2005 Upper Neches Basin Highlights Report

Angelina & Neches River Authority

The Angelina & Neches River Authority (ANRA) is an independent governmental agency of the State of Texas created by the Texas Legislature in 1977. It is authorized to construct, maintain, and operate any and all works necessary for the purpose of controlling, storing, and preserving the water resources in a 17 county area in the Neches River Basin. ANRA is governed by a nine member Board of Directors appointed by the Governor of Texas to six year terms. ANRA receives no tax revenues from the state nor can it levy any taxes. Revenues are derived solely from the services provided and through customer contracts. Revenue bonds can be issued for the purpose of financing projects in the basin. The current functions of ANRA are water quality management, water resource development, water/wastewater utilities, and water conservation.

Texas Clean Rivers Program

The Texas Clean Rivers Program was created in 1991 by the state legislature to assess, maintain and improve the quality of water resources within each river basin in Texas. Through an ongoing partnership between the Texas Commission on Environmental Quality, river authorities, regional entities, industry, citizens, and other local, state and federal agencies, the Clean Rivers Program (CRP) utilizes a watershed management approach to identify and evaluate water quality issues, establish priorities for corrective action and work to implement those actions. ANRA has served as the CRP regional planning agency in the Upper Neches Basin since the inception of the program. The CRP is funded through fees from water/wastewater permits issues by the state. A Steering Committee consisting of basin stakeholders representing government, industry, and public interests provide input and guidance at regular meetings. These public meetings also provide a forum for citizens to participate with ideas and express any concerns involving water quality issues in the basin.

Upper Neches River Basin

The Upper Neches River Basin originates in southwest Van Zandt county and extends southeasterly through the Piney Woods of East Texas to the confluence of the Angelina and Neches Rivers at B.A. Steinhagen Lake. For Clean Rivers Program assessment purposes, the Neches River Basin is divided into upper and lower study areas. ANRA is responsible for the upper region and the Lower Neches Valley Authority (LNVA) in Beaumont reports on the lower region. The Upper Neches region is primarily located within the South Central Plains ecoregion and encompasses approximately 7,451 square miles. There are nine classified river segments consisting of two major reservoirs, eight water supply lakes, and the future Lake Columbia on Mud Creek. The principal tributaries in the basin are Mud Creek, Striker Creek, East Fork Angelina River, Piney Creek, Attoyac Bayou, and Ayish Bayou. The cities of Tyler, Jacksonville, Nacogdoches, and Lufkin are located in the river basin.

THE TEXAS CLEAN RIVERS PROGRAM

Prepared in cooperation with the
Texas Commission on Environmental Quality
under the authorization of the
Texas Clean Rivers Act

Summary of 2004 Highlights

The Basin Highlights Report provides an annual update of the current water quality activities and events in the Upper Neches River Basin. The 2004 highlights included the completion of the Basin Summary Report, implementation of an in-stream flow study, record rainfall in the basin, and the analytical testing provided by the ANRA laboratory.

2004 Basin Summary Report

ANRA's Basin Summary Report was completed during 2004 and is currently available on the ANRA web page. The Summary Report is completed every five years and provides a comprehensive review of surface water quality data in the Upper Neches River Basin. The report includes watershed summaries for each river segment in the basin. Each summary contains a description of the water quality conditions/issues, trend analysis by station and parameter, maps showing monitoring stations and water quality issues, a discussion of watershed characteristics and potential influences, and recommendations of water quality management strategies and potential sources of pollution. The data review and trend analysis results will be discussed further in this report. The Basin Summary Report is also available on ANRA's website.

Permit Support Monitoring Flow Study

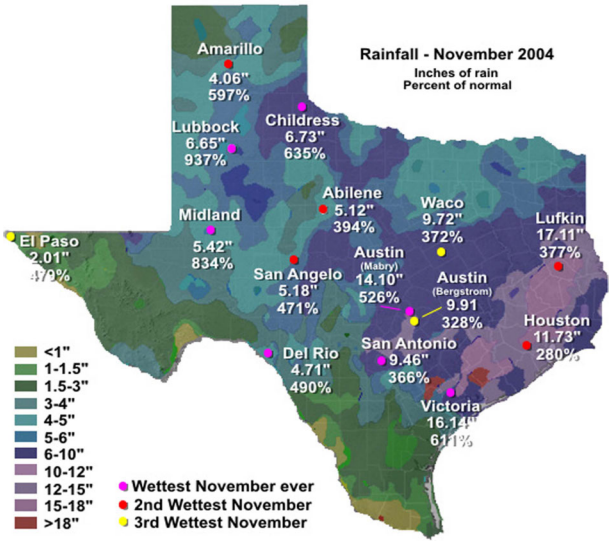
In January 2004, ANRA received additional funding from the Clean Rivers Program to conduct an in-stream flow study on several receiving streams in the basin. TCEQ provided a priority list of streams associated with discharge permits in the Neches River Basin. The planning for the study was initiated by ANRA staff in Nov. 2003 and involved numerous site visits to identify exact locations and determine accessibility issues. In a few cases, local input from the permitee was necessary to determine discharge locations and distances. Once the final list of sites was developed and the contract amendments approved by TCEQ, the study was implemented in March 2004.

ANRA will measure in-stream flows at six monitoring locations on a monthly basis for 18 months. The stations are located on five different receiving streams primarily upstream of the permitted discharge locations. The permit holders benefiting from this site-specific flow study include the City of Henderson, City of Whitehouse, International Paper Co. in Camden, and Clemsa Lumber Company near Lufkin. The information collected will be used to determine the seven day, 2 year low flows (7Q2) for each stream which will then be used in setting permit discharge limits. The study will also include the collection of field measurements (pH, Temp., Dissolved Oxygen, and Conductivity), field observations, and photographs at each location. A final report will be submitted to the TCEQ in August 2005.

ANRA staff collect in-stream flow measurements using a Flow Tracker Handheld Acoustic Doppler Velocimeter (ADV).

Record Rainfall and Flooding in 2004

November 2004 was the wettest November in Texas since comprehensive record keeping began in 1895 and 2004 may be the state's wettest year according to reports from NOAA. The Lufkin area received 17.11 inches of rainfall during the month of November and nearly 80 inches in 2004. In September, the eye of Hurricane Ivan came across the area and dumped seven inches of rain in a few hours. There was significant flooding in many areas of the basin. A graphic from NOAA shows the November rainfall totals from across Texas. ANRA has seen a correlation with the water quality data collected during this period, and it will be discussed further in this report.



ANRA Laboratory Analysis

During FY 2004, ANRA's Environmental Laboratory conducted all of the routine analytical testing for the Clean Rivers Program in the basin. Only dissolved metals in water were submitted to a contract laboratory. This marks the first time since the inception of the CRP, that all parameters except metals were collected and analyzed by ANRA. In addition to the CRP, other basin monitoring programs which provide data to the CRP (i.e. Sam Rayburn Reservoir and City of Tyler) utilized the ANRA Laboratory as well. Recently, ANRA hired a consultant to review the laboratory operation in preparation for the National Environmental Laboratory Accreditation Program (NELAP) adopted by the TCEQ. Additional information about the ANRA laboratory is included on page 16.

Increased Water Quality Monitoring

Water quality monitoring is increasing in the Upper Neches Basin through the CRP. The City of Tyler began monitoring quarterly in FY 2004 at four stations in the basin. The FY 2005 monitoring schedule includes 35 routine, 6 targeted flow, and 2 intensive monitoring stations. In addition, 5 routine stations are scheduled for additional 24-hour monitoring during the year. The Basin Highlights Report provides an overview of all water quality monitoring activities in the basin.

Overview of Water Quality Monitoring Programs

Through the Clean Rivers Program, ANRA conducts a basin-wide Surface Water Quality Monitoring (SWQM) Program that was established in 1996 to collect scientifically valid water quality data. Annual coordinated monitoring meetings are used to develop the monitoring schedules. All monitoring entities in the basin are invited to attend these meetings. The current FY 2005 Upper Neches Basin coordinated monitoring schedule, which includes ANRA, City of Tyler, and TCEQ monitoring stations (with parameters, frequencies and monitoring types), is available on the ANRA website at www.anra.org. There is also a link to the CRP Database of Coordinated Monitoring Schedules in Texas.

The Neches Basin Coordinated Monitoring Meeting is held annually at the LNVA Conference Center on Lake Sam Rayburn.

Types of Monitoring

Fixed Station/ Routine Monitoring is conducted in order to document long-term water quality conditions and characteristics over a variety of seasonal and flow conditions at fixed stations throughout the basin. ANRA currently performs quarterly routine monitoring at 23 routine stations in the basin. In addition, seven stations are monitored by ANRA monthly from March to November at the Sam Rayburn Reservoir, and the City of Tyler is monitoring four stations in the upper basin. All of these monitoring events are coded as **RT** on the coordinated monitoring schedule.

Systematic/ Intensive Monitoring is utilized to more thoroughly characterize water quality conditions in the basin and to investigate and detect areas of potential concern. ANRA is currently monitoring two stations which are coded with an **IS** on the coordinated monitoring schedule. Several systematic sites were converted to routine stations in the 2005 schedule because of the monitoring duration. Typically these types of stations are monitored for only two years.

24 Hour (Diurnal) Monitoring is designed primarily for the collection of 24-hour dissolved oxygen measurements, although other field parameters are collected. Coded as **DI** on the coordinated monitoring schedule, diurnal measurements are essential for characterizing the aquatic life use of a water body. These measurements allow scientists to analyze the daily variation in an aquatic system that cannot typically be seen with grab samples. ANRA will conduct 24-hour measurements at five routine monitoring stations during the year.

Permit Support Monitoring is developed in specific areas identified by TCEQ staff where additional information on water quality and quantity is needed for the permitting process. These may include studies to develop site-specific criteria, receiving water assessments, and characterization of low flow conditions. The TCEQ staff will use the water quality and flow data when calculating site-specific values for use in permit development. In March 2004, ANRA implemented an 18 month flow monitoring study. The monthly in-stream flow measurements are conducted at six monitoring stations to support four different discharge permits in the basin. The flow study sites are coded as **FL** on the coordinated monitoring schedule.

