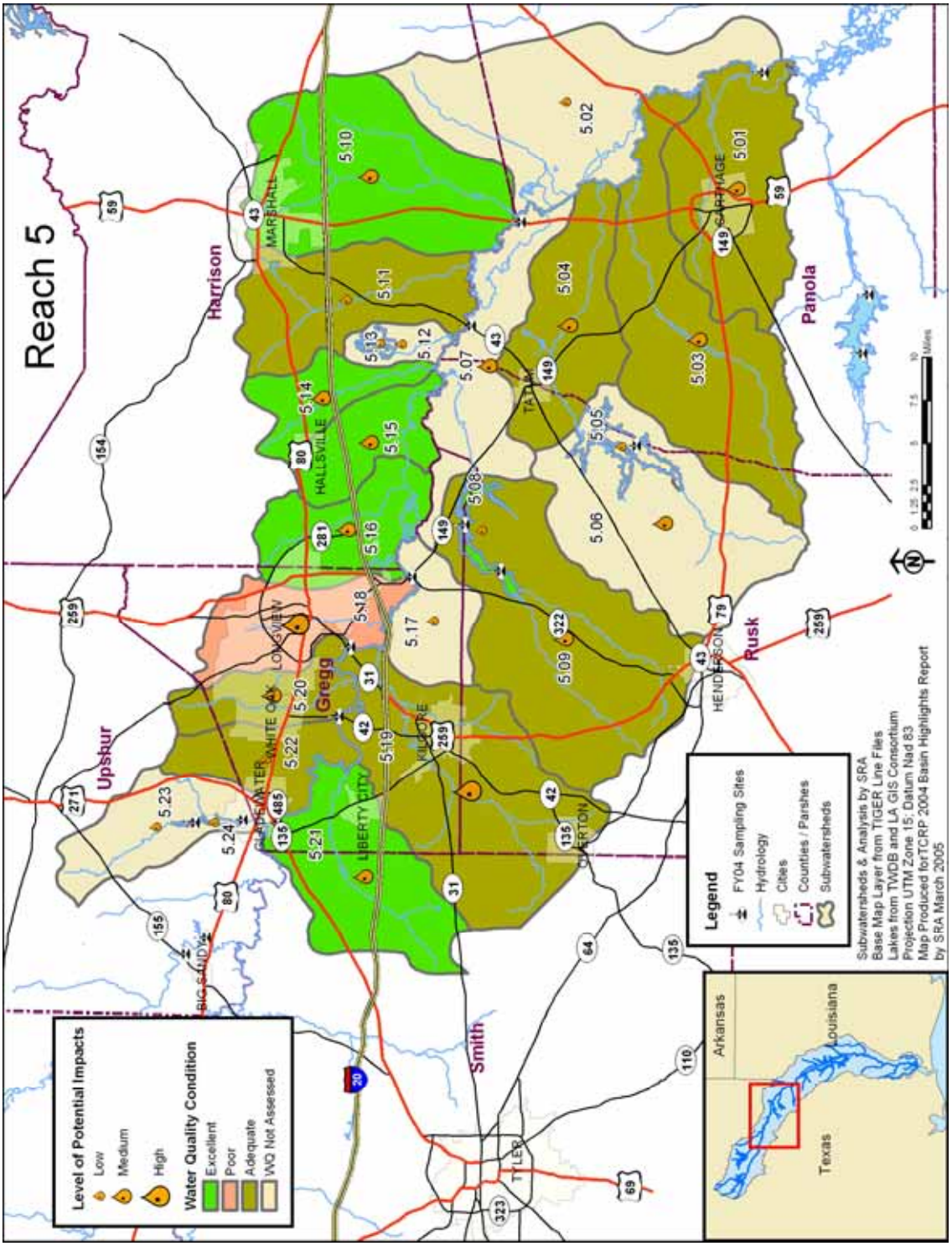
Wards Creek is also included on the 303(d) List for low dissolved oxygen, but the sample site was not sampled under the SRA QAPP and is not representative of the stream.

