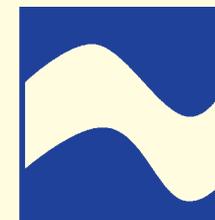


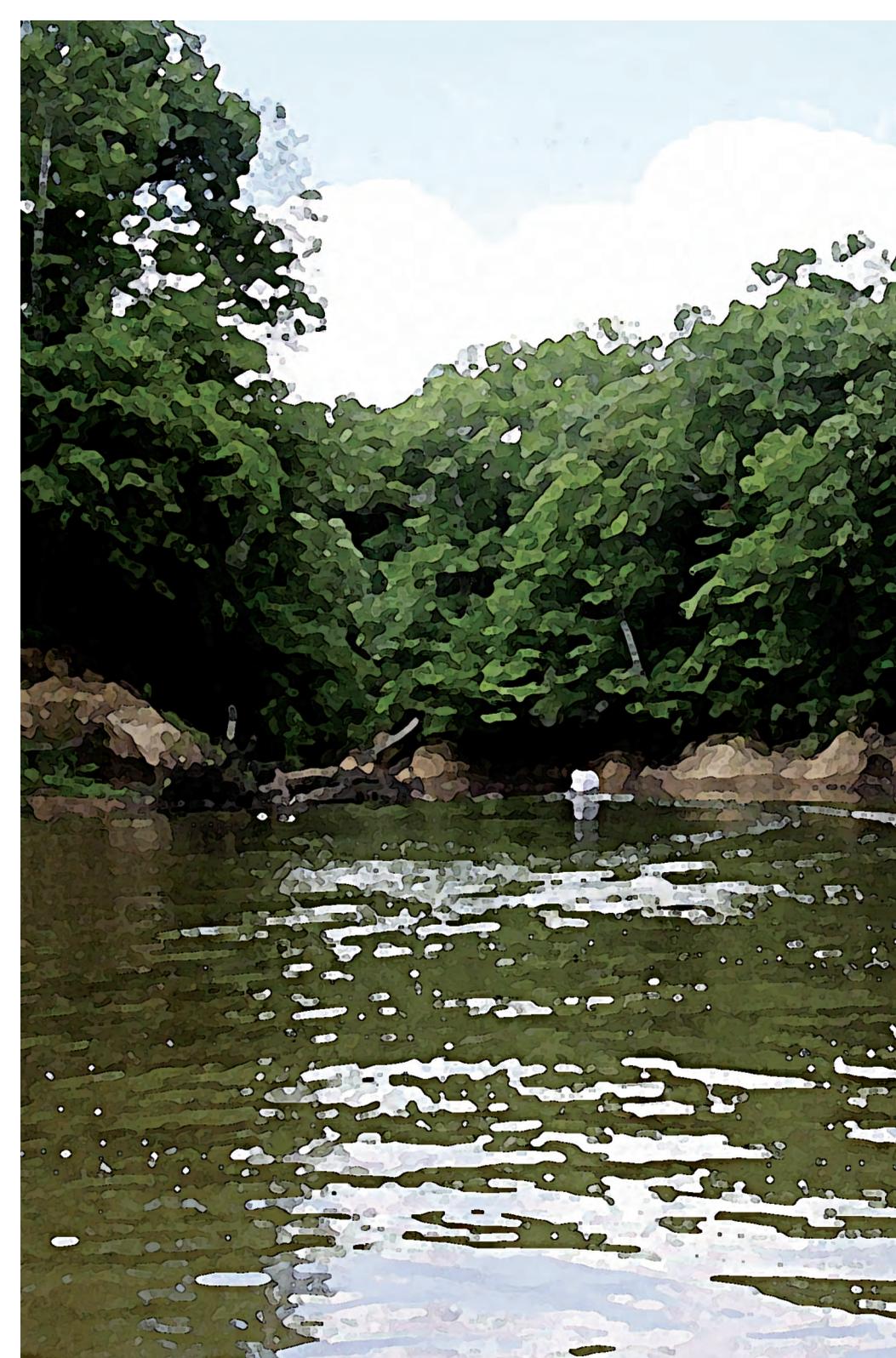
# **2004 BASIN SUMMARY REPORT**

## **UPPER NECHES RIVER BASIN**

PREPARED IN COOPERATION WITH THE  
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY  
UNDER THE AUTHORIZATION OF THE  
TEXAS CLEAN RIVERS ACT