Water Quality Parameters

ANRA utilizes a variety of physical and chemical parameters to monitor the water quality in the basin. The following is a brief explanation by category of the various water quality parameters collected and analyzed by ANRA's monitoring programs.

Field Parameters

The field parameters are measured on-site by ANRA staff and include pH, Temperature, Dissolved Oxygen, and Specific Conductance. These parameters indicate the general health of an aquatic system. Great variations from routine conditions can cause serious health and reproductive problems in aquatic organisms. Just like the air we breathe, dissolved oxygen is used in respiration by aquatic organisms.

Bacteria

E. coli is the indicator bacteria used to identify threats for contact recreation use. High levels of these bacteria could mean that harmful enteric pathogens and viruses are present. *E. coli* is a coliform bacteria which is associated with sewage, because it is derived from the digestive tract of mammals.

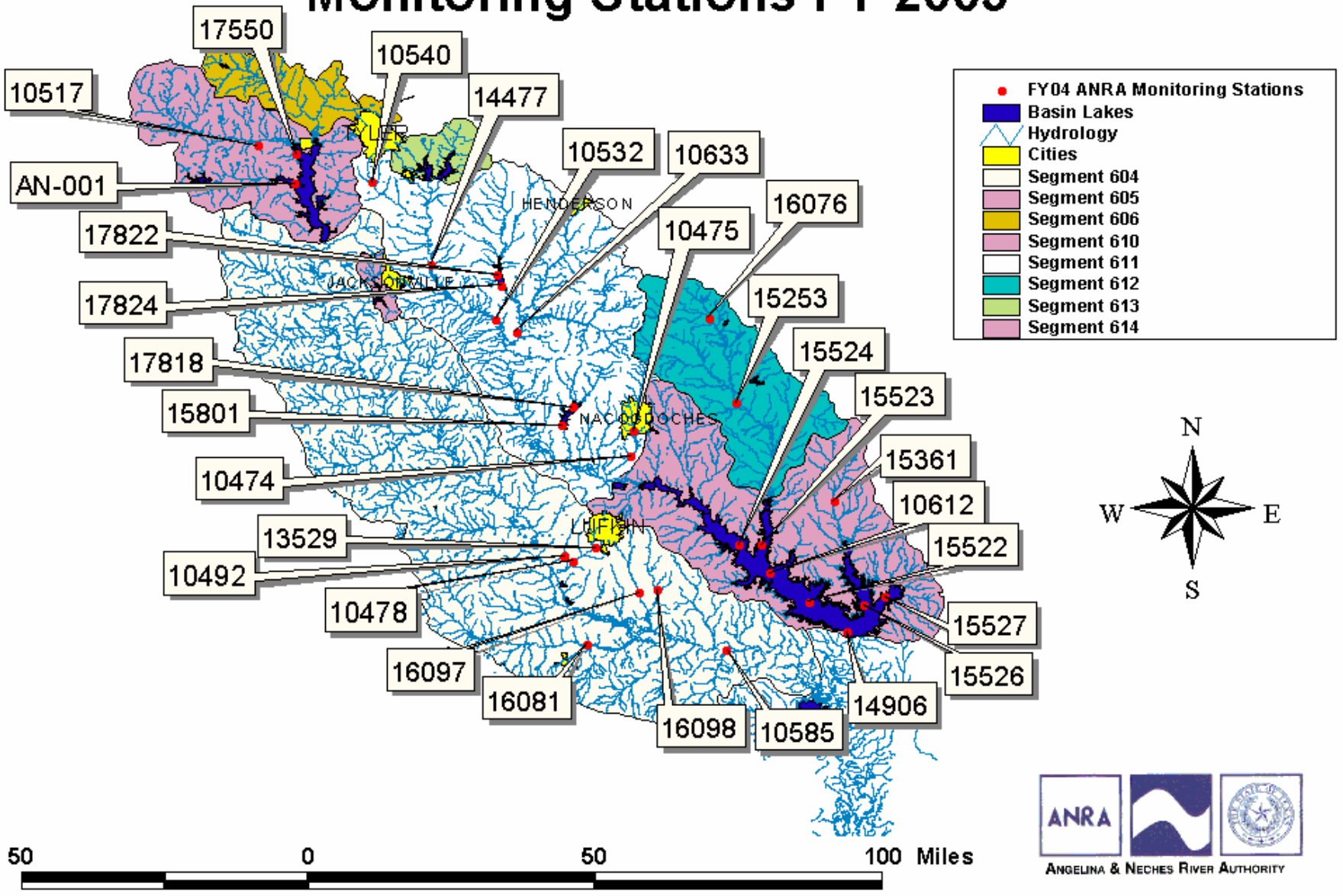
Conventional Parameters

Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Chloride and Sulfate are common constituents of wastewater and source waters. Their presence can create water that is aesthetically unpleasing, and in high concentrations may cause unwanted physiological reactions in aquatic organisms, especially aquatic plants. Phosphates, Nitrates, and Ammonia-Nitrogen are the important nutrients that can cause eutrophication. Eutrophication is defined as the process of enrichment of a water body due to an increase in nutrient loading. Eutrophic waters provide ideal conditions for the growth of algae and over time may cause algal blooms which decrease dissolved oxygen and can cause fish kills or other unpleasant effects. Common sources of these pollutants include domestic wastewater, detergents, urban stormwater runoff, and intensive agriculture.

Metals in Water

The metals in water currently analyzed are dissolved Cadmium, Copper, Chromium, Lead, Silver, Zinc, Nickel, Arsenic, Aluminum, Manganese, and Total Selenium, Mercury, and Hardness. Common inorganic metallic substances, such as copper and zinc, can act either as toxicants or as growth stimulators. Metals are normally present at low levels or in a nontoxic form, however they may become toxic under unusual, acid conditions. Inorganic substances are usually required in small amounts for all organisms but in greater amounts can be toxic. Metals in water are those which are available for uptake by organisms.

Figure B.1: ANRA Routine Monitoring Stations FY 2005



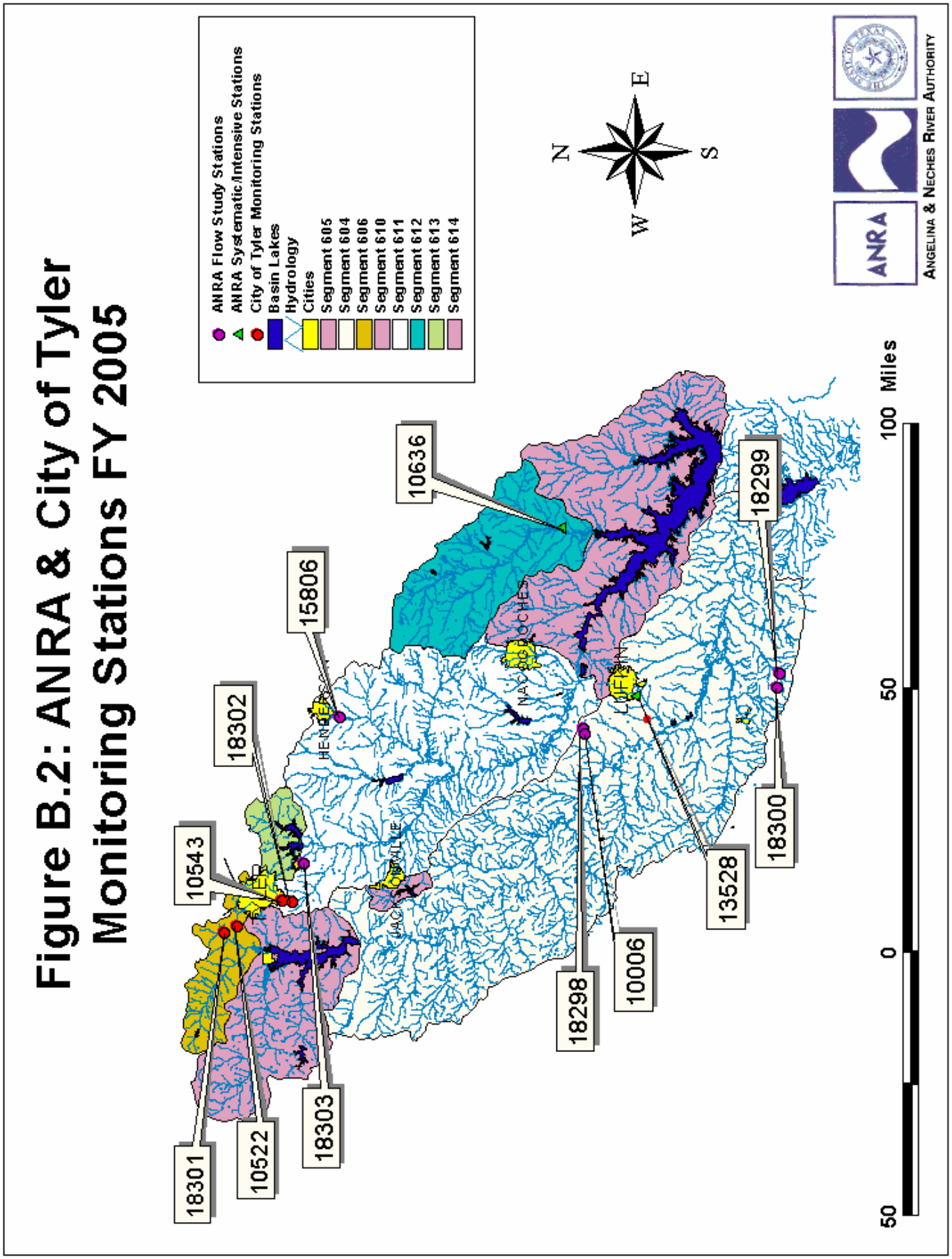


Figure B.2: ANRA & City of Tyler
Monitoring Stations FY 2005
ANRA Flow Study Stations
ANRA Systematic/Intensive Stations
City of Tyler Monitoring Stations
Basin Lakes
Hydrology
Cities
Segment 605
Segment 604
Segment 606
Segment 610
Segment 611
Segment 612
Segment 613
Segment 614
N
E
S
W
ANRA
Angelina & Neches River Authority
50
0
50
100 Miles
10636
15806
18302
10543
18301
10522
18303
18299
18300
13528
10006
18298
HENDERSON
NACOGDOCHES
JACKSONVILLE
JEFFERSON

Water Quality Data Review

The TCEQ assesses the status of the state's surface water quality every two years. The state's assessment report is submitted to the U.S. Environmental Protection Agency (EPA) to comply with the federal Clean Water Act, Sections 305(b) and 303(d). The report is published on the TCEQ website and is called the *Texas Water Quality Inventory and 303(d) List*.