Monitoring

The SRA WQMP includes five main-stem river sites in Reach 5. Personnel from TCEQ and the City of Longview are sampling two sites in Lake Cherokee. The Longview sampling program is also under the SRA QAPP. The USGS is monitoring three sites in Reach 5 as part of a dissolved oxygen study initiated by TCEQ.

Sabine River at SH 42 Near Longview and Kilgore

Water Quality Conditions Map



Reach 6

Description

Reach 6 encompasses the Sabine River below Lake Tawakoni from above the 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 1,977 square miles. Reach 6 includes Lake Fork Reservoir (Segment 0512), which is a public water supply reservoir. This reach also includes Segments 0506 (Sabine River Below Lake Tawakoni), 0514 (Big Sandy Creek), and 0515 (Lake Fork Creek). Reach 6 is largely a rural area, but Segment 0512 historically had numerous dairies.

Water Quality

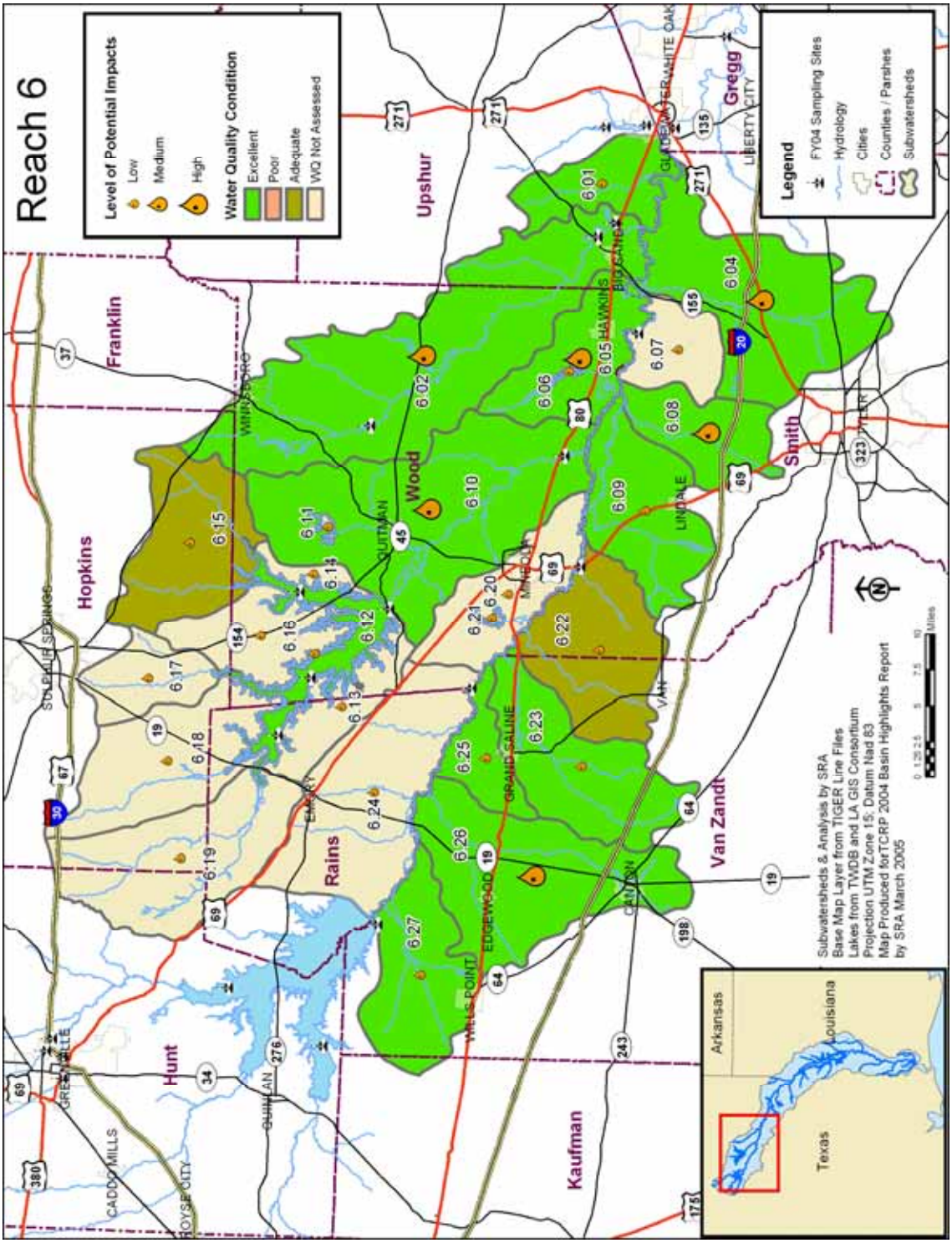
Water quality concerns have been identified in three subwatersheds in Reach 6 and one main-stem site. Ambient toxicity tests in the Little White Oak Creek Subwatershed showed lethality in about 20% of the samples, but no impairments were seen in the biological assessments. The TCEQ included Little White Oak Creek on the 303(d) List based on a very limited data set. No toxic materials have been identified. Observations in the Harris Creek Subwatershed showed low dissolved oxygen levels. Elevated levels of nutrients were also observed in the Running Creek and Elm Creek Subwatersheds. One main-stem site, the Sabine River at FM 17, also had elevated bacteria levels although the sources have not been identified.