**Angelina & Neches River Authority**



# **Board of Directors Angelina & Neches River Authority**

**Karen Elizabeth Barber, President**

**Carl Ray Polk, Vice President**

**Julie Dowell, Secretary Treasurer**

**Al Chavira, Secretary Pro-Tem**

**George S. Vorpahl, Director**

**James E. Raney, Director**

**Joe M. Deason, Director**

**Kenneth R. Darden, Director**

**Dominick B. (Nick) Bruno, Director**

**Kenneth Reneau, General Manager**

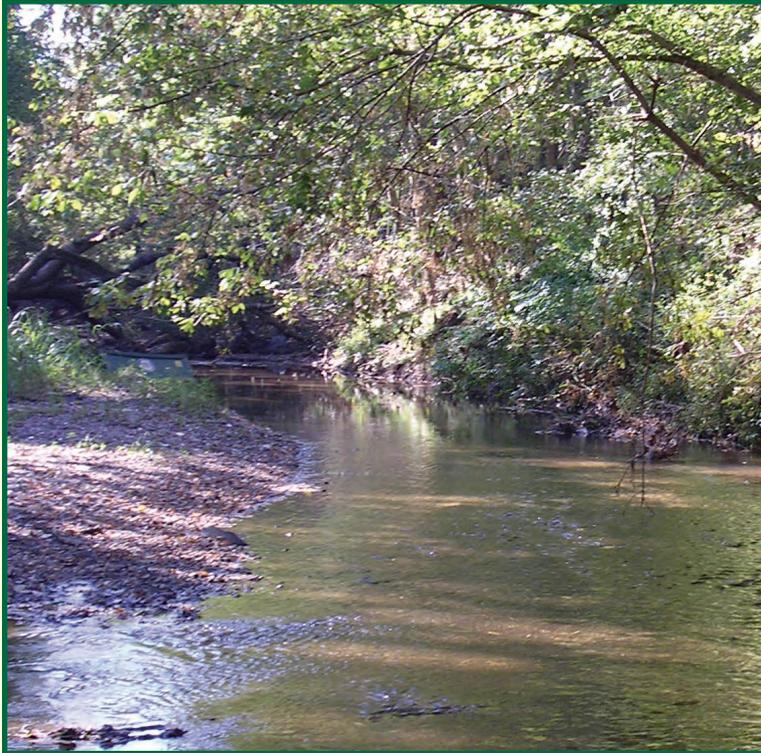
# TABLE OF CONTENTS

- Executive Summary .....Pages 2-9
- 1.0 Introduction .....Pages 10-12
  - Goals and Objectives
  - Coordination and Cooperation
  - Upper Neches Basin Overview
  - Summary of Basin Water Quality Characteristics
- 2.0 Public Involvement .....Page 13
  - ANRA Steering Committee
- 3.0 Technical Summary .....Page 14
- 3.1 Overview of Technical Summary .....Pages 14-17
  - TCEQ's 2004 Water Quality Inventory
  - Technical Terms
- 3.2 Technical Process .....Pages 18-20
  - Table 3.2-1: Segment Specific Water Quality Standards
  - Table 3.2-2: Use Support Criteria
  - Table 3.2-3: General Use Criteria
  - Table 3.2-4: Criteria for Nutrients in Water
- 3.3 Watershed Summaries .....Pages 23-42
  - Neches River below Lake Palestine - Segment 0604 & 0614 .....(24-27)
  - Lake Palestine - Segment 0605 .....(28-30)
  - Neches River above Lake Palestine - Segment 0606 .....(31-33)
  - Sam Rayburn Reservoir - Segment 0610 & 0615 .....(34-38)
  - Angelina River above Sam Rayburn Reservoir - Segment 0611 & 0613 .....(39-41)
  - Attoyac Bayou - Segment 0612 .....(42-42)
- 4.0 Conclusions and Recommendations .....Pages 43-44
- 5.0 Maps of the Upper Neches River Basin .....Pages 45-49
- 6.0 Appendices .....Page 50
  - Appendix A: Upper Neches River Basin Steering Committee Members
  - Appendix B: ANRA Data Analysis Results - Data Review and Trend Analysis

## EXECUTIVE SUMMARY

### INTRODUCTION

The Angelina & Neches River Authority, originally named the "Sabine & Neches Conservation District," was created in 1935 by the Texas legislature as a conservation and reclamation district. In 1949, the legislature divided the territory of the Sabine & Neches Conservation



District into the "Sabine River Authority" and the "Neches River Conservation District". It was not until 1971 that the Neches River Conservation District was activated and began operating as a water resource agency. In 1977, Senate Bill 125, changed the name of the Neches River Conservation District to the "Angelina & Neches River Authority".

The Authority's Mission Statement says "The Angelina & Neches River Authority, operating as an independent governmental agency, shall pursue any responsible means to assure the controlling, storing, and preserving of water resources in the Neches River Basin. This pursuit shall include the construction, maintenance, operation, monitoring, and testing of this resource."

The Angelina & Neches River Authority (ANRA) has far-reaching responsibilities for protecting and enhancing the valuable water resources in the Neches River Basin. ANRA's functions in the basin include water quality monitoring, drinking water and wastewater analysis, on-site sewage facility permitting, water and wastewater utilities, water resources development, regional wastewater/composting facilities, and other regional planning efforts.

The ANRA Environmental Division which is located at the main offices in Lufkin, Texas has numerous

responsibilities related to water quality management, analysis, permitting, and planning and works in conjunction with both public and private entities. The regulation of on-site sewage facilities (OSSF) around the Sam Rayburn Reservoir is an important program to protect the watershed and ensure compliance with state rules and regulations. A full service environmental laboratory provides microbiological drinking water analysis, municipal and industrial wastewater/solids analysis in addition to testing the water quality in the river basin under the Texas Clean Rivers Program. ANRA's participation in the Texas Clean Rivers Program since it's inception in 1991, has been the foundation to develop basin-wide monitoring programs, implement special water quality studies, and provide public outreach to educate and involve the citizens that live in the basin.

The 2004 Basin Summary Report for the Upper Neches River Basin was developed to support the objectives of the Texas Clean Rivers Program. It is ANRA's goal that the Basin Summary Report be utilized as a tool by the TCEQ and other state, federal, and local governmental bodies to identify and prioritize water quality issues within the basin, and allow for strategic guidance in the development of action plans designed to maintain and improve water quality in the Upper Neches River Basin and ultimately the State of Texas.

## ACTIVITIES AND ACCOMPLISHMENTS

Senate Bill 818 known as the "Texas Clean Rivers Act" was enacted by the 72nd Legislature in 1991 and amended by House Bill 1190 of the 75th Legislature in 1997. The "Texas Clean Rivers Act" established the state-wide Clean Rivers Program which provides for river authorities and other regional planning agencies to conduct water quality monitoring and assessments in their individual basins, or watersheds, under the supervision of the Texas Commission on Environmental Quality (TCEQ) formerly known as the Texas Natural Resource Conservation Commission. The goal of the Texas Clean Rivers Program is to maintain and improve the quality of water resources within each river basin in Texas through an ongoing partnership involving the TCEQ, other agencies, river authorities, regional entities, local governments, industry, and citizens. The Clean Rivers Program (CRP) utilizes a watershed management approach to identify and evaluate water quality issues, establish priorities for corrective action, and outline strategies to implement those actions. In the Upper Neches River Basin, ANRA is the planning agency for all CRP activities with guidance from the TCEQ. ANRA is responsible for implementing the goals of the CRP through data collection activities, data analysis, prioritization of water quality concerns, and public outreach activities.

### TEXAS CLEAN RIVERS PROGRAM 2000-2005 LONG-TERM GOALS

- GOAL 1 - ENSURE EFFICIENT USE OF PUBLIC FUNDS**
- GOAL 2 - ENHANCE PUBLIC PARTICIPATION AND OUTREACH**
- GOAL 3 - ENCOURAGE COMPREHENSIVE AND COOPERATIVE WATERSHED PLANNING**
- GOAL 4 - MAINTAIN BASIN-WIDE WATER QUALITY MONITORING PROGRAMS**
- GOAL 5 - DEVELOP AND MAINTAIN A RIVER BASIN WATER QUALITY DATABASE CLEARINGHOUSE**
- GOAL 6 - PROVIDE QUALITY ASSURED DATA TO THE COMMISSION FOR USE IN WATER QUALITY DECISION-MAKING**
- GOAL 7 - FOCUS ON PRIORITY ISSUES AND ADDRESS LOCAL INITIATIVES**
- GOAL 8 - IDENTIFY, ANALYZE, AND REPORT ON WATER QUALITY ISSUES AND POTENTIAL CAUSES OF POLLUTION**
- GOAL 9 - IDENTIFY AND EVALUATE ALTERNATIVES FOR PREVENTING AND REDUCING POLLUTION**

The Clean Rivers Program also supports the goals of ensuring safe, clean water supplies for the future. A "Long-Term Action Plan" for fiscal years 2000-2005 was developed to outline the steps and progress required for the Clean Rivers Program to meet these goals.