Water Quality Inventory and 303(d) List

The draft 2004 Water Quality Inventory and 303(d) List was prepared by TCEQ and it was initially published in January 2004. After a 30 day public comment period, the report was re-evaluated and a revised report was published on November 23, 2004. A second public comment period was issued and the TCEQ is currently responding to the comments received. The period of record for the water quality data used in the 2004 assessment (Inventory and List) is March 1, 1998 to Feb. 28, 2003, which is the previous five years of quality assured data available to the TCEQ. The majority of the data used for the assessment is acquired through the Texas Clean Rivers Program.

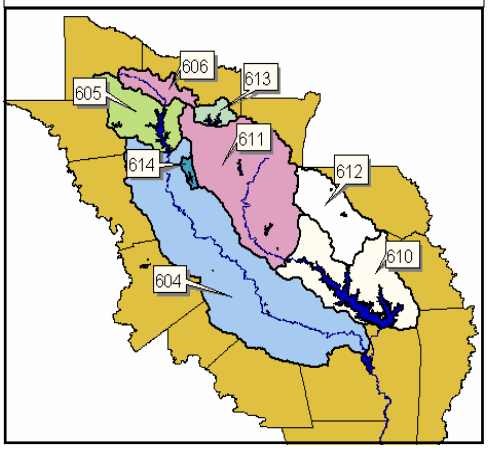
Surface Water Quality Standards

The Texas surface water quality standards are developed by the TCEQ and must be approved by the EPA. They serve as the foundation for managing surface water quality. A standard is a combination of a designated use and the criteria necessary to attain and maintain that use. They are the established goal for a body of water. The uses are the purpose for which the water should be fit, such as contact recreation, support of aquatic life, or drinking water supply. The criteria define the in-stream conditions necessary to support those uses. Criteria are either numeric limits on the amount of a certain pollutant that a water body may contain or narrative conditions on the water's color, odor, or turbidity. Some standards are applied generally to many different water bodies, while some are site-specific. Most water bodies will have multiple uses designated, i.e. a reservoir with a water supply use, contact recreation use, and aquatic life use.

Classified Segments

All major rivers, lakes and estuaries in Texas have been assigned tracking numbers, called *classified segments*. The classified segments are given numbers that correspond to the major river basin in which they are located. The Neches River has been divided into 15 classified segments and is designated as Basin 6. In the Upper Neches Basin there are nine segments which include four lakes. All tributaries which are monitored in the basin and are not part of the classified segment system are referred to as *unclassified segments*. These unclassified segments, both tributaries and lakes, are assigned the number of the classified segment of their watershed and a letter, i.e. 0604A.

Upper Neches Basin Classified Segments



Summary of the 2004 Assessment

The TCEQ conducted a targeted water quality assessment for 2004 on approximately 27% of the water bodies previously assessed in 2002. The 195 targeted water bodies were primarily ones identified as concerns in 2002 but limited data was available so a full assessment was not possible. These water bodies were prioritized for more intense monitoring over the last two years. In the Upper Neches Basin, there are 18 targeted water bodies included in the 2004 assessment and ten of those are unclassified segments.

Categories of Use Attainment

The TCEQ's Water Quality Inventory assigns each assessed water body to one of five categories to provide information to the public, EPA, and internal agency programs. The categories indicate the status of the water body, and how the state will approach identified water quality problems. Higher category numbers correspond to higher levels of effort required to manage water quality. Water bodies in Category 5 constitute the 303(d) List and require remedial action by the state to restore water quality. More specifically, Category 5a water bodies require the development of a Total Maximum Daily Load (TMDL). A plan to implement a TMDL upon completion and approval is also required. Additional information about TMDL's is available at http://www.tnrcc.state.tx.us/water/quality/tmdl/index.html. Water bodies in Category 1 are meeting all of their uses and simply require routine monitoring and preventive action.

ANRA's Water Body Ranking

For the purpose of easily interpreting the current assessment, ANRA has developed a water body ranking system based on the Draft 2004 Water Quality Inventory and 303(d) List. ANRA has ranked each water body included in the assessment based on the water body meeting the criteria established to support it's designated uses as outlined in the *Texas Surface Water Quality Standards*. The designated uses apply to all classified water bodies. The unclassified water bodies normally have to meet the criteria for aquatic life use, contact recreation use, fish consumption and the protection of human health. In addition, many unclassified lakes are designated as public water supplies.

Pages 8-15 of the Basin Highlights Report outline information for each classified segment in the Upper Neches Basin. Each segment's summary includes the current CRP monitoring schedule, assessment rankings, and a review of all planned data collection activities in the segment. Classified segments and corresponding unclassified segments are included in the summaries. Trend analysis results and graphs may also be used in the summaries.

ANRA Ranking of the Water Bodies

Exceptional: Attaining all applicable water quality standards and no use is threatened. (Category 1)

Good: Attaining most designated uses, no use is threatened, and insufficient data is available to assess the remaining uses. (Category 2)

Fair: Standard is not supported or is threatened for one or more designated uses, TMDL not required. (Category 4)

Poor: Currently on the 303(d) List, the water body does not meet applicable standards or is threatened for one or more designated uses by one or more pollutants. (Category 5)

Unknown: Insufficient or no data is available to determine if any designated use is attained. (Category 3)

Comparison of Surface Water Quality Assessments

The following information is a comparison of the water quality assessments used in ANRA's 2005 Basin Highlights Report and the 2004 Basin Summary Report. Any differences between the assessment results will be discussed in the water body rankings for each segment on the following pages (8-15).

2005 Basin Highlights Report

The Highlights Report essentially uses the latest Draft 2004 Texas Water Quality Inventory and 303(d) List issued by the TCEQ on November 23, 2004 to rank each water body in the basin. The five year period of record for the water quality data used in the 2004 Water Quality Inventory is March 1, 1998 to Feb. 28, 2003. The *2004 Guidance for Assessing Texas Surface and Finished Drinking Water Quality Data* was used for this assessment.

However, it is important to consider that the TCEQ conducted a targeted water quality assessment for 2004 on approximately 27% of the water bodies previously assessed in 2002. In the Upper Neches Basin, only 18 targeted water bodies were re-assessed in the 2004 Water Quality Inventory. The following list of classified and unclassified segments in the basin were re-assessed in 2004:

0604: Neches River Below Lake Palestine
- A. Cedar Creek
- B. Hurricane Creek
- D. Piney Creek
- M. Biloxi Creek

0605: Lake Palestine
- A. Kickapoo Creek

0606: Neches River above Lake Palestine
- A. Prairie Creek

0610: Sam Rayburn Reservoir
- A. Ayish Bayou

0611: Angelina River above Sam Rayburn Reservoir
- A. East Fork Angelina River

0612: Attoyac Bayou
- B. Waffelow Creek

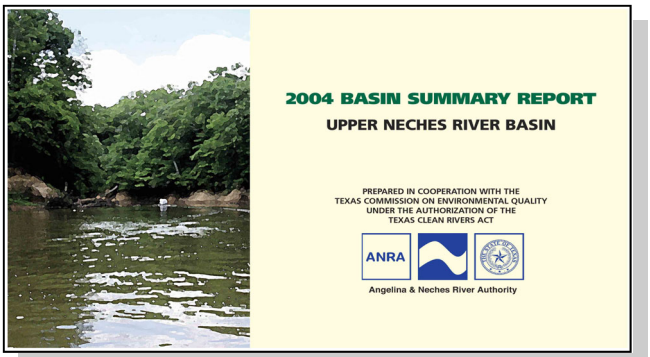
0613: Lake Tyler/Lake Tyler East

0615: Angelina River/ Sam Rayburn Reservoir
- A. Papermill Creek

For the 2004 assessment, the TCEQ 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.

2004 Basin Summary Report

The Summary Report included a comprehensive data review conducted by ANRA staff based on the *2002 Guidance for Assessing Texas Surface and Finished Drinking Water Quality Data*. The period of record for the data review was Sept. 1, 1998 to August 31, 2003. In some cases where the period of record did not meet the minimum number of samples (10), more recent data was used to complete the datasets.



ANRA's data review included 13 parameters primarily collected during routine monitoring visits by ANRA and TCEQ. This included any available 24-hour (diurnal) dissolved oxygen measurements. Dissolved metals in water and sediment were not included in the assessment. Additional information from TCEQ's Water Quality Inventory and 303(d) List was discussed in the watershed summaries sections. Ambient toxicity data was also obtained from the TCEQ and discussed in the appropriate watershed summaries.

In order to provide a comprehensive data review, the unclassified water bodies were assessed using the same criteria established for classified segments. This differs slightly from TCEQ's guidance for assessing general uses which says the water temp., pH, chloride, sulfate, and TDS criteria developed for classified segments do not apply to unclassified water bodies. However, dissolved oxygen and bacteria (E. coli) standards and nutrient screening levels apply to all water bodies.

In the 2002 assessment guidance, TCEQ specified a minimum number of samples for assessment. Support of designated uses in the water quality standards was 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.

Segment 604—Neches River Below Lake Palestine

The Neches River below Lake Palestine is by far the longest segment in the Upper Neches River Basin. Beginning in Anderson/Cherokee County at the Lake Palestine Dam and flowing 231 miles to the B.A. Steinhagen Reservoir in Jasper/Tyler County it has a drainage area of over 3,400 square miles. Segment 604 is routinely monitored by ANRA and both TCEQ Regions (5 & 10). The TCEQ regions monitor only the classified segment (Neches River) while ANRA conducts routine monitoring on both the Neches River and six unclassified segments in the watershed.