Monitoring

The SRA WQMP includes seven sites in Reach 6, including three sites in Lake Fork Reservoir. Flows are being measured at two additional sites in support of TCEQ permitting requirements and TCEQ personnel are monitoring two sites in Lake Gladewater.

Lake Fork Reservoir

Water Quality Conditions Map



Reach 7

Description

Reach 7 extends from Iron Bridge Dam (Lake Tawakoni, river mile 514.5) to the Sabine River (Cowleech Fork, river mile 579.4) watershed divide near the City of Celeste (headwaters of the Sabine River). This reach is divided into seven subwatersheds and covers 775 square miles. All of Reach 7 subwatersheds drain into Lake Tawakoni (Segment 0507), a public water supply reservoir. Although much of Reach 7 is rural, it contains one of the four largest cities in the Sabine Basin.

Water Quality

In Subwatershed 7.07 (Cowleech Fork), elevated levels of bacteria and nutrients were detected in a SRA special study. The impairments appear to be the result of an effluent dominated stream and non-point sources.

Lake Tawakoni Watershed Protection Program

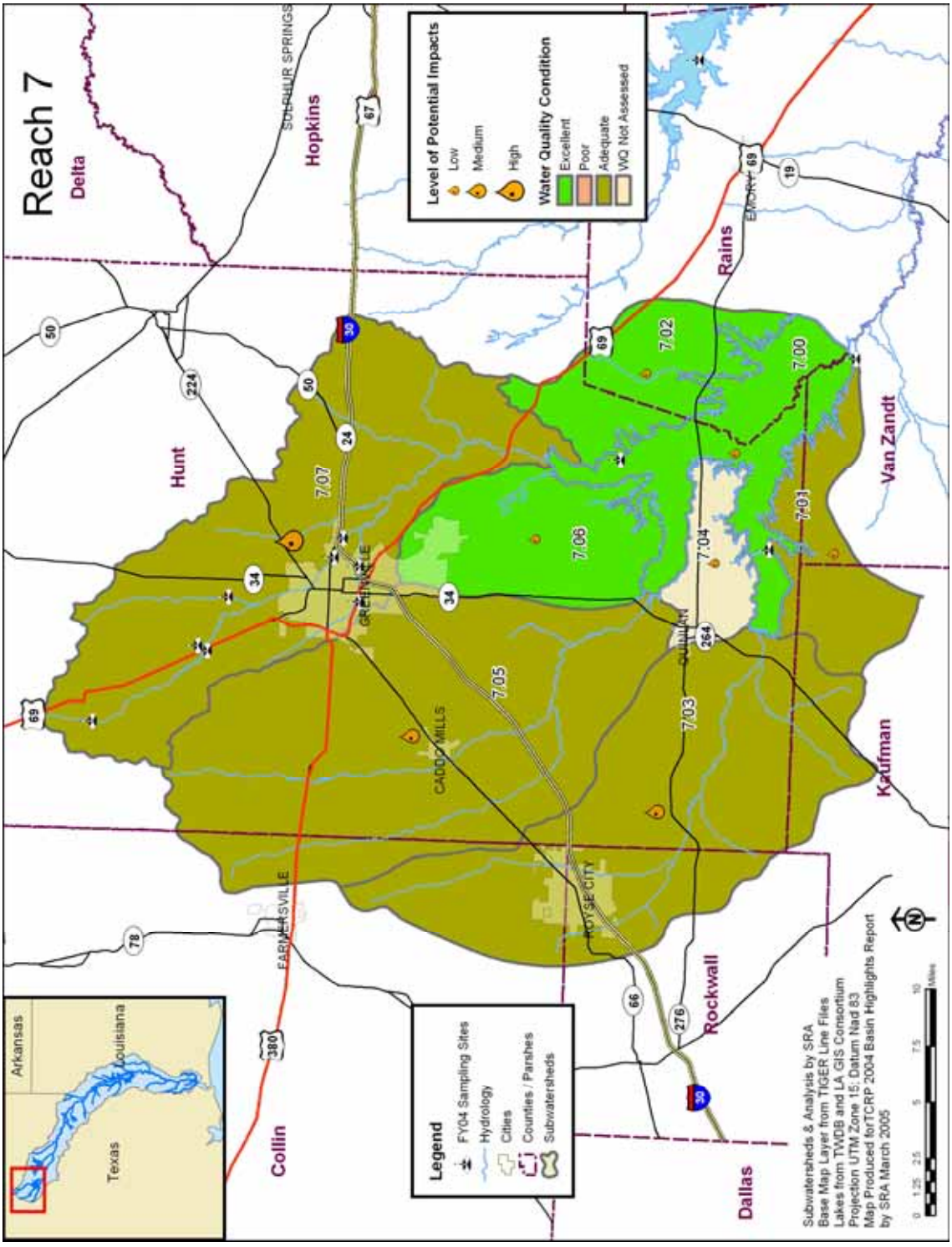
The SRA is developing a watershed protection program for Lake Tawakoni and its watershed as a TCRP Special Study. The program identifies municipal, commercial, and industrial activities, as well as individual activities that could potentially impact water quality. This effort is intended to increase public awareness of the water resources in this watershed.

Monitoring