The Clean Rivers Program enables citizens and stakeholders of the Neches River Basin to meet periodically to review and discuss water quality issues. The forum that CRP provides and the input that ANRA has received through this process, has led to the development of special projects,



improved the planning of activities, and generated attainable objectives designed to resolve water quality issues and concerns. The activities which involve this type of coordination and cooperation with other basin entities include the annual coordinated monitoring meetings, basin steering committee meetings, volunteer environmental monitoring program, public meetings and investigations of water quality complaints. ANRA also

works closely with the TCEQ regional offices in Beaumont and Tyler to coordinate monitoring activities and special projects in the basin. In addition, ANRA and the Lower Neches Valley Authority (LNVA) entered into an interlocal agreement in 2001 for the purpose of monitoring, inspecting, and testing the water quality in the Sam Rayburn Reservoir. The funds provided by the LNVA are used to enhance ANRA's OSSF program, perform additional water quality monitoring and data collection activities, and increase public education and outreach efforts for the Sam Rayburn Reservoir and surrounding areas.

Public involvement is considered a primary means of building support and developing a broad-based constituency for water quality management and watershed assessments. Including the public and stakeholders in the process is a priority for the Clean Rivers Program and ANRA. ANRA continues to support public involvement and participation in the basin by hosting public meetings, sponsoring informational booths at area events, hosting volunteer environmental training workshops, and giving presentations to area groups. ANRA is currently a sponsor for the annual Neches River Rendezvous canoe trip coordinated by the Angelina County Chamber of Commerce. Public displays are available at both entrances to the ANRA offices which provide literature to the public on water quality, water conservation, volunteer monitoring,

on-site sewage facilities, and educational material for schools.

ANRA remains an active supporter of volunteer environmental monitoring activities in the Upper Neches River Basin. As a partner in Texas Watch, an environmental monitoring program developed by TCEQ and funded primarily through Federal 319(h) Nonpoint Source Pollution grants, ANRA provides training and support for students, teachers, and citizens in the basin who want to be involved in the environmental monitoring process. Currently, the ANRA volunteer network includes several volunteer groups consisting of approximately fifteen certified water quality monitors that collect data and observations at six different monitoring locations. ANRA utilizes the data collected by volunteers to assist in developing local and regional management strategies. ANRA believes that the volunteer program provides the opportunity for the public to actively participate in the assessment of the Upper Neches River Basin. It is also a valuable educational tool that informs the public of local and basin-wide water quality issues and the importance of water quality monitoring.

The ANRA web page at [www.anra.org](http://www.anra.org) is another way to reach the public and inform them about the Clean Rivers Program. Included on the ANRA web page are current CRP activities, water quality reports, current monitoring tables and maps, CRP



meetings and events, and links to the TCEQ, Texas Watch, and other CRP planning agencies. The website also provides public access to ANRA's water quality database. The database can be searched by the name of a water body or a list of monitoring stations is made available to help identify a water body or monitoring station near a particular area of interest. The on-line database is updated periodically to include current data which has been submitted to the TCEQ.

ANRA's Clean Rivers Program activities are directed by the Clean Rivers Program Steering Committee. The Upper Neches River Basin Steering Committee was originally formed in late 1991 to serve in an advisory capacity for regional water quality assessment efforts. Since 1991, the Steering Committee has been instrumental in the CRP planning process and committee members continue to provide meaningful input and feedback to ANRA in the local watersheds. Members for this Committee were sought from federal and state agencies, local governments, industry, academic institutions, agricultural interests, conservation groups, and other interested basin stakeholders. The Steering Committee membership is routinely evaluated and expanded to achieve greater public participation and input to Clean Rivers Program activities in the basin.

The Steering Committee will continue to serve as the primary public resource for providing general

guidance and direction for ANRA's regional water quality efforts while increasing basin stakeholder participation. The Steering Committee is responsible for reviewing and approving ANRA's Clean Rivers Program biennial work plans and budgets for each contract period. The Committee assists ANRA with the following activities:

- creating specific, achievable water quality objectives and basin priorities
- reviewing, developing, and approving major basin reports
- establishing monitoring priorities; reviewing and developing monitoring plans
- identifying priority problem areas and developing action plans to address them

The ANRA Steering Committee meets on an annual basis, and more frequently as needed, to review information and provide guidance for ANRA's watershed management efforts. Steering Committee meetings have helped to develop a rapport and understanding between the many basin stakeholders. Steering Committee members are the medium through which information regarding water quality issues can be disseminated to stakeholders and general public.





**ANRA Environmental Laboratory**

## **SIGNIFICANT FINDINGS**

Watershed planning and management allows for the examination of the complex relationships that exist between water resources availability, utilization, and impact(s) within the Upper Neches River Basin. Water quality data pertaining exclusively to East Texas have been analyzed under the umbrella of the Clean Rivers Program.

This data is being utilized to better define regional ambient water quality conditions in the Upper Neches River Basin and to formulate realistic, effective, and scientifically based approaches to water quality regulations and discharge permit criteria.

In 1997, the TCEQ developed a comprehensive Watershed Management Approach to address the water quality impairments identified in the Clean Water Act 303(d) List of impaired water bodies in Texas. The 303(d) List identifies and prioritizes the water bodies in Texas that need Total Maximum Daily Loads (TMDL) allocations. The Watershed Management Approach involves a 5-year cyclical approach that coordinates monitoring, modeling, standards, permitting, and planning efforts by basin. The five phases that were developed are:

- 1 - Scoping and Re-evaluation
- 2 - Data Collection
- 3 - Assessment and Targeting
- 4 - Strategy Development
- 5 - Implementation

The TCEQ discharge permits are issued according to a basin schedule over the five year cycle. The Basin Summary Report is completed during Phase 3- Assessment and Targeting of the Basin Management Cycle. Basin group A, which includes the Neches River Basin, is currently in this phase of the five year cycle.

In August 2000, the Texas Surface Water Quality Standards established nine classified segments in the Upper Neches River Basin with segment specific criteria for the protection of their designated uses (Table 2). To determine whether the designated uses are supported, water quality parameters are examined and compared to water quality criteria and screening levels found in the Texas Surface Water Quality Standards and the TCEQ's *Guidance for Assessing Texas Surface and Finished Drinking Water Quality Data, 2002*.

Overall, for the nine classified segments in the Upper Neches Basin, all segments are fully supporting the aquatic life use criteria for dissolved oxygen, three segments are not supporting and/or partially supporting the general use support criteria, and three segments are not supporting the contact recreation use. Two segments are not supporting the aquatic life use due to elevated levels of metals in water. Two segments are partially supporting the fish consumption use due to mercury levels in fish tissue. Five segments have secondary water quality concerns due to elevated concentrations of nutrients and/or chlorophyll a. These concentrations exceed screening levels established by the TCEQ since water quality standards have not been developed for Texas.