During FY 2005, additional monitoring is being conducted in the segment. TCEQ region 10 is conducting a special study to collect and analyze fish tissue on the Neches River at Hwy. 59. The study is part of a statewide fish tissue monitoring effort. ANRA is continuing an intensive survey on Cedar Creek south of Lufkin, and diurnal (24 hour) monitoring on Piney Creek and Biloxi Creek. Monthly targeted monitoring to measure in-stream flows was implemented in 2004 and will be completed during FY 2005. The flow sites in Segment 604 include Dabbs Creek, an unnamed tributary of Dabbs Creek, and Bodan Creek at two locations. ANRA's FY 2005 monitoring schedule for the segment is available on page 8.

0604—Neches River below Lake Palestine: Due to the length of the segment and the number of monitoring stations, the Neches River is divided into the Upper, Middle, and Lower regions. Each region has two monitoring stations which were included in the assessment. The ranking is assigned to each region as follows:

Lower Region (Lower boundary to SH 94 crossing West of Lufkin) - Most uses are fully supported, but the Contact Recreation Use was not assessed at the lower monitoring station and the Fish Consumption Use was not assessed at the upper monitoring station. ANRA's 2004 Summary Report indicates a primary concern for *E. coli* at the upper monitoring station.

Middle Region (SH 94 crossing to US Hwy. 84 East of Palestine) - Most uses are fully supported although the overall Aquatic Life Use is not supported due to chronic metals (lead) in water at the upper monitoring station. The Contact Recreation Use and Fish Consumption Use were not assessed at the lower monitoring station. The 2004 Summary Report shows a primary concern for *E. coli* at the lower monitoring station. This segment is currently a category 5c water body, therefore additional data will be collected before a TMDL or review of the water quality standards is scheduled.

Upper Region (US Hwy. 84 crossing to headwaters at the Lake Palestine Dam) - All designated uses are fully supported in this region of the segment although the Fish Consumption Use and Nutrient Enrichment were not assessed at the upper monitoring station. The 2004 Summary Report shows a nutrient concern for chlorophyll a at the upper monitoring station.

0604A—Cedar Creek: Contact Recreation Use is not supported in the lower area downstream of FM 2497 due to the bacteria (*E. coli*) levels. Nutrient Enrichment is a concern for ammonia-nitrogen and total nitrate+nitrite nitrogen in the same area. The 2004 Summary Report also indicates a concern for total phosphorus and ortho-phosphorus. It is a category 5c water body, and CRP routine/intensive monitoring will continue. (see page 9)

0604B—Hurricane Creek: Contact Recreation Use is not supported due to the elevated *E. coli* levels at SH 324 South of Lufkin. There is also a Nutrient Enrichment concern for ammonia-nitrogen at this location. The water body is a category 5c and routine monitoring will continue. (see page 9)

0604C—Jack Creek: Contact Recreation Use is not supported due to elevated bacteria (fecal coliform) levels. Nutrient Enrichment is a concern for ammonia-nitrogen and nitrate+nitrite nitrogen. The 2004 Summary Report also indicates a concern for total and ortho phosphorus and elevated levels of E. coli bacteria. It is a category 5c water body and routine monitoring will continue. (see page 9)

0604D—Piney Creek: Aquatic Life Use is not supported due to depressed dissolved oxygen (DO) in the lower 25 miles. The Contact Recreation Use is fully supported although a use concern based on limited data for bacteria in the upper 25 miles exists. The 2004 Summary Report indicates a concern for ammonia-nitrogen, partial support for low pH and dissolved oxygen, and a primary concern for 24-hour dissolved oxygen measurements. It is a category 5c water body and routine/diurnal monitoring will continue. (see page 9)

0604H—One Eye Creek: Aquatic Life Use is fully supported but the Contact Recreation Use and Nutrient Enrichment were not assessed. Limited data is available since the monitoring station was established in order to measure in-stream flows at a location immediately upstream of the City of Rusk WWTP in Cherokee County.

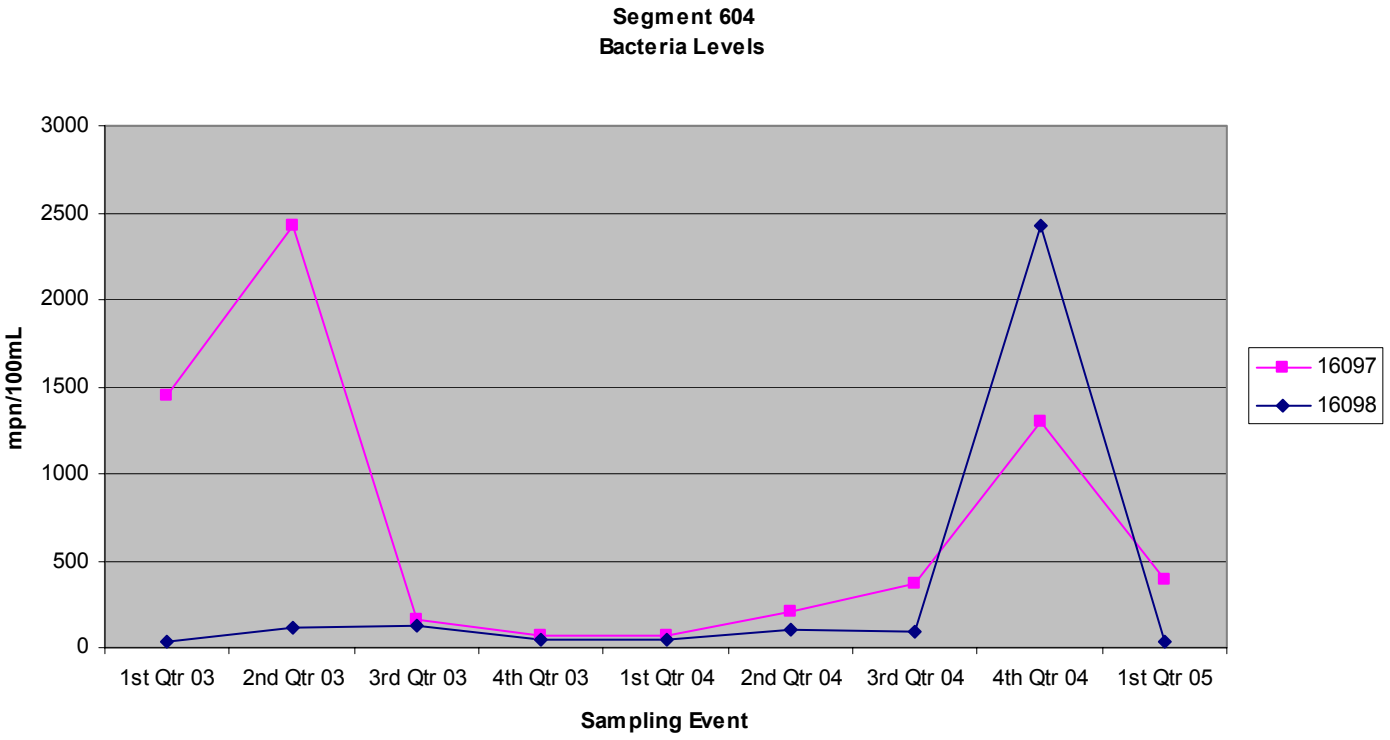
0604M—Biloxi Creek: Contact Recreation Use is not supported in the upper and lower portions due to *E. coli* levels. Both an Aquatic Life Use concern based on limited dissolved oxygen data and a Nutrient Enrichment concern for total phosphorus are listed. The 2004 Summary Report also includes a concern for ammonia-nitrogen and a primary concern for 24-hour DO measurements. It is a category 5c water body and routine/diurnal monitoring is ongoing. (see page 9)

0604N—Buck Creek: Most uses are fully supported although Fish Consumption Use was not assessed and Contact Recreation Use was not assessed at the upper monitoring station. ANRA routine monitoring is ongoing. (see page 9)

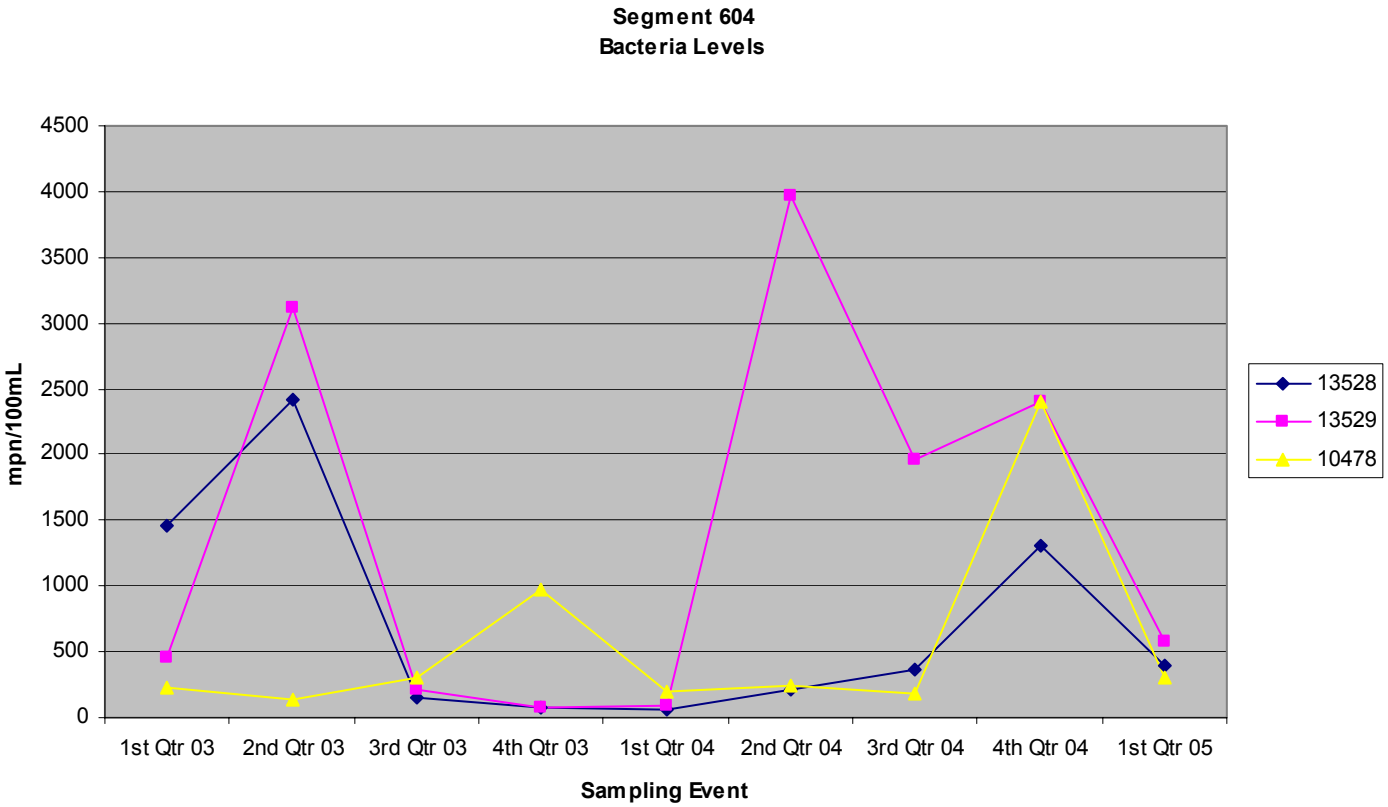
0604T—Lake Ratcliff: Fish Consumption Use is partially supported due to mercury in fish tissue. Other uses were not assessed. It is a category 5a water body and is included in a statewide TMDL project to address mercury in fish tissue.