The SRA 2005 WQMP includes three sites monitored monthly in Reach 7. The USGS is monitoring one site in Reach 7 as part of a dissolved oxygen study. The City of Dallas Water Utilities Department is monitoring five sites in and around Lake Tawakoni. TCEQ personnel are also monitoring water quality at two sites in the Cowleech Fork Subwatershed.

Two-Mile Bridge on Lake Tawakoni

Water Quality Conditions Map



Sabine River Basin Highlights 2004 Summary

Water quality in the Basin is generally excellent as a whole, predominantly meeting Stream Standards for water supply and contact recreation. The Texas Clean Rivers Program has enabled the SRA to collect extensive data on many sites that previously had little or no data. This program has been one of the most successful the SRA has been a part of and should continue to be a state priority. Protecting water quality is a vital part of providing for the water supply needs of the Basin. The SRA plays a leading role in managing the water resources in the Sabine Basin, and has for over 50 years, but this effort cannot be successfully accomplished without the partnership and cooperation with numerous state agencies and local stakeholders. SRA looks forward to continuing this cooperative relationship between TCEQ, other agencies, and the Basin stakeholders in balancing the long-term water needs with the resources available.

References

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[7] Water Conservation Implementation Task Force, TWDB, www.twdb.state.tx.us/assistance/conservation/taskforce.asp, referenced 3/30/2005.

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