## Summary of ANRA's Data Review for the Upper Neches River Basin

The table at right summarizes the results of ANRA's comprehensive 5-year data review of surface water quality in the Upper Neches River Basin, which includes all classified segments and selected unclassified segments or tributaries where sufficient data has been collected.

Segment	Waterbody	No. of Stations	Results of 5-year Data Review (September 1998 - August 2003)
0604	Neches River below Lake Palestine	3	Fully Supporting, No Concerns
		2	Fully Supporting, Primary Concern (E. coli)
		1	Fully Supporting, Concern (Chl a)
0604-A	Cedar Creek	1	Not Supporting (TDS, Chloride, Sulfate, E. coli) Concern (Ammonia-N, Nitrate+Nitrite, Total Phosphorus, Ortho-Phosphorus)
0604-B	Hurricane Creek	1	Not Supporting (TDS, Chloride, Sulfate, E. coli) Concern (Ammonia-N)
0604-C	Jack Creek	1	Not Supporting (TDS, Chloride, Sulfate, E. coli) Concern (Ammonia-N, Nitrate+Nitrite, Total Phosphorus, Ortho Phosphorus)
0604-D	Piney Creek	1	Not Supporting (Sulfate) Partially Supporting (pH, DO) Concern (Ammonia-N) Primary Concern (24 Hr. DO)
0604-M	Biloxi Creek	1	Not Supporting (Chloride, Sulfate, TDS, E. coli) Concern (Ammonia-N)
		1	Not Supporting (TDS, Sulfate, E. coli) Primary Concern (24 Hr. DO)
0604-N	Buck Creek	1	Not Supporting (Sulfate, Chloride, TDS)
0614	Lake Jacksonville	2	Fully Supporting, No Concerns
0605	Lake Palestine	2	Not Supporting (TDS) Concerns (Ammonia-N, Nitrate+Nitrite, Total Phosphorus, Ortho Phosphorus)
		1	Partially Supporting (pH) Concern (Chl a)
		1	Fully Supporting, No Concerns
0605-A	Kickapoo Creek	1	Not Supporting (TDS, E. coli) Partially Supporting (DO) Concerns (Ammonia-N) Primary Concern (24 Hr. DO)
0606	Neches River above Lake Palestine	1	Not Supporting (E. coli) Concern (Nitrate+Nitrite)
		1	Not Supporting (DO) Partially Supporting (pH) Primary Concern (24 Hr. DO)
		1	Not Supporting (pH, Sulfate) Primary Concern (24 Hr. DO)
0610	Sam Rayburn Reservoir	2	Fully Supporting, No Concerns
		3	Fully Supporting Concern (Nitrate+Nitrite)
		3	Fully Supporting Concern (Ammonia-N, Nitrate+Nitrite)
		2	Fully Supporting Concern (Ammonia-N, Nitrate+Nitrite, Total Phosphorus)

Segment	Waterbody	No. of Stations	Results of 5-year Data Review (September 1998 - August 2003)
0610-A	Ayish Bayou	1	Not Supporting (TDS, E. coli) No Concerns
0615	Angelina River/ Sam Rayburn Reservoir	1	Fully Supporting Concerns (Ammonia-N, Nitrate+Nitrite, Total Phosphorus, Ortho Phosphorus) Primary Concern (E. coli, 24 hr. DO)
		1	Fully Supporting Concern (Nitrate+Nitrite) Primary Concern (24 hr. DO)
0615-A	Paper Mill Creek	1	Not Supporting (DO, Chloride, Sulfate, TDS) Concerns (Ammonia-N, Total Phosphorus) Primary Concern (E. coli, 24 hr. DO)
0611	Angelina River above Segment 0615	2	Fully Supporting, No Concerns
		1	Fully Supporting Primary Concern (E. coli)
		1	Not Supporting (E. coli) Partially Supporting (pH) Primary Concern (24 Hr. DO)
0611-A	East Fork Angelina River	1	Fully Supporting, No Concerns
0611-B	La Nana Bayou	1	Not Supporting (E. coli) Partially Supporting (DO) Concerns (Ammonia-N, Total Phosphorus, Ortho Phosphorus)
		1	Not Supporting (E. coli) No Concerns
0611-C	Mud Creek	1	Fully Supporting Concern (Total Phosphorus) Primary Concern (24 hr. DO)
		1	Not Supporting (E. coli) No Concerns
0611-D	West Mud Creek	1	Fully Supporting Concerns (Ammonia-N, Nitrate+Nitrite, Total Phosphorus, Ortho Phosphorus)
0613	Lake Tyler/ Lake Tyler East	4	Fully Supporting, No Concerns
0612	Attoyac Bayou	2	Not Supporting (E. coli) No Concerns





## RECOMMENDATIONS

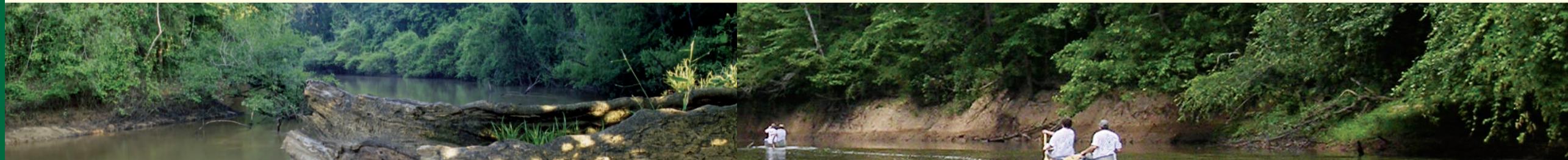
The 2004 Basin Summary Report shows that significant progress has been made in the collection and analysis of water quality data in the basin. This was the intent of the Texas Clean Rivers Act in 1991 and it is occurring in the Upper Neches Basin through the efforts of ANRA. Since the Upper Neches surface water quality

monitoring program began in September 1996, ANRA has compiled over 27,000 records from 1,637 monitoring events. The data collection effort has included monitoring in all areas of the basin, including numerous subwatersheds and receiving streams to support discharge permits. The types of data collected have included routine water quality parameters, in-stream flows, metals in water and sediment, priority pollutants (pesticides, herbicides, etc.), biological assessments, and receiving water assessments. In addition, ANRA has collected geographical data in the basin using GPS technology and maintains an inventory of events and issues that impact water quality in the basin.

In the Upper Neches Basin, the majority of the classified segments support the designated uses as defined by the Texas Surface Water Quality Standards. There are water quality impairments and concerns that have been identified in this report, especially in the unclassified segments, which will focus efforts in the basin and may initiate the development of special projects. If special projects are developed in the basin it would further increase the cooperation and coordination of basin entities and may identify additional funding sources.