Segment 604 - FY 2005 CRP Monitoring Schedule

ANRA Monitoring Stations								
Station ID	Station Description	Prog-Code	Monitoring Parameters					
			24 HR Monitoring	Metals Water	Conven-tionals	Bacteria	Inst. Flow	Field
18298	Bodan Creek at US 69	FL					12	4
18372	Bodan Creek at CR 17	FL					12	4
10478	Cedar Creek at FM 2497	RT		1	4	4	4	4
13528	Cedar Creek at CR 1336	IS			4	4	4	4
13529	Hurricane Creek at FM 324	RT		1	4	4	4	4
16081	Piney Creek at FM 1987	RT		1	4	4	4	4
16081	Piney Creek at FM 1987	DI	3				3	
16098	Buck Creek at FM 1818	RT		1	4	4	4	4
16097	Biloxi Creek at FM 1818	RT		1	4	4	4	4
16097	Biloxi Creek at FM 1818	DI	3				3	
10492	Jack Creek at FM 2497	RT		1	4	4	4	4
18299	Dabbs Creek at FM 942	FL					12	4
18300	Unnamed Tributary of Dabbs at FM 62	FL					12	4
10585	Neches River at US 69	RT		1	4	4	4	4



The above graph represents *E. Coli* data collected in FY 2003-2005 at Station 16097 (Biloxi Creek at FM 1818) and Station 16098 (Buck Creek at FM 1818). Biloxi Creek is currently not supporting the Contact Recreation Use, however Buck Creek is fully supporting the use. The high *E. coli* values or "spikes" occurred during periods of significant rainfall and thus increased flows. However, station 16098 did not spike during the 1st and 2nd quarters of 2003, therefore other factors are likely contributing to the increased levels at Biloxi Creek.



The above graph represents E. coli data collected in FY 2003-2005 in the Cedar Creek watershed south of Lufkin. Station 10478 is Cedar Creek at FM 2497, Station 13528 is Cedar Creek at CR 1336, and Station 13529 is Hurricane Creek at SH 324. Both 13528 and 13529 are located well upstream of station 10478 which is near the Neches River. The water quality standard for single grab E. coli samples is 394 mpn/100mL. Both Cedar Creek and Hurricane Creek are not supporting the Contact Recreation Use due to elevated levels of E. coli bacteria. The increased rainfall/flooding during 2004 likely contributed to the elevated bacteria levels or spikes at all three stations during the 4th quarter. The spikes in the 2nd quarter of 2003 at both 13528 and 13529 did not occur at station 10478 (Cedar Creek) downstream, and the spike at 13529 (Hurricane Creek) during 2nd quarter 2004 did not occur at the other two sites. There are no obvious explanations for these inconsistencies, but it does serve to reinforce the randomness of bacteria sampling in a large watershed with many contributing factors, including both point and non-point sources of pollution.

Segment 605—Lake Palestine

Lake Palestine impounds the Neches River from the Blackburn Crossing Dam in Anderson/Cherokee County to a point 4.2 miles downstream of FM 279 in Henderson/Smith County, up to a normal pool elevation of 345 feet MSL. Lake Palestine stretches for approximately 21 miles with a surface area of 25,560 acres, and the watershed has a drainage area of 714 square miles.

The major tributaries feeding Lake Palestine are the Neches River, Kickapoo Creek (Segment 605A), and Flat Creek. Both ANRA and TCEQ Region 5 conduct routine monitoring on Lake Palestine. In addition, ANRA conducts routine monitoring on Kickapoo Creek near Brownsboro.

0605—Lake Palestine: All designated uses are fully supported, however some uses were not assessed at a few locations due to limited data. There is a General Use concern based on limited data for high pH at the upper mid-lake/ Big Eddy Bay area, and Nutrient Enrichment Concerns for ammonia-nitrogen and nitrate+nitrite nitrogen at the headwaters of the Neches River arm. In addition, ANRA's 2004 Basin Summary Report indicates a concern for total and ortho phosphorus and a non-support of the total dissolved solids (TDS) standard in the upper lake region. It also includes a partial support of the pH standard and a concern for chlorophyll *a* in the upper mid-lake region. Routine monitoring by the TCEQ is ongoing in these areas of the lake.

0605A—Kickapoo Creek: Contact Recreation Use is not supported downstream of FM 1803 due to elevated bacteria levels. There is a Nutrient Enrichment Concern for ammonia-nitrogen in the same area. In addition, the 2004 Summary Report shows a partial support of the dissolved oxygen (instantaneous) criteria and a primary concern for 24-hour DO measurements. It is a Category 5c water body and routine monitoring by ANRA is ongoing. (see page 11)

Segment 605 - FY 2005 CRP Monitoring Schedule

ANRA Monitoring Stations								
Station ID	Station Description	Prog-Code	Monitoring Parameters					
			24 HR Monitoring	Metals Water	Conv	Bacteria	Inst Flow	Field
10517	Kickapoo Creek at FM 314	RT		1	4	4	4	4
18371	Lake Palestine at FM 315 (Flat Creek Pier)	RT			4	4		4
17550	Lake Palestine at FM 315 (North Crossing)	RT			4	4		4

Segment 606—Neches River Above Lake Palestine

The Neches River above Lake Palestine is from a point 4.2 miles downstream of FM 279 in Henderson/Smith County to Rhines Lake Dam in Van Zandt County. The segment is approximately 27 miles long and has a drainage area of 264 square miles.

Historically, the majority of the monitoring on Segment 606 has been conducted by the TCEQ Region 5 in Tyler. During FY 2004, the City of Tyler began quarterly monitoring on two unclassified segments or tributaries in the watershed. The following routine monitoring stations were established: 10522-Black Fork Creek upstream of Tyler's Westside WWTP and 18301-Prairie Creek at SH 110 NW of Tyler. Both stations will assess the water quality conditions above the permitted outfall on Black Fork Creek. The parameters collected by Tyler are identical to ANRA's routine parameters and the samples are analyzed by the ANRA laboratory.

0606—Neches River above Lake Palestine: The Aquatic Life Use is not supported for depressed dissolved oxygen and is partially supported for zinc (acute) in water from Prairie Creek to river mile 7.0. The zinc (chronic) in water was removed from the 2002 303(d) List. The General Use is partially supported for low pH in the upper area from river mile 7.0 to the headwaters. A Nutrient Enrichment Concern exists for nitrate+nitrite nitrogen in the lower region. There are Aquatic Life Use/General Use concerns for depressed dissolved oxygen, low pH, and an impaired macrobenthos community in the middle region. In addition, ANRA's 2004 Summary Report indicates the lower station is not supporting the *E. coli* standard and the upper station is not supporting the segment specific pH and sulfate standards. A primary concern for 24-hour DO measurements is identified at two stations. It is a Category 5c water body and routine monitoring is ongoing at two stations by the TCEQ Regional Office in Tyler.

0606A—Prairie Creek: The Contact Recreation Use is not supported due to elevated bacteria levels in the lower 4 miles. There is also an Aquatic Life Use concern for depressed dissolved oxygen in the lower 4 miles and zinc (acute) in water based on limited data in the upper 9 miles. Prairie Creek is a Category 5c water body and water quality monitoring is not scheduled during FY 2005 at these areas. However, the City of Tyler is monitoring on Prairie Creek well above the problem areas for DO and bacteria. Dissolved metals in water are not being collected at this time. The 2004 Basin Summary Report did not include Prairie Creek in the data review due to insufficient data.

ANRA conducted a CRP surface water quality monitoring training event for the City of Tyler staff in 2004.

Segment 606 - FY 2005 CRP Monitoring Schedule

City of Tyler Monitoring Stations								
Station ID	Station Description	Prog-Code	Monitoring Parameters					
			24 HR Monitoring	Metals Water	Conven-tionals	Bacteria	Inst. Flow	Field
10522	Black Fork Creek near Tyler WWTP	RT			4	4	4	4
18301	Prairie Creek at SH 110	RT			4	4	4	4

Segment 610—Sam Rayburn Reservoir

Sam Rayburn Reservoir is the largest reservoir wholly within the State of Texas. It extends from the Sam Rayburn dam in Jasper County to a point 3.5 miles upstream of Marion's Ferry on the Angelina River arm in Angelina/Nacogdoches County, and to a point 2.4 miles downstream of Curry Creek on the Attoyac Bayou arm in Nacogdoches/San Augustine County. The normal pool elevation is 164 feet with a surface area of 114,500 acres and 560 miles of shoreline.

During FY 2005, ANRA will continue to monitor seven routine stations across the Sam Rayburn Reservoir as part of an inter-governmental agreement with the Lower Neches Valley Authority (LNVA). The Sam Rayburn Water Quality Monitoring Program is conducted on a monthly basis from March through November and includes the same parameters as the CRP monitoring. ANRA will also monitor the Ayish Bayou at SH 103 for both routine and diurnal monitoring. The TCEQ Region 10 office in Beaumont continues to monitor quarterly at five routine stations and implemented a special study to collect for metals in sediment and Golden algae at three locations on the reservoir. Diurnal monitoring at one location is also scheduled. The TMDL project to address dissolved oxygen, pH, and aluminum in water is currently inactive pending further data collection. A Sam Rayburn Reservoir TMDL Project update is included in the Basin Projects section on the page 17.