In response to a metals in water issue in the Upper Neches Basin, ANRA implemented an

intensive 18 month dissolved metals in water study in June 2002 to address the possible concerns. In preparing the Draft 2002 305b Assessment, TCEQ and ANRA officials determined there were quality assurance issues with the metals in water data collected during 1998 and 1999. Based on ANRA's recommendation, the metals data from this time period was not included in the state's 2002 assessment and the dissolved metals in water study was initiated. Additional funds were received through the Clean Rivers Program and quarterly metals in water sampling was conducted at 15 high priority monitoring stations over a two year period. Since the total hardness values in East Texas are relatively low, the metals in water criteria is significantly lower than other parts of Texas. To address the low detection limits that would be required to accurately assess the metals data, ANRA utilized an ultra-clean sample collection and laboratory analysis technique developed by Albion Environmental in College Station, TX to accurately determine trace metals at the parts per billion (ppb) to parts per trillion (ppt) level. The analytical results from this study determined that basin-wide metals in water contamination is not occurring since all values were reported below the water quality criteria established in the TSWQS. ANRA has continued to monitor dissolved metals in water using this technique on an annual or semi-annual basis since the initial study was completed.



The following recommendations are provided by ANRA to continue the progress that has been made with the data collection efforts and focus on problem areas that may require more intensive actions. Special studies that are recommended should determine the extent of a problem and formulate a justification for standards revisions, recommended actions, and/or determine designated uses. The data review has indicated that additional data will aid in many cases to determine whether concerns are justified. Stream standards may need to be re-evaluated to determine if segment specific criteria support naturally occurring water quality conditions in the region. Additional monitoring in areas where a general use is not supported would help to determine the cause and potential sources if not attributed to natural conditions.

- Continue *E. coli* monitoring in segment 0604 on Cedar Creek, Jack Creek, Hurricane Creek, and Biloxi Creek and encourage stakeholders in these watersheds to address the potential sources of pollution.
- General use criteria be established for the unclassified segments. ANRA's data review included these parameters and applied the segment-specific criteria to the unclassified water bodies for screening purposes only.
- Collect additional 24-hour dissolved oxygen measurements on Piney Creek, and if necessary add monitoring stations upstream and downstream to locate the extent of the potential

problem area. If the depressed levels continue, a Use Attainability Analysis (UAA) may need to be completed in order to ensure that the high aquatic life use criteria is appropriate for this unclassified water body in segment 0604.

- Implement intensive monitoring in the upper portion of Lake Palestine to determine the severity of the nutrients problem and the potential sources.
- Continue monitoring at Kickapoo Creek near Brownsboro and consider monitoring additional stations upstream to address on-going water quality issues.
- Continue monitoring dissolved metals in water on the Neches River at SH 64, including the collection of hardness data, to identify potential concerns for zinc in water.
- Collect additional *E. coli* data at the Ayish Bayou in segment 0610, and the Angelina River and Paper Mill Creek in segment 0615 to provide a better understanding of bacteria concerns.
- Continue the collection of the 24-hour dissolved oxygen measurements in segment 0615 to fully assess the aquatic life use in the segment.
- Continue to monitor bacteria, pH and 24-hour DO measurements on the Angelina River at SH 204 in segment 0611.
- Continue to monitor *E. coli* and nutrients at La Nana Bayou, Mud Creek and West Mud Creek monitoring stations in segment 0611.
- Additional metals (lead) in water data needs to

be collected and analyzed using much lower detection limits (i.e. 0.1 ug/L) in the East Fork Angelina River.

- Continue to monitor *E. coli* bacteria in the Attoyac Bayou. Additional monitoring in the tributaries will help to determine the magnitude of the problem and may identify the source(s) of the bacteria.

The majority of the recommendations are to continue the routine and intensive monitoring that is currently being conducted and incorporate additional monitoring stations in some areas. In addition, a special study is recommended for the Sam Rayburn Reservoir and Lake Palestine to identify the sources of nutrients in the watersheds. Additional targeted monitoring in conjunction with current routine monitoring efforts may establish target areas to implement Best Management Practices (BMPs) and/or develop implementation plans. The input and cooperation of stakeholders in the watersheds to develop project proposals is important to obtain additional funding for the projects. Local matching funds would likely be required to obtain additional funding through sources such as the Texas Nonpoint Source Pollution Management Program which utilizes federal Clean Water Act (CWA) section 319(h) funds allocated to Texas.



## 1.0 INTRODUCTION

The Angelina & Neches River Authority, originally named the "Sabine & Neches Conservation District," was created in 1935 by the Texas legislature as a conservation and reclamation district. In 1949, the legislature divided the territory of the Sabine & Neches Conservation District into the "Sabine River Authority" and the "Neches River Conservation District". It was not until 1971 that the Neches River Conservation District was activated and began operating as a water resource agency. In 1977, Senate Bill 125, changed the name of the Neches River Conservation District to the "Angelina & Neches River Authority."

The Authority's Mission Statement says "The Angelina & Neches River Authority, operating as an independent governmental agency, shall pursue any responsible means to assure the controlling, storing, and preserving of water resources in the Neches River Basin. This pursuit shall include the construction, maintenance, operation, monitoring, and testing of this resource."

The Angelina & Neches River Authority (ANRA) has far-reaching responsibilities for protecting and enhancing the valuable water resources in the Neches River Basin. ANRA's functions in the basin include water quality monitoring, drinking water and wastewater analysis, on-site sewage facility permitting, water and wastewater utilities, water resources development, regional wastewater/composting facilities, and other regional planning efforts.

The ANRA Environmental Division which is located at the main offices in Lufkin, Texas has numerous responsibilities related to water quality management, analysis, permitting, and planning and works in conjunction with both public and private entities. The regulation of on-site sewage facilities (OSSF) around the Sam Rayburn Reservoir is an important program to protect the watershed and ensure compliance with state rules and regulations. A full service environmental laboratory provides microbiological drinking water analysis, municipal and industrial wastewater/solids analysis in addition to testing the water quality in the river basin under the Texas Clean Rivers Program. ANRA's participation in the Texas Clean Rivers Program since its inception in 1991, has been the foundation to develop basin-wide monitoring programs, implement special water quality studies, and provide public outreach to educate and involve the citizens that live in the basin.

The 2004 Basin Summary Report for the Upper Neches River Basin was developed to support the objectives of the Texas Clean Rivers Program. It is ANRA's goal that the Basin Summary Report be utilized as a tool by the TCEQ and other state, federal, and local governmental bodies to identify and prioritize water quality issues within the basin, and allow for strategic guidance in the development of action plans designed to maintain and improve water quality in the Upper Neches River Basin and ultimately the State of Texas.