0610—Sam Rayburn Reservoir: The Fish Consumption Use is partially supported in all assessed areas due to mercury in largemouth bass and freshwater drum. The aluminum in water was removed from the 2002 303(d) List. The contact recreation use, public water supply, and general uses are fully supported.

This segment was identified on the 2000 303(d) List as partially supporting the aquatic life use due to depressed dissolved oxygen levels. However, there has been an insufficient number of 24-hour dissolved oxygen values available in 2002 and 2004 to determine if the criterion is supported. This segment will be identified as not meeting the standard for dissolved oxygen until sufficient 24-hour measurements are available to demonstrate support of the criterion. Therefore, the Aquatic Life Use is only partially supported for depressed dissolved oxygen in the following areas: lower Attoyac Bayou arm, upper Angelina River arm, upper Ayish Bayou arm, and upper mid-Angelina River arm.

In addition, there is a sediment contaminants concern for arsenic, manganese, and zinc in sediment, and a narrative criteria concern for metals in sediment in many areas of the lake. A nutrient enrichment concern for total phosphorus is listed for the upper Angelina River arm and an aquatic life use concern for depressed dissolved oxygen in the upper Attoyac Bayou arm.

ANRA's 2004 Basin Summary Report indicates that segment 610 is fully supporting the aquatic life use based on instantaneous dissolved oxygen measurements. Since 24-hour data was not available, routinely collected instantaneous measurements (grabs) were compared to the surface water quality standards. Only one DO measurement from ten different monitoring stations on the reservoir was below the 3.0 mg/L grab sample criterion, and only three measurements were below the 24-hour average criterion of 5.0 mg/L. The Summary Report also indicates there is a nutrients concern in many areas of the reservoir. Five stations show a concern for ammonia-nitrogen, eight stations for nitrate+nitirite, and two stations for total phosphorus.

The reservoir is listed as a Category 5c water body and routine monitoring by ANRA will continue in FY 2005. (see table below)

0610A—Ayish Bayou: The Contact Recreation Use is not supported for bacteria in the lower portion downstream of US Hwy. 96. The middle and upper portions were also identified in prior assessments as not supporting the contact recreation use for bacteria. The Aquatic Life Use is fully supported and the Fish Consumption Use was not assessed. The 2004 Summary Report also indicates the Ayish Bayou is not supporting the *E. coli* standard. The water body is listed as a category 5c and routine/diurnal monitoring is scheduled for FY 2005. (see table below)

Segment 610 - FY 2005 CRP Monitoring Schedule

ANRA Monitoring Stations								
Station ID	Station Description	Prog-Code	Monitoring Parameters					
			24 HR Monitoring	Metals Water	Conventionals	Bacteria	Inst. Flow	Field
15361	Ayish Bayou at SH 103	RT		1	4	4	4	4
15361	Ayish Bayou at SH 103	DI	2					
10612	Sam Rayburn Reservoir at SH 147	RT			9	9		9
14906	Sam Rayburn Reservoir at Main Pool	RT			9	9		9
15522	Sam Rayburn Reservoir near Veach Basin	RT			9	9		9
15523	Sam Rayburn Reservoir adjacent to Alligator Cove	RT			9	9		9
15524	Sam Rayburn Reservoir near Shirley Creek	RT			9	9		9
15526	Sam Rayburn Reservoir near Needmore Point	RT			9	9		9
15527	Sam Rayburn Reservoir near Mill Creek	RT			9	9		9

Segment 611-Angelina River above the Sam Rayburn Reservoir

The Angelina River above the Sam Rayburn Reservoir extends from the aqueduct crossing 0.6 miles upstream of the confluence of Paper Mill Creek in Angelina/Nacogdoches County to the confluence of Barnhardt Creek and Mill Creek at FM 255 in Rusk County. Segment 611 is approximately 104 miles in length and has 2,008 square miles of drainage area. The major tributaries in Segment 611 include Mud Creek, West Mud Creek, East Fork Angelina River, and La Nana Bayou. This segment also includes Lake Striker, Lake Nacogdoches, Kurth Lake, and Pinkston Reservoir.

Surface water quality monitoring in Segment 611 is performed by ANRA, City of Tyler and both TCEQ Regions (5 & 10). During FY 2005, ANRA will continue routine monitoring at one station on the Angelina River and 9 stations on many of the unclassified segments, or tributaries. The tributaries include La Nana Bayou, Mud Creek, West Mud Creek, Lake Nacogdoches, and Lake Striker. The 4 stations on the two lakes were changed from systematic to routine in FY 2005. TCEQ Region 5 will also conduct a special study to collect fish tissue samples at Lake Striker. In addition, ANRA will continue the monthly targeted flow monitoring at two stations in the segment, Bromley Creek and Blackhawk Creek.

0611—Angelina River above Sam Rayburn Reservoir: Due to the length of this segment, it is divided into an upper and a lower region with two monitoring stations per region. The ranking is assigned to each region as follows:


Upper Region (FM 343 crossing to headwaters in Rusk County) - Contact Recreation Use is not supported due to elevated levels of fecal coliform bacteria at one of the monitoring stations. In prior assessments, there was a Fish Consumption Use concern for lead in water and a General Use concern for low pH based on limited data. However, they are both fully supported in the current (2004) assessment. ANRA's 2004 Basin Summary Report indicates one station in the upper region is not supporting the *E. coli* standard, partially supporting the pH criteria, and has a primary concern for 24-hour DO measurements. The water body is a Category 5c due to the bacteria impairment and routine/diurnal monitoring will continue. (see page 14)


Lower Region (Lower boundary to FM 343 in Nacogdoches/Cherokee Co.) - All designated uses are fully supported, however there is an Aquatic Life Use concern for chronic toxicity in water to aquatic organisms based on limited data. The 2004 Summary Report indicates one station in the lower region has a primary concern for *E. coli.* Routine monitoring will continue at both stations during 2005.


0611A—East Fork Angelina River: The Contact Recreation Use is not supported in one area based on the fecal coliform geometric mean. The Aquatic Life Use and Fish Consumption Use are not supported due to lead in water from prior assessments. Insufficient data was available for the latest assessment, however additional data has been collected by the TCEQ and it will be reassessed in 2006. It is currently a Category 5c water body and routine monitoring is ongoing at one station.


0611B—La Nana Bayou: The Contact Recreation Use is not supported due to bacteria (fecal coliform) levels in both the mid and lower sections below SH 7. The Aquatic Life Use is fully supported and the Fish Consumption Use was not assessed. There is a Nutrient Enrichment Concern for ammonia-nitrogen in the lower section. The 2004 Summary Report also indicates the water body is not supporting the *E. coli* standard at both stations. Ammonia-nitrogen, total phosphorus and ortho-phosphorus are listed as concerns and the dissolved oxygen criteria was partially supported. The water body is a Category 5c and ANRA will continue routine monitoring at two locations (see page 14). However, more intensive monitoring or a special study to address the bacteria levels should be considered.


0611C—Mud Creek: The Contact Recreation Use in the lower potion of the water body is not supported due to fecal coliform levels. However, the trend analysis included in ANRA's 2004 Summary Report shows a decreasing trend over time for fecal coliform. More recent *E. coli* data from the US Hwy. 84 monitoring station shows only a slight violation (147) of the geometric mean criterion (126). The upper monitoring station at US Hwy. 79 is fully supporting the bacteria (*E. coli*) standards. Aquatic Life Use is fully supported and the Fish Consumption Use was not assessed. The 2004 Summary Report indicates the *E. coli* standard is not supported at the lower station, and there is a concern for total phosphorus and a primary concern for 24-hour DO measurements at the upper station. The water body is a Category 5c for the bacteria impairment and routine/diurnal monitoring will continue at two locations. (see page 14)

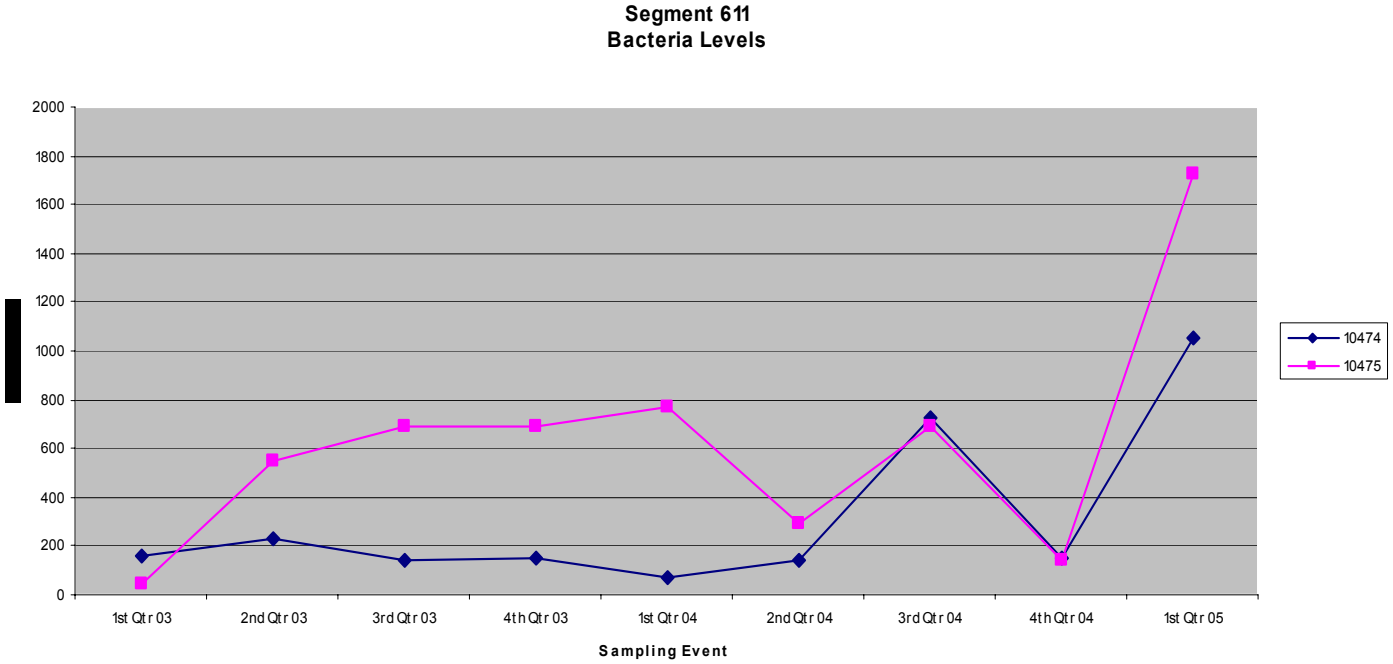

0611D—West Mud Creek: The Aquatic Life and Contact Recreation Uses are fully supported while the Fish Consumption Use was not assessed. There is a Nutrient Enrichment Concern for nitrate+nitrite nitrogen below US Hwy. 69. The 2004 Summary Report indicates additional concerns for ammonia-nitrogen, total phosphorus and ortho-phosphorus. Routine monitoring will continue during 2005 by both ANRA the City of Tyler. (see page 14)


0611H—Ragsdale Creek: The Aquatic Life Use is fully supported based on limited dissolved oxygen data. All other uses were not assessed due to limited data. No monitoring is currently scheduled although the City of Jacksonville routinely performs in-stream sampling to support regulatory compliance of their permitted wastewater facilities.


0611O—Lake Nacogdoches: The Public Water Supply Use is fully supported. No other uses were assessed based on limited data. Additional data will be available for future assessments since systematic/routine monitoring has been ongoing since FY 2003 at two locations. (see page 14)

Segment 611 - FY 2005 CRP Monitoring Schedule

ANRA & City of Tyler Monitoring Stations								
Station ID	Station Description	Prog-Code	Monitoring Parameters					
			24 HR Monitoring	Metals Water	Conven-tionals	Bacteria	Inst. Flow	Field
10633	Angelina River at SH 204	RT		1	4	4	4	4
10633	Angelina River at SH 204	DI	3				3	
10532	Mud Creek at US 84	RT		1	4	4	4	4
10540	West Mud Creek at FM 346	RT		1	4	4	4	4
10474	La Nana Bayou at Nac CR 526	RT		1	4	4	4	4
10475	La Nana Bayou at Loop 224 S	RT		1	4	4	4	4
14477	Mud Creek at US 79	RT			4	4	4	4
14477	Mud Creek at US 79	DI	3				3	
15801	Lake Nacogdoches at Main Pool	RT			4	4		4
17818	Lake Nacogdoches upper lake	RT			4	4		4
17824	Lake Striker near dam	RT			4	4		4
17822	Lake Striker upper lake	RT			4	4		4
18303	Blackhawk Creek at SH 110	FL					12	4
18302	West Mud Creek at US 69 (City of Tyler)	RT			4	4	4	4
15806	Bromley Creek 1 mile south of US 79	FL					12	4
10543	West Mud Creek at SSTP (City of Tyler)	RT			4	4	4	4



The above graph represents *E. Coli* data collected in FY 2003-2005 at Station 10474 (La Nana Bayou at CR 526) and Station 10475 (La Nana Bayou at Loop 224) South of Nacogdoches. La Nana Bayou does not support the Contact Recreation Use. Both stations had spikes during 3rd qtr. 2004 and 1st qtr. 2005. However, station 10475 consistently exceeds the *E. coli* standard of 394 mpn/100mL.

Segment 612—Attoyac Bayou

The Attoyac Bayou segment is from a point 2.4 miles downstream of Curry Creek in Nacogdoches/San Augustine County to FM 95 in Rusk County. The segment extends for approximately 82 miles until it enters the Sam Rayburn Reservoir, and it has a drainage area of 667 square miles.

During FY 2005, ANRA will continue routine monitoring at two locations on the segment. Intensive monitoring is scheduled at an additional station (SH 21 crossing) to collect dissolved metals in water only. The collection of metals at this location has been ongoing since FY 2003.

0612—Attoyac Bayou: The Contract Recreation Use is not supported in the upper and lower portions of the segment. The *E. coli* geometric mean was exceeded at both locations. There is also a Contact Recreation Use concern for fecal coliform in the upper station. All other uses are fully supported. The 2004 Summary Report also indicates the *E. coli* standard is not supported at two stations on the segment. No other concerns were identified. The water body is a Category 5c and routine/intensive monitoring will continue during 2005. (see table below)

0612B—Waffelow Creek: The aquatic life, contact recreation, and fish consumption uses were not assessed. The unclassified water body was removed from the 2002 303(d) List for bacteria. Additional data has not been collected since 1998.

0612C—Pinkston Reservoir: The Public Water Supply Use is fully supported. The aquatic life, contact recreation, and fish consumption uses were not assessed. Monitoring is not currently scheduled for this lake, however it will be considered in future planning meetings.

ANRA staff performs in-stream flow measurements on the Angelina River near SH 204.

Segment 612 - FY 2005 CRP Monitoring Schedule

ANRA Monitoring Stations								
Station ID	Station Description	Prog-Code	Monitoring Parameters					
			24 HR Monitoring	Metals Water	Conventionals	Bacteria	Inst. Flow	Field
16076	Attoyac Bayou at US 59	RT		1	4	4	4	4
10636	Attoyac Bayou at SH 21	IS		1				1
15253	Attoyac Bayou at SH 7	RT			4	4	4	4

Segment 613 - Lake Tyler & Lake Tyler East

Lake Tyler & Lake Tyler East impound Prairie Creek and Mud Creek from Whitehouse Dam and Mud Creek Dam in Smith County up to the normal pool elevation of 375 feet. They have a combined surface area of 4,880 acres. It is used as a public water supply for the City of Tyler.

The TCEQ regional office in Tyler has continually monitored this segment. During FY 2005, routine monitoring will continue at two stations on Lake Tyler and two stations on Lake Tyler East.

0613—Lake Tyler/Lake Tyler East: All designated uses are fully supported in the segment. In previous assessments, low pH was an issue, however the segment was reassessed using more recent data and it is now fully supporting the general use criteria. The parameter was removed from the 2002 303(d) List. ANRA's 2004 Basin Summary Report indicates all uses are fully supported and there are no additional concerns.

Segment 614 - Lake Jacksonville

Lake Jacksonville impounds Gum Creek from Buckner Dam in Cherokee County up to the normal pool elevation of 422 feet. It has a surface area of 1,320 acres. It is used as a public water supply for the City of Jacksonville.

The TCEQ regional office in Tyler has routinely collected data on Lake Jacksonville. During FY 2005, routine monitoring will continue at two stations on the lake. A special study is also scheduled to collect and analyze fish tissue samples.

0614—Lake Jacksonville: The Public Water Supply and General Uses are fully supported. The Aquatic Life, Contact Recreation, and Fish Consumption Uses were not assessed. Routine monitoring conducted by TCEQ in recent years will provide sufficient data to assess all uses in the future. The 2004 Summary Report shows the segment is fully supporting all uses and there are no additional concerns.

Segment 615 - Angelina River/Sam Rayburn Reservoir

This designated segment was created by the *2000 Texas Surface Water Quality Standards* and it consists of the riverine portion of Sam Rayburn Reservoir from a point 3.5 miles upstream of Marion's Ferry to a point 1.71 miles upstream of the confluence of Paper Mill Creek. It has a surface area of 3,555 acres.

TCEQ Region 10 in Beaumont has historically monitored this area of the lake. During FY 2005, routine monitoring will continue at three stations in the segment. Two stations are on the segment upstream and downstream of the confluence with Paper Mill Creek, and the other station is on Paper Mill Creek, an unclassified segment. Diurnal monitoring is scheduled for the downstream station. In addition to the routine monitoring parameters, color in water will also be measured at all three stations.

0615—Angelina River/Sam Rayburn Reservoir: The Aquatic Life Use is not supported due to depressed dissolved oxygen and an impaired fish community downstream of the confluence with Paper Mill Creek. The Fish Consumption Use is partially supported due to mercury in largemouth bass and freshwater drum species in the segment. The Contact Recreation Use, General Use, and Public Water Supply Use are fully supported. There is also an Aquatic Life Use concern based on limited data upstream of Paper Mill Creek for depressed dissolved oxygen and impaired habitat. There are Nutrient Enrichment Concerns for ammonia-nitrogen, nitrate+nitrite, total phosphorus, and ortho-phosphorus downstream and a nitrate+nitrite concern upstream. A Narrative Criteria Concern for color is listed for both the upstream and downstream portions of the segment. The 2004 Summary Report also includes a primary concern for 24-hour DO at both monitoring stations and a primary concern for *E. coli* at the lower station. The water body is a Category 5c and routine/diurnal monitoring by the TCEQ will continue during FY 2005.

0615A—Paper Mill Creek: The Aquatic Life, Contact Recreation, and Fish Consumption Uses are fully supported. However, an Aquatic Life Use concern based on limited data for depressed dissolved oxygen and acute toxicity in water to aquatic organisms is listed. A Nutrient Enrichment Concern for ammonia-nitrogen and total phosphorus, and a Narrative Criteria Concern for color are also included in the Draft 2004 Water Quality Inventory. The 2004 Summary Report indicates the DO standard is not supported based on instantaneous measurements, and there is a primary concern for *E. coli* and 24-hour DO measurements. Routine monitoring by the TCEQ will continue. Intensive surveys have been conducted by independent consultants in recent years, however the dataset is limited and therefore was not included in the 2004 assessment.