### Clean Rivers Program and Upper Neches Basin Goals and Objectives

Senate Bill 818 known as the "Texas Clean Rivers Act" was enacted by the 72nd Legislature in 1991 and amended by House Bill 1190 of the 75th Legislature in 1997. The "Texas Clean Rivers Act" established the state-wide Clean Rivers Program which provides for river authorities and other regional planning agencies to conduct water quality monitoring and assessments in their individual basins, or watersheds, under the supervision of the Texas Commission on Environmental Quality (TCEQ) formerly known as the Texas Natural Resource Conservation Commission. The goal of the Texas Clean Rivers Program is to maintain and improve the quality of water resources within each river basin in Texas through an ongoing partnership involving the TCEQ, other agencies, river authorities, regional entities, local governments, industry, and citizens. The Clean Rivers Program (CRP) utilizes a watershed management approach to identify and evaluate water quality issues, establish priorities for corrective action, and outline strategies to implement those actions. In the Upper Neches River Basin, ANRA is the planning agency for all CRP activities with guidance from the TCEQ. ANRA is responsible for implementing the goals of the CRP through data collection activities, data analysis, prioritization of water quality concerns, and public outreach activities.

The Clean Rivers Program also supports the goals of ensuring safe, clean water supplies for the future. A "Long-Term Action Plan" for fiscal years 2000-2005 was developed to outline the steps and progress required for the Clean Rivers Program to meet these goals.



## TEXAS CLEAN RIVERS PROGRAM 2000-2005 LONG-TERM GOALS

- GOAL 1 - ENSURE EFFICIENT USE OF PUBLIC FUNDS
- GOAL 2 - ENHANCE PUBLIC PARTICIPATION AND OUTREACH
- GOAL 3 - ENCOURAGE COMPREHENSIVE AND COOPERATIVE WATERSHED PLANNING
- GOAL 4 - MAINTAIN BASIN-WIDE WATER QUALITY MONITORING PROGRAMS
- GOAL 5 - DEVELOP AND MAINTAIN A RIVER BASIN WATER QUALITY DATABASE CLEARINGHOUSE
- GOAL 6 - PROVIDE QUALITY ASSURED DATA TO THE COMMISSION FOR USE IN WATER QUALITY DECISION-MAKING
- GOAL 7 - FOCUS ON PRIORITY ISSUES AND ADDRESS LOCAL INITIATIVES
- GOAL 8 - IDENTIFY, ANALYZE, AND REPORT ON WATER QUALITY ISSUES AND POTENTIAL CAUSES OF POLLUTION
- GOAL 9 - IDENTIFY AND EVALUATE ALTERNATIVES FOR PREVENTING AND REDUCING POLLUTION

### Coordination and Cooperation with Other Basin Entities

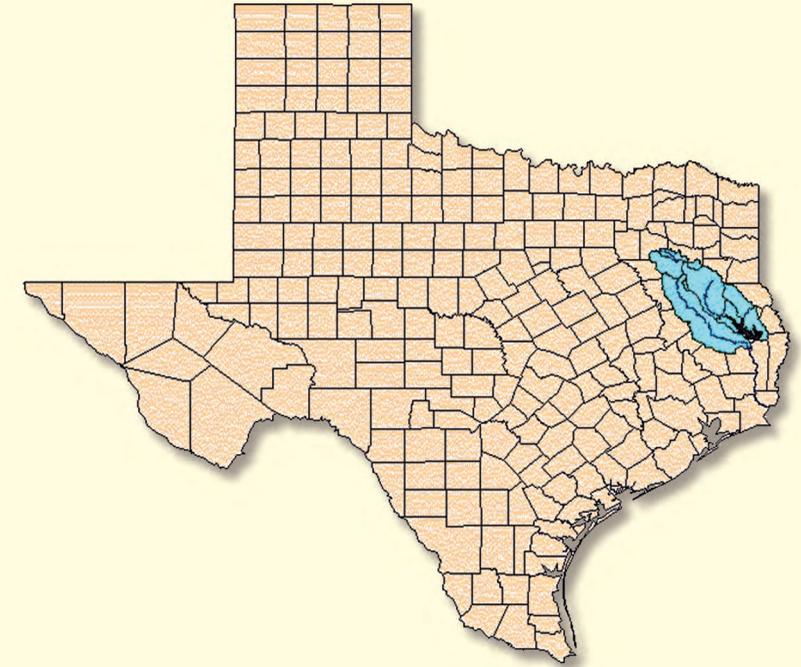
The Clean Rivers Program enables citizens and stakeholders of the Neches River Basin to meet periodically to review and discuss water quality issues. The forum that CRP provides and the input that ANRA has

received through this process, has led to the development of special projects, improved the planning of activities, and generated attainable objectives designed to resolve water quality issues and concerns. The activities which involve this type of coordination and cooperation with other basin entities include the annual coordinated monitoring meetings, basin steering committee meetings, volunteer environmental monitoring program, public meetings and investigations of water quality complaints. ANRA also works closely with the TCEQ regional offices in Beaumont and Tyler to coordinate monitoring activities and special projects in the basin. In addition, ANRA and the Lower Neches Valley Authority (LNVA) entered into an interlocal agreement in 2001 for the purpose of monitoring, inspecting, and testing the water quality in the Sam Rayburn Reservoir. The funds provided by the LNVA are used to enhance ANRA's OSSF program, perform additional water quality monitoring and data collection activities, and increase public education and outreach efforts for the Sam Rayburn Reservoir and surrounding areas.

### Upper Neches Basin Overview

The Upper Neches River Basin represents two major river basins in the State of Texas. The Angelina and Neches River Basins join 21 east Texas counties and encompass approximately 10,000 square miles. They combine to discharge an estimated 1.2 billion gallons of water each year to the Gulf of Mexico.

The Upper Neches River Basin originates in southeast Van Zandt county and extends southeast through the Piney Woods of East Texas to the confluence of the



Angelina and Neches Rivers. The Upper Neches River Basin, primarily located within the South Central Plains ecoregion, encompasses approximately 8,500 square miles and is approximately 150 miles in length with an average width of 65 miles. All or part of the following 17 counties are included in the basin: Anderson, Angelina, Cherokee, Henderson, Houston, Jasper, Nacogdoches, Newton, Polk, Rusk, Sabine, San Augustine, Shelby, Smith, Trinity, Tyler, and Van Zandt.