2004 Summary of Water Bodies with Concerns for Use Attainment

Segment ID	Segment Name	Concern Location	Use	Level of Concern	Parameter of
604C	Jack Creek	Upper 8 miles	Contact Recreation	Use Concern	Bacteria
604M	Biloxi Creek	Lower portion below CR 228	Contact Recreation Aquatic Life Use	Use Concern Use Concern-Limited Data	Bacteria Dissolved Oxygen
604M	Biloxi Creek	Upper portion above CR 228	Contact Recreation Aquatic Life Use	Use Concern Use Concern-Limited Data	Bacteria Dissolved Oxygen
0605	Lake Palestine	Upper midlake/ Bid Eddy Bay	General Use	Use Concern-Limited Data	High pH
0605A	Kickapoo Creek	Downstream of FM 1803	Contact Recreation	Use Concern	Bacteria
0606	Neches River above Lake Palestine	Prairie Creek to river mile 7.0	Aquatic Life Use General Use	Use Concern Use Concern	Bacteria Low pH
0606	Neches River above Lake Palestine	Prairie Creek to river mile 7.0	Aquatic Life Use	Use Concern-Limited Data	Macrobenthos Community
0606A	Prairie Creek	Lower 4 miles	Contact Recreation Aquatic Life Use	Use Concern Use Concern	Bacteria Dissolved Oxygen
0606A	Prairie Creek	Upper 9 miles	Aquatic Life Use	Use Concern-Limited Data	Zinc in water
0610	Sam Rayburn Res.	Upper Angelina River arm Upper Attoyac Bayou arm	Aquatic Life Use Aquatic Life Use	Use Concern Use Concern	Dissolved Oxygen Dissolved Oxygen
0611	Angelina River above Sam Rayburn Res.	Lower boundary to FM 1911	Aquatic Life Use	Use Concern-Limited Data	Chronic Toxicity in water
611B	La Nana Bayou	Mouth to unimproved road near FM 3228/1275	Contact Recreation	Use Concern	Bacteria
0612	Attoyac Bayou	Bear Creek to headwaters	Contact Recreation	Use Concern	Bacteria

Table continued on the next page.

2004 Summary of Water Bodies with Concerns for Use Attainment (continued)

Segment ID	Segment Name	Concern Location	Use	Level of Concern	Parameter of Concern
0615	Angelina River/Sam Rayburn Res.	Downstream of Paper Mill Creek	Aquatic Life Use Aquatic Life Use	Use Concern Use Concern-Limited Data	Dissolved Oxygen Dissolved Oxygen
0615	Angelina River/Sam Rayburn Res.	Upstream of Paper Mill Creek	Aquatic Life Use Aquatic Life Use	Use Concern-Limited Data Use Concern-Limited Data	Dissolved Oxygen Impaired Habitat
0615A	Paper Mill Creek	Lower 9 miles	Aquatic Life Use	Use Concern-Limited Data	Acute Toxicity in Water
0615A	Paper Mill Creek	Lower 9 miles	Aquatic Life Use	Use Concern-Limited Data	Dissolved Oxygen

Upper Neches Basin Projects

Sam Rayburn Reservoir TMDL Update

The Total Maximum Daily Load (TMDL) Project for Dissolved Oxygen, Aluminum, and pH in the Sam Rayburn Reservoir was initiated in July 2002. It began with an evaluation of all existing sampling data including the draft 2002 303(d) List. Based on this evaluation, there are no impairments that currently require a TMDL. Therefore, the project is inactive pending further data. The conditions that caused initiation of this project will be addressed in the following ways:

- Data indicated that the current aluminum standard for the reservoir may be inappropriate. The TCEQ Water Quality Standards Program conducted a water effects ratio (WER) and determined the standard should be revised.
- TCEQ Regional Office will conduct additional 24-hour monitoring for dissolved oxygen over the next two years to assess conditions for the aquatic life use.
- The most current five years of data indicate that the pH standard is being met.
- Bio-West will conduct intensive surveys in Papermill Creek and design a monitoring project based on that data to determine the effects of discharges from the creek on the Angelina River Arm of the reservoir.

ANRA and the TCEQ will continue routine data collection to assess compliance with the standards applicable to the reservoir. TCEQ will work with the Clean Rivers Program in the Neches River Basin utilizing ANRA and LNVA to keep the public informed of the status of TMDL activities at the reservoir. Additional information about the TMDL project is available at the following website: http://www.tnrcc.state.tx.us/water/quality/tmdl/rayburn.html

ANRA's Lake Columbia Water Supply Project Update

The current phase for the Lake Columbia project is the US Army Corps of Engineers (USACE) 404 permitting process. This process will address a number of environmental issues. The 404 permit application was filed in the fall of 2000. In August 2003, the Texas Water Development Board (TWDB) approved a loan application submitted by ANRA. The approval of the loan commitment for $10 million will allow several tasks to be completed. Phase One will finance the Environmental Impact Statement (EIS). This comprehensive study will cost around $1 million and take approximately 18-24 months to complete. Phase Two will finance land appraisals and surveying for the reservoir. Phase Three will finance the acquisition of land for the reservoir.

The loan commitment from the TWDB for the release of the Phase One portion of the loan contains a condition that the Pre-Construction participants must sign an amended contract to guarantee repayment of the loan. All of the participants have passed and approved the amendment with some of them increasing their percentage share in the project. The ANRA staff worked closely with the TWDB to ensure that the participants had all of the information they needed to make informed decisions. In August 2004, ANRA was notified by the Ft. Worth office of the USACE that they reviewed the Statement of Qualifications submitted by ANRA for several environmental contractors, and determined that ANRA's first preference is fully acceptable to the USACE. The environmental firm, R.J. Brandes Co. will team with Horizon Environmental and RRC to perform the EIS study.

ANRA's Environmental Laboratory

During FY2004, the ANRA Environmental Laboratory underwent numerous changes, including the hiring of a new Laboratory Manager and an additional Environmental Analyst partially funded by the Clean Rivers Program. In addition to changes in staff, the laboratory has been able to upgrade or replace several key pieces of equipment that has allowed the laboratory to expand its analytical services for the Upper Neches Basin Water Quality Monitoring Programs.

In the past, the ANRA Laboratory was able to conduct testing in-house for ammonia, total dissolved solids, total suspended solids, and *E. coli*, with all other parameters being analyzed by a contract commercial laboratory in Houston. By adding additional staff and equipment, the laboratory has been able to add multiple tests to our in-house capabilities, including nitrate+nitrite, ortho-phosphorus, total phosphorus, chloride, sulfate, total hardness, and chlorophyll. The ANRA Laboratory now conducts the analysis for all water quality samples, with the exception of dissolved metals in water and metals in sediment. By performing this testing internally, ANRA has been able to reduce costs and turn-around times, improve quality assurance, and gain additional project oversight.

During FY 2005, the ANRA Laboratory received funds from the Clean Rivers Program to contract with IIM Laboratory Quality Consultants (IIMLQC) in Houston. IIMLQC provides professional consultation of quality assurance activities and assistance related to the development, implementation, and documentation of the laboratory. More specifically, IIMLQC has been contracted to provide consultation related to the assessment, determination of need requirements, and guidance for laboratory operations compliant to the National Environmental Laboratory Accreditation Program (NELAP).

Stakeholder Participation and Public Outreach

Stakeholder participation and public outreach is an important aspect of the Texas Clean Rivers Program. In fact the Clean Rivers Act states that, "A truly comprehensive watershed assessment program must allow for the participation of stakeholders and other interested parties in the development of water quality objectives and priorities for each river basin". CRP defines a stakeholder as any individual or entity that has a vested interest in the basin's waters, and includes the general public, institutions, government, industry, fee payers, and other interested parties. Stakeholder participation to help determine the direction of each basin's CRP activities is accomplished through the Steering Committee process.

A public outreach program gives the public and concerned citizens an opportunity to stay informed, get involved and make a difference. ANRA's public outreach activities consist of volunteer water quality monitoring, environmental education events, public meetings, and the ANRA web page.

Upper Neches Basin Steering Committee

The Steering Committee for the Upper Neches Basin meets publicly at least once a year in the Lufkin/Nacogdoches area. The Steering Committee provides input to ANRA's Clean Rivers Program and assists in developing water quality objectives, establishing basin priorities, reviewing CRP workplans, allocating resources, reviewing major reports, and identifying water quality issues in addition to other activities.

A Steering Committee Meeting was held on April 28, 2004 at the Fredonia Hotel and Convention Center in Nacogdoches, Texas. Topics discussed included the FY 04-05 CRP workplan/ budget, ANRA's water quality data review report and trend analysis, Draft 2004 Basin Summary Report, Upper Neches River basin coordinated monitoring schedule, and updates on basin water quality projects. The meeting was well attended and the interactions and discussions were very helpful and informative. The meeting minutes and presentation handouts are currently available on the ANRA web site. Anyone interested in becoming a member of the Steering Committee may contact ANRA Project Manager, David Hancock at (936) 633-7541 for more information.

Volunteer Environmental Monitoring

Volunteer Environmental Monitoring allows anyone interested in the environment and water quality, the opportunity to conduct water quality monitoring in areas close to their home. ANRA serves as the Texas Watch regional partner for the Upper Neches Basin and provides training, monitoring kits, and replacement reagents to the volunteer monitors in the basin.

ANRA supports a number of volunteer monitoring groups in the basin. The largest and most active group are members of the Greater Lake Palestine Council (GLPC), a group of representatives from each Property Owner's Association surrounding Lake Palestine. The GLPC is concerned about protecting water quality in Lake Palestine and making other improvements in the area. Currently, the GLPC volunteers and the staff at ANRA are coordinating with the Texas Watch Program at Texas State University to plan a regional volunteer meeting as well as a data analysis workshop to take place later this Spring. All of the data collected by the volunteer monitors is easily accessible via the internet using the data viewer at www.texaswatch.geo.swt.edu. ANRA appreciates the efforts of all volunteer monitors in the basin and encourages others to participate in the Texas Watch Program. For information about ANRA's Volunteer Monitoring Program, please contact Matt Romig at (936) 633-6435 or e-mail info@anra.org.

Lake Palestine at Flat Creek public boat ramp and pier in Henderson County

ANRA's Web Page

Another means of reaching the public and providing water quality information is through the ANRA web page at www.anra.org. The ANRA web page is a great place to find out information about the Clean Rivers Program as well as other ANRA projects. The Clean Rivers Program section includes general information about the program and information on how to get involved. The site also includes CRP water quality reports, water quality data, basin-wide coordinated monitoring schedule, GIS maps and helpful links to the TCEQ, Texas Watch, and other CRP planning agencies. The site is routinely updated to include current CRP activities and upcoming events/meetings.

Getting Involved

The Angelina & Neches River Authority strives to involve the public in its activities, whether it is through volunteer monitoring programs, public outreach events, or the Steering Committee process. As water becomes more important everyday, so does the need for everyone to get involved. Please contact ANRA at (936) 632-7795 or e-mail: info@anra.org.