The principal tributaries within the Upper Neches River Basin are the Angelina River, Mud Creek, Attoyac Bayou, and Piney Creek. There are nine classified stream segments within this portion of the basin (Segments 0604, 0605, 0606, 0610, 0611, 0612, 0613, 0614, 0615), with two major reservoirs (Sam Rayburn Reservoir and Lake Palestine) and eight minor reservoirs (Lake Tyler, Lake Tyler East, Lake Jacksonville, Lake Athens, Striker Lake, Lake Nacogdoches, Kurth Lake, and Lake Pinkston) containing a total of 154,00 surface acres. The general topography of the Upper Neches River Basin is rolling hills with elevations ranging from 280 feet above mean sea level (MSL) to 500 feet MSL.

The Upper Neches River Basin receives average annual rainfall totals ranging from 36 inches in the northwestern portion of the basin to 50 inches in the area of the confluence of the Angelina and Neches Rivers. The average annual runoff is approximately 500 acre-feet per square mile of drainage area or approximately 3,725,000 acre-feet (about 1,200 billion gallons of water).

The Upper Neches River Basin is supported by groundwater from four aquifers:

Carrizo-Wilcox Aquifer	Gulf Coast Aquifer
Sparta Aquifer	Queen City Aquifer

Historically, the Upper Neches River Basin has been supported economically by silviculture, oil and gas activities, and varied agriculture activities. Light and heavy industries, steel manufacturing, and the recreation and tourism industry are significant contributors to the region's economy.

### Summary of the Upper Neches Basin Water Quality Characteristics

Watershed planning and management allows for the examination of the complex relationships that exist between water resources availability, utilization, and impact(s) within the Upper Neches River Basin. Water quality data pertaining exclusively to East Texas have been analyzed under the umbrella of the Clean Rivers Program. This data is being utilized to better define regional ambient water quality conditions in the Upper Neches River Basin and to formulate realistic, effective, and scientifically based approaches to water quality regulations and discharge permit criteria.

In 1997, the TCEQ developed a comprehensive Watershed Management Approach to address the water quality impairments identified in the Clean Water Act 303(d) List of impaired water bodies in Texas. The 303(d) List identifies and prioritizes the water bodies in Texas that need Total Maximum Daily Loads (TMDL) allocations. The Watershed Management Approach involves a 5-year cyclical approach that coordinates monitoring, modeling, standards, permitting, and planning efforts by basin. The five phases that were developed are:

- 1 - Scoping and Re-evaluation
- 2 - Data Collection
- 3 - Assessment and Targeting
- 4 - Strategy Development
- 5 - Implementation

The TCEQ discharge permits are issued according to a basin schedule over the five year cycle. The Basin Summary Report is completed during Phase 3- Assessment and Targeting of the Basin Management Cycle. Basin group A, which includes the Neches River Basin, is currently in this phase of the five year cycle.

In August 2000, the Texas Surface Water Quality Standards established nine classified segments in the Upper Neches River Basin with segment specific criteria for the protection of their designated uses (Table 2). To determine whether the designated uses are supported, water quality parameters are examined and compared to water quality criteria and screening levels found in the Texas Surface Water Quality Standards and the TCEQ's *Guidance for Assessing Texas Surface and Finished Drinking Water Quality Data, 2002*.

Overall, for the nine classified segments in the Upper Neches Basin, all segments are fully supporting the aquatic life use criteria for dissolved oxygen, three segments are not supporting and/or partially supporting the general use support criteria, and three segments are not supporting the contact recreation use. Two segments are not supporting the aquatic life use due to elevated levels of metals in water. Two segments are partially supporting the fish consumption use due to mercury levels in fish tissue. Five segments have secondary water quality concerns due to elevated concentrations of nutrients and/or chlorophyll a. These concentrations exceed screening levels established by the TCEQ since water quality standards have not been developed for Texas.



## 2.0 PUBLIC INVOLVEMENT

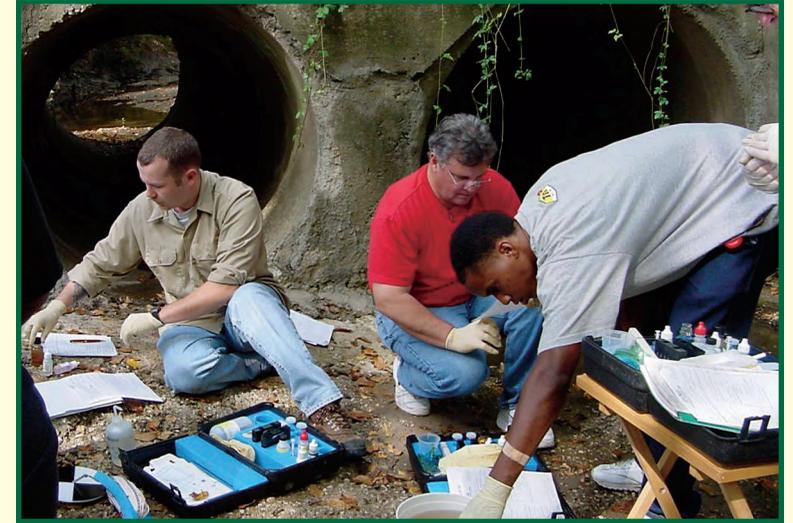
Public involvement is considered a primary means of building support and developing a broad-based constituency for water quality management and watershed assessments. Including the public and stakeholders in the process is a priority for the Clean Rivers Program and ANRA. ANRA continues to support public involvement and participation in the basin by hosting public meetings, sponsoring informational booths at area events, hosting volunteer environmental training workshops, and giving presentations to area groups. ANRA is currently a sponsor for the annual Neches River Rendezvous canoe trip coordinated by the Angelina County Chamber of Commerce. Public displays are available at both entrances to the ANRA offices which provide literature to the public on water quality, water conservation, volunteer monitoring, on-site sewage facilities, and educational material for schools.

ANRA remains an active supporter of volunteer environmental monitoring activities in the Upper Neches River Basin. As a partner in Texas Watch, an environmental monitoring program developed by TCEQ and funded primarily through federal CWA section 319(h) Nonpoint Source Pollution grants, ANRA provides training and support for students, teachers, and citizens in the basin who want to be involved in the environmental monitoring process. Currently, the ANRA volunteer network includes several volunteer groups consisting of approximately fifteen certified water quality monitors that collect data and observations at six different monitoring locations. ANRA utilizes the data collected by volunteers to assist

in developing local and regional management strategies. ANRA believes that the volunteer program provides the opportunity for the public to actively participate in the assessment of the Upper Neches River Basin. It is also a valuable educational tool that informs the public of local and basin-wide water quality issues and the importance of water quality monitoring.

The ANRA web page at <http://www.anra.org>, is another way to reach the public and inform them about the Clean Rivers Program. Included on the ANRA web page are current CRP activities, water quality reports, current monitoring tables and maps, CRP meetings and events, and links to the TCEQ, Texas Watch, and other CRP planning agencies. The website also provides public access to ANRA's water quality database. The database can be searched by the name of a water body or a list of monitoring stations is made available to help identify a water body or monitoring station near a particular area of interest. The on-line database is updated periodically to include current data which has been submitted to the TCEQ.

In addition, ANRA has included information on the website about the CRP Steering Committee for the Upper Neches Basin. This information includes the membership, role and goals of the Steering Committee as well as how the public can get involved in the process. Meeting announcements are posted on the website and the most recent meeting minutes and presentation materials are also available on-line.





### **ANRA Steering Committee**

ANRA's Clean Rivers Program activities are directed by the Clean Rivers Program Steering Committee. The Upper Neches River Basin Steering Committee was originally formed in late 1991 to serve in an advisory capacity for regional water quality assessment efforts. Since 1991, the Steering Committee has been instrumental in the CRP planning process and committee members continue to provide meaningful input and feedback to ANRA in the local watersheds. Members for this Committee were sought from federal and state agencies, local governments, industry, academic institutions, agricultural interests, conservation groups,

and other interested basin stakeholders. The Steering Committee membership is routinely evaluated and expanded to achieve greater public participation and input to Clean Rivers Program activities in the basin. A list of the 2004 CRP Steering Committee members is provided in Appendix A.

The Steering Committee will continue to serve as the primary public resource for providing general guidance and direction for ANRA's regional water quality efforts while increasing basin stakeholder participation. The Steering Committee is responsible for reviewing and approving ANRA's Clean Rivers Program biennial work plans and budgets for each contract period. The Committee assists ANRA with the following activities:

- creating specific, achievable water quality objectives and basin priorities
- reviewing, developing, and approving major basin reports
- establishing monitoring priorities; reviewing and developing monitoring plans
- identifying priority problem areas and developing action plans to address them

The ANRA Steering Committee meets on an annual basis, and more frequently as needed, to review information and provide guidance for ANRA's watershed management efforts. Steering Committee meetings have helped to develop a rapport and understanding between the many basin stakeholders. Steering Committee members are the medium through which information regarding water quality issues can be disseminated to stakeholders and the general public.

## **3.0 TECHNICAL SUMMARY**

### **3.1 Overview of the Technical Summary**

The technical summary provides a detailed review and assessment of water quality in each major watershed in the basin. The watersheds are divided up by the classified segments established by TCEQ for the river basin. In some cases, smaller segments are included in the watershed summaries of larger segments to simplify the process.

The watershed summaries provide an initial overview of the location and characteristics of each watershed. Information on population projections, endangered species, eco-region, soil types, and permitted outfalls is provided. The results of ANRA's comprehensive data review for each water body by monitoring station is presented in a summary table. The results of the data review as it pertains to the designated uses for each watershed are evaluated. If the designated uses are not supported or there is a water quality concern, further analysis and explanations are provided. The results of the trend analysis is incorporated into the explanations as needed. A spatial analysis of the watershed may also be included in the discussion. The TCEQ's Draft 2004 Texas Water Quality Inventory Report is reviewed for each watershed and further analysis and discussion is provided where an impairment is identified.

#### **TCEQ's 2004 Water Quality Inventory**

Every two years, states must assess the quality of their water and submit a report to the EPA detailing the extent to which each water body in the state meets



water quality standards. The TCEQ publishes this assessment report which it calls the Texas Water Quality Inventory and 303(d) List.

For 2004, the TCEQ conducted a targeted water quality assessment of 182 water bodies (out of the 731 assessed in 2002). The targeted water bodies were identified as concerns in 2002 because the data set for them was too small to allow for a full assessment, but a number of measurements did not meet the criteria defined in the standards. These 182 targeted water bodies were prioritized for more intensive monitoring over the last two years. The draft 2004 Water Quality Inventory provides an up-to-date status of them.

### **Changes in Assessment Methodology**

In 2002, the TCEQ specified a minimum number of samples for assessment. Support of designated uses in the water quality standards were assessed with a minimum of 10 samples, and concerns were identified with a minimum of four samples. For assessments that depend on the frequency of exceedances of a criterion to identify non-support of a use, a threshold number of exceedances was required. At the minimum sample set of ten samples, two or three exceedances, depending on the parameter, were required in order for the water body to be identified as partially supporting or not supporting the use.

For the 2004 assessment, the TCEQ has identified water bodies with small datasets as partially supporting or not supporting designated uses, without regard for sample size, provided they meet the threshold number of exceedances and are otherwise representative. This

change in assessment procedure was implemented due to the certainty that small data sets that already have the threshold number of exceedances will demonstrate partial or non-support of uses once more samples are collected to reach a total sample size of ten.

Due to this change in methodology, the TCEQ's 2004 draft assessment has identified several sites in the Neches basin as not supporting certain parameters that do not appear in ANRA's Data Review. The minor differences are based on ANRA following CRP prescribed assessment methodology requiring a minimum of ten samples. Any discrepancies between the two assessment results are identified in the data review portion of the relevant watershed summaries.

### **Technical Terms**

Technical terms specific to water quality assessments are used in the data review process. Explanations and definitions are provided below to help interpret and understand the data reviews included in the watershed summaries section.

*Texas Surface Water Quality Standards (TSWQS)* - State rules adopted by the TCEQ that are designed to establish numerical and narrative goals for water quality throughout the state and provide a basis on which the TCEQ regulatory programs can establish reasonable methods to implement and attain the state's goals for water quality.

*Texas Water Quality Inventory* - TCEQ carries out a regular program of monitoring and assessment to compare conditions in Texas surface waters to establish

standards and to determine which water bodies are meeting the standards set for their use, and which are not. TCEQ works in collaboration with the Texas Clean Rivers Program and other federal, state, regional, and local agencies to collect and assess water quality data. The results of the assessment are published periodically in the *Texas Water Quality Inventory and 303(d) List*, as required by Sections 305(b) and 303(d) of the federal Clean Water Act (CWA).

*Total Maximum Daily Loads (TMDL)* - A scientific model or study which determines the maximum amount of a pollutant that a water body can receive and still both attain and maintain its water quality standards. A TMDL allocates this allowable amount, or load, to point and non-point sources in the watershed. TMDLs must be submitted to the Environmental Protection Agency (EPA) for review and approval and a TMDL is normally prepared for each pollutant in the impaired water body.

*Aquatic Life Use* - The standards associated with this use are designed to protect plant and animal species that live in and around the water. They establish optimal conditions for the support of aquatic life and define indicators used to measure whether these conditions are met. Some pollutants or conditions that may violate this standard include low levels of dissolved oxygen, or toxic substances such as metals or pesticides.

*Contact Recreation Use* - The standard associated with this use measures the level of certain bacteria in water to estimate the relative risk of swimming or other recreational activities involving direct contact with the water. Recreational activities involving a significant